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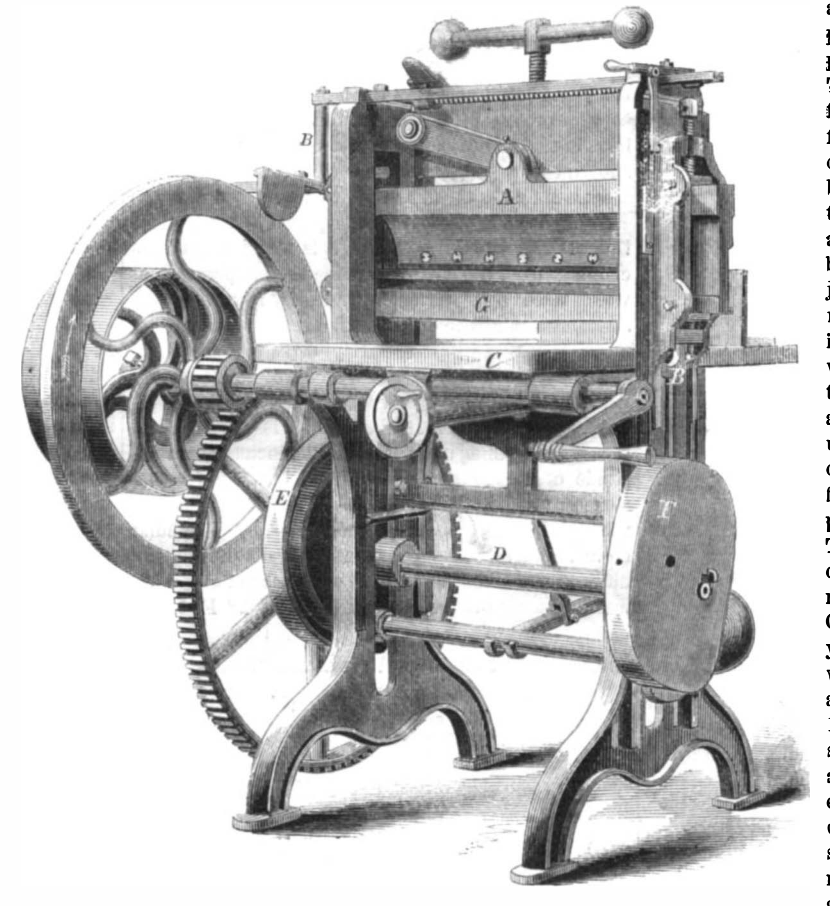
Improved Paper-cutting Machine.

This machine will commend itself to mechanics and paper-makers by reason of its trim and neat appearance, and the judicious disposition of its parts to obtain the end desired. When we add that it is efficient, well made, and performs its work with ease and accuracy, we give it strong commendation.

To cut paper in bulk requires very much more power than most persons have any idea of. When screwed up in a mass so that it is firmly held under the knife, it is almost as dense as hard wood, and the cutter can only be driven through it by sheer force; consequently a great deal of ingenuity can be shown in designing such machines. They frequently have to be worked by hand power, and the mechanical combinations, therefore, to get the greatest effect with the least space and weight, are not unworthy of the time bestowed upon them. The details of this machine are as follows:—A is the knife bar; B is one of the slides in each of which one end of the knife bar works; C is the table on which the paper to be cut is placed, and D is the main shaft, the ends of which sustain the cams, E and F; these cams are connected with the slides, by means of which they give motion to the knife bar. They are so constructed that in moving down the bar they bring down the ends a short distance, alternately, thus giving a sawing or oscillating motion to the knife during its cutting stroke. G is a clamp by which the paper is held firmly down to the table. The shaft, D, is turned to the point which gives the knife bar its highest elevation, and the paper to be cut is then placed in proper position on the table, C, and fastened by screwing down the clamp, G; the shaft is then put in motion rotating the cams, drawing the knife bar downward making the oscillating cut already described, through the material to the table, C, then quickly elevating the knife bar again to the position at starting, when the operation may be repeated. This is a superior machine, substantially and thoroughly made. The cut being made by cams gives great power during the cut, and throws the knife up quickly to its stopping place. The cams always bring down the edge of the knife to the same spot and never gouge or split the strip of wood or lead, which is cut against, and the oscillating as well as sliding motion of the knife, makes it cut easier, cleaner and with less strain than when the ends of the knife move parallel. The edge of the knife holds well and is not liable to crack out in nicks. The cams run the knife down and up while turning in the same direction, and there are no slips, clutches, or reverse motions about it. The machines are built in the machine shop of the Cincinnati Type Foundery Co., 201 Vine street, Cincinnati, Ohio.

A patent is pending before the Patent Office, having been applied for through the Scientific American Patent Agency.



WELLS'S PAPER-CUTTING MACHINE.

Brick Machines.—C. F. Loosey, Esq., Austrian Consul, No. 2 Hanover-square, this city, wishes to correspond with manufacturers of brick machinery.

Cheap Automatic Regulator of the Electric Light.

It is well known that during the action of the electric light, particles of carbon are carried over from the positive to the negative electrode, increasing the distance between the points, and thus diminishing or extinguishing the light. Various plans have been devised to regulate the distance between the points so as to keep the light constantly. Mr. Samuel Highly communicates to the *London Atheneum* the following description of a cheap device for this purpose:—The principle of this "Pneumatic Electric Regulator" was suggested to the author by Mr. Malden. The instrument is sensitive in action, and, from its simplicity, little liable to get out of order, and can be arranged for any length of carbon. The rod supporting the upper carbon is attached to a copper float, which rests upon a column of water, contained in a chamber communicating by an opening with an air chamber, from which a pipe, terminated by a flexible tube of vulcanized rubber, is carried under a wedge-shaped piece attached to the rod holding the lower carbon, and which passes through a stout coil of insulated wire. When the carbons are brought into contact the current passes through, and the coil becomes magnetic, pulls down the iron core, and separates the carbon, so as to produce the proper arc of light; at the same time forcing down the wedge upon the flexible tube, closing it as effectually as with a stop-cock. As soon as the distance between the poles becomes too great for the current to pass freely, the coil ceases to be magnetic, and the lower rod is raised slightly by means of a lever and counterpoise spring. Air is thus forced from the chamber by the column of water; the float sinks, bringing down the upper carbon into contact with the lower one; the current is thus again completed; the coil becomes magnetic, and pulls down the iron core, pressing the stop-cock wedge upon the upper tube. These operations are repeated sympathetically as the carbon burns away.

Double-rod Cornish Man Engine.

The rods are connected by link rods to the horizontal arms of a pair of levers, whose two limbs are bent at right angles to each other, which are supported on a braced timber framing placed above the mouth of the shaft. The ends of the vertical arms are firmly connected together by two flat wrought-iron rods. The motion of the driving crank is transmitted by a long wooden beam linked to the vertical limb of the left-hand angle lever. The rods are guided by broad rollers of cast iron, with projecting flanges at the sides in the model; these are placed alternately in front and at the back of the rods, which would necessitate changing the side on which the platforms are attached; this arrangement is not used in practice. A resting place or platform is provided at every 10 fathoms. The guide rollers are placed at 8 fathoms distance apart. The diameter of the path of the crank is 10 feet. Two double-rod man engines have been built in Cornwall; the first was put up in the year 1843 at Tresavean, a mine which is now abandoned; the other, at the United Mines, was put up in 1845, and is still at work. The Tresavean engine was carried down to a depth of 290 fathoms; it was driven by a steam engine of 36 inches diameter of cylinder, and 6 feet stroke, making 15 revolutions per minute, which was reduced by spur gearing to one-fifth, or 3 strokes per minute on the rods; the latter were uniformly 8 inches square throughout. The speed at which the men were lifted was 72 feet per minute, 24 minutes being requisite for the entire journey of 290 fathoms. The United Mines engine has the section of the rods tapered, varying from 7½ inches square in the upper 60 fathoms to 7 inches in the next length of 100 fathoms, and 6½ in. in the last 50 fathoms. The driving power is furnished by a steam engine of 32 inches cylinder diameter and 6 feet stroke, which also works a pair of crushing rollers; the speed is reduced by gearing wheels to one-sixth of that of the engine, which runs at 18 revolutions per minute, the rods making three oscillations during the same period. The time required for traveling the whole distance of 200 fathoms is 17½ minutes.

Messrs. Beck, of the Branksea Pottery, Poole, Dorset, are exhibiting in the West London Exhibition a patent perforated 24-inch drain pipe. The invention, which is due to Mr. Whitton, the foreman potter at the above works, consists in a series of longitudinal perforations in the substance of the pipe. This allows the heat to act upon the interior of the clay to a far greater extent than heretofore, and causes the clay to burn much harder, producing a better pipe,

VARIATIONS IN THE BOILING POINT.

The temperature at which any given liquid boils, although perfectly fixed under certain conditions, is nevertheless influenced by several circumstances, such as—1st, the nature of the vessel in which it is boiled; 2d, the presence of matters in solution in the liquid; and 3d, and most important of all, the variation of the pressure of the atmosphere upon its surface.

INFLUENCE OF ADHESION ON THE BOILING POINT.

Adhesion of the liquid to the surface of the vessel which contains it has a marked effect in raising the boiling point. In consequence of this action, water sometimes boils at 214° in a glass vessel, but the temperature falls to 212°, and continues to boil steadily at this point if a pinch of metallic filings be dropped in. If the interior of the vessel be varnished with shellac, the boiling will often not occur till a temperature of 221° is reached, and then will take place in bursts, the temperature falling to 212° at each gust of vapor. So again the presence of a little oil elevates the boiling point of water three or four degrees. The experiments of Donny have thrown light upon some of causes by which ebullition is facilitated. He has found that the presence of air in solution singularly assists the evolution of vapor. From the increased elasticity which the dissolved air acquires by the addition of heat, minute bubbles are thrown off in the interior of the liquid, especially where it is in contact with a rough surface; and into these bubbles the steam dilates and rises. By long boiling of the water, the air becomes nearly all expelled; in such a case the temperature has been observed to rise even as high as 360° in an open glass vessel, which was then shattered with a loud report, by a sudden explosive burst of vapor. In such circumstances the force of cohesion retains the particles of the liquid throughout the mass in contact with each other, in a species of tottering equilibrium; and when this equilibrium is overturned at any one point the repulsive power of the excess of heat stored up in the mass suddenly exerts itself, and the result is an explosion with the instantaneous dispersion of the liquid. The difficulty of expelling air completely, even from a small bulk of water, can be adequately conceived by those only who have attempted it; ebullition *in vacuo* for a very considerable period is not sufficient to effect it. In the slow freezing of water the air previously held in solution is perfectly expelled. In consequence of this absence of air, if a lump of ice free from air bubbles be immersed in heated oil, so as to melt it without allowing it to come into contact with air, the temperature of the water may be raised many degrees above its boiling point, and it will then be suddenly converted into steam with explosive force. Dufour finds that many liquids may be heated far beyond their normal boiling point, by suspending them in the midst of a liquid of equal density, but which can be heated sufficiently without itself beginning to boil. If the globule of suspended and superheated liquid be touched with any solid body it bursts into vapor with explosive violence.

Where the latent heat of the vapor is low, and the liquid has comparatively little adhesion to air, as is the case with alcohol, or ether, or sulphuric acid, frequent bumping or irregular boiling occurs, endangering the vessel and its contents.

INFLUENCE OF THE SOLUTION OF SOLIDS IN A LIQUID ON ITS BOILING POINT.

Any force that acts in opposition to the repulsive energy of heat produces a corresponding rise in the boiling point; so that the solution of a salt in water, by the influence of adhesion, always elevates the point of ebullition, and the more so the larger the quantity of salt added. Indeed it has been supposed that the quantity of salt required to produce a certain rise of temperature might be employed as a measure of the amount of adhesion between the liquid and the salt in solution.

INFLUENCE OF PRESSURE ON THE BOILING POINT.

Since ebullition consists essentially in the rapid formation of vapor of an elasticity equal to that of the atmosphere which is exerting its pressure on the surface of the liquid, any diminution of that pressure should be attended with a corresponding depression of the boiling point; and it is a fact that water which has long ceased to boil under the usual atmospheric pressure, may be at once made to enter into ebullition by placing it under the receiver of the air-pump, and exhausting the air; by this means water may be made to boil at a temperature of 70° F. Indeed, liquids in general boil *in vacuo* at from 60 to 140° below their ordinary point of ebullition when under a barometric pressure of thirty inches. This result may be shown by boiling some water in a Florence flask, and corking up the flask while the steam is escaping rapidly. Upon pouring cold water over the upper part of the flask the steam is condensed, its pressure is removed, and the water begins to boil briskly; but in this case, the bubbles nearly all rise from the surface, not from the bottom of the liquid. A simple proof that steam from boiling water possesses an elasticity equal to that of the atmosphere is obtained by repeating the last experiment with a tin canister, instead of a globular flask. On corking up the canister, and pouring cold water over it, the steam within is suddenly condensed, a vacuum is produced, and the canister is crushed in by the pressure of external air.

The reduction of temperature at which boiling takes place is advantageously applied in the preparation of vegetable extracts, the medicinalp roperties of which would be impaired by the ordinary temperature of 212°, and by exposure to the air. The apparatus consists of a still and a receiver, which are connected by an air-tight joint, and are filled with steam to expel atmospheric air, and then hermetically sealed; on cooling the receiver, rapid evaporation and ebullition take place at a temperature much lower than that of the usual boiling point of the liquid. A modification of this process is used in the manufacture of sugar, both in the concentration of the cane juice and in the subsequent evaporation of the sirup.

MEASUREMENT OF HIGHTS BY THE BOILING POINT.

As might be expected in consequence of the diminution of atmospheric pressure, it is found that on ascending from the earth's surface the temperature at which water boils becomes gradually lower. In descending a mine the effect is reversed, and the boiling point becomes proportionately elevated. De Saussure observed that on the summit of Mont Blanc, which is 15,650 feet (nearly three miles) above the sea-level, water boils at 185°·8; and Wisse determined the boiling point upon Mount Pichincha, at an altitude of 15,940 feet, to be 185°·27 while the barometer stood at 17·208 inches. The observation of the point at which water boils at any particular elevation furnishes an easy means of determining its altitude above the sea level; a difference of about 596 feet of ascent producing a variation of 1° F. in the boiling point of water.

BOILING POINT OF WATER AT DIFFERENT PRESSURES.

Boiling Point. Deg. Fah.	Barometer Inches.	Boiling Point. Deg. Fah.	Barome er Inches.
184	16·676	200	23·454
185	17·047	201	23·937
186	17·421	202	24·441
187	17·803	203	25·014
188	18·196	204	25.468
189	18·593	205	25·992
190	18·992	206	26·529
191	19·407	207	27·068
192	19·822	208	27·614
193	20·254	209	28·183
194	20·687	210	28·744
195	21·124	211	29·331
196	21·576	212	29·922
197	22·030	213	30·516
198	22·498	214	31.120
199	22·965	215	31·730

The preceding table shows the temperature at which water boils at the corresponding hights of the barometric column, calculated by Regnault, and confirmed by direct observation.

The necessity of attending to the hight of the barometer at the time of making a careful observation upon the boiling point of any liquid will now be obvious. It has been ascertained that a variation of one-tenth of an inch in the barometric column makes a difference of more than a sixth of a degree F. in the boiling point; so that within the range of the barometer in this climate the boiling point of water may vary 5°.

HIGH PRESSURE STEAM.

As a reduction of the pressure lowers the boiling point, so an augmentation of the pressure raises it. To demonstrate this fact, an apparatus has been contrived, consisting of a small iron boiler furnished with three apertures in the lid, through one of which a thermometer stem is passed air-tight; through the second, a long glass tube, open at both ends, is inserted; the lower extremity of this tube plunges below the surface of mercury placed in the boiler, above which a quantity of water is introduced; the third aperture must be furnished with a stop-cock. It will be found, on applying heat, that so long as free communication with the atmosphere is permitted through the open stop-cock, the temperature of ebullition will remain steadily at 212°; but by closing the cock, the steam may be confined, and as fresh portions of steam continue to rise from the water, the pressure on the surface increases, as is shown by the rise of the mercury in the open tube; the boiling point also becomes higher; until when the mercury stands at 30 inches, and the pressure on the surface is equal to that of an additional atmosphere, the thermometer marks a temperature of 249°·5. By continuing the heat without allowing the steam to escape, the boiling point rises still higher, and the elasticity of the steam increases with increasing rapidity as the temperature rises, as is shown by the following table founded upon the experiments of Regnault:—

TEMPERATURE OF STEAM AT HIGH PRESSURES.

Pressure in atmospheres of 30 inch mercury.	Temp. Deg. F.	Rise in temp. for each additional atmosphere—Deg.	Pressure in atmospheres of 30 inch mercury.	Temp. Deg. F.	Rise in temp. for each additional atmosphere—De .
1	212·0	37·5	11	364·2	6·9
2	249·5	23·8	12	371·1	6·7
3	273·3	17·9	13	377·8	6·2
4	291·2	14·8	14	384·0	6·0
5	306·0	12·2	15	390·0	5·4
6	318·2	11·4	16	395·4	5·4
7	329·6	9·9	17	400·8	5·1
8	339·5	8·9	18	405·9	4·9
9	348·4	8·2	19	410·8	4·6
10	356·6	7·6	20	415·4	—

These results differ but little from those obtained under the direction of Dulong and Arago, by a commission appointed for the purpose many years ago by the French Government. They found the temperature of steam of 20 atmospheres to be 418°·4, and calculated that if the elasticity rose to 50 atmospheres the temperature would amount to 510°·4.

It will be observed that the increase of elasticity, by equal additions of heat, is more rapid at high than at low temperatures, and this circumstance (in addition to the greater simplicity of construction of the machinery in high-p essure engines) is one of the principal reasons for the increased economy of power obtained in employing high-pressure steam as a motive power, when compared with that furnished by the use of low-pressure engines. But it is only when in contact with a body of water from which fresh steam is constantly rising, that the elasticity augments in this manner, and thus produces a force sufficient to rend asunder the strongest vessels. If dry steam alone be heated, it follows the law which regulates the expansion and elasticity of gaseous bodies in general.

High-pressure steam while confined is always of the temperature of the water from which it is produced; it is, therefore, often used in the arts to supply a steady temperature above that of 212°. It is found that the solvent powers of water are much increased by the elevation of temperature caused by preventing the free escape of the steam. Papin's digester is an apparatus designed to effect this object; it is simply a strong iron vessel, furnished with a safety-valve for regulating the pressure at which the steam is allowed to blow off. The water may thus be kept steadily at any required temperature above 212° as long as is requisite. The gelatin of bones may by this means be easily extracted from the earthy matter, although the bones may be boiled for hours in water at 212° without undergoing any such change. —*Prof. Miller.*

Artificial Pearls.

Artificial pearls or beads are of various kinds; most generally they consist of solid masses of glass, with a hole drilled in them; or they are blown hollow, and then filled out with metallic luster grains, wax, or with the fine scales of the bleak fish, which have a silvery and pearly luster.

The art of imitating pearls is attributed to a manufacturer of beads, of the name of Janin or Jalquin, who lived at Paris in 1680; he was led to the discovery by seeing, one day, the scales of the bleak fish swimming in a trough, where the fish detached them by rubbing against each other, and he at once conceived the idea of applyingethese scales for imitating the orient of the pearls, by mixing them with a mucilage and filling the interior of hollow glass bulbs, and he gave this natural and wonderful production the name of Extract of Orient—a very singular name, but still significant of the meaning of its employment. It is well known that this little white fish, the bleak, is found in abundance in the rivers Seine and Marne, in France, and in many small rivers in Sweden, Germany and Italy. The bleak fish fructify around water-mills, where they are caught by nets.

For the purpose of extracting the color of the scales of the fish, they are rubbed pretty hard in the fresh water collected in a stone basin, which settles down in the bottom of this vessel; the sediment is then pressed out through a linen rag, and they are then replaced again in fresh water and left there to settle for several days, when the water is drawn off and the precipitate is carefully collected; this is called the extract or essence, and it requires from seventeen to eighteen thousand fish to obtain five hundred grammes (a little over one pound).

The scales being animal matter are therefore liable to decomposition, and for their preservation numerous chemical agents have been employed by the different manufacturers, all of whom, who have succeeded, keep it a secret; it is, however, known that liquid ammonia is added to the paste of the scales.

The operation of the manufacture is very difficult, but an experienced workman can manufacture six thousand pearls a day.

The chemists have experimented for some years to imitate the extract of orient—as it requires such a large quantity of fishes to obtain any amount of the scales—and, according to Mr. Barbot, the following preparation has produced a favorable result: which is by distilling one part of oxide of bismuth and two parts of corrosive sublimate; the product is a species of butter, which on redistilling yields metallic quicksilver and a very fine powder; this is the substance used for orientalizing or coating the artificial pearls with the true gloss of an Oriental pearl.

The same scales are likewise used to coat beads of gypsum, or alabaster, which are soaked in oil and then covered with wax, to give them a pearly appearance. The Roman beads are made in this manner: the scales are dissolved either in liquid ammonia or vinegar, and the solution or liquid is used for covering those artificial beads. The Turkish rose-beads are made of an odoriferous paste and are turned afterward like those of coral, amber, agate, or other hard substances. The knitting beads are sold in meshes of one hundred and fifty, or twenty strings, of fifty beads each, of various colors; and the large glass beads in meshes of twelve strings. There are numerous manufactories in Germany and Italy of the various kinds of beads, which are used to a very great extent both in Africa and North and South America. Germany exports yearly from its different manufacturing places, such as Heidelberg, Nuremberg, Sonnenberg, Meistersdorf, in Bohemia, and Mayence, more than a million dollars' worth. In Venice are large establishments for the finest cut beads.

Nuremberg manufactures, besides glass beads, considerable quantities of amber beads. In Gablontz, in Bohemia, more than six thousand persons are engaged in the manufacture of beads, that are made of pure glass, or of a composition. From the glass-houses, which are very numerous in Bohemia, the rods of different sizes are delivered to the glass mills for cutting, which is performed by water power or by hand. In 1828 there were in that neighborhood one hundred and fifty-two mills in operation; a number of glass-blowers were likewise engaged, who possessed great dexterity in blowing the small beads with the assistance of a small blow-table. In the manufactory of George Benedict Barbaria, at Venice, six hundred varieties of beads are constantly making; and that of Messrs. Gaspari and Moravia manufactures, besides the beads, every article of jewelry from the same material.

The rose beads of Steffansky and Tausig are made of bread crumbs, which are beaten up with rose water in a wooden mortar, until they become a uniform mass, to which is added some otto of roses and drop-lake, when it is made into beads with dissolved gum tragacanth; for the black rose beads, Frankford black is substituted in the place of the drop-lake.

Lamaire, of France, manufactures beads equal in luster and beauty to real pearls. He adds to 1,000 ounces of glass beads, 3 ounces scales of the bleak-fish, ½ ounce fine parchment glue, 1 ounce white wax, 1 ounce pulverized alabaster, with which he gives them an external coating.

Rouyer manufactures his beads, also in France, from opal, which he covers with four or five layers of dissolved isinglass, and then with a mixture of a fat oil, spirits of turpentine, and copal, so as to prevent their becoming moist. In order to render them of the peculiar luster of the Oriental pearls, they are covered with a colored enamel. The opal is fused into rods by a lamp, over which is laid a brass wire to support it; the wire is held in one hand and the opal in the other, and the wire is then kept turning until the bead has the desired size and roundness; if a colored enamel is to be applied, the beads are made but half the required size, which being done, they are once more covered with the opal, then the solution of isinglass is used, and lastly the varnish. Beads made in this manner are with difficulty distinguished from the Oriental pearls.

The best method of making artificial pearls, is certainly by means of pulverized real pearls. Either the smallest, or the deformed large specimens, may be reduced to a fine powder, and then soaked in vinegar or lemon-juice, and the paste made up with gum tragacanth; they may then be cut out with a pill machine, or a silver mold, of any desired size, and when a little dry, inclosed in a leaf and baked in an oven: by tin amalgam, or by the silver of the scales of young fish, the proper luster may be given.

The shad fish, as well as the white fish of our lakes, must yield an extract of orient, of as good a quality as the bleak fish of the Seine, and it is to be hoped that some enterprising mechanic may take an opportunity of preparing the white matter adhering to the scales of the fish just mentioned, either for export or for the purpose of imitating pearls, which may be done as well in this country as anywhere else.

Notes on New Discoveries and New Applications of Science.

DR. VOGEL'S RESEARCHES ON THE CHEMICAL ACTION OF LIGHT.

Some experiments upon the chemical action of light which have for some time past been occupying the attention of Dr. Hermann Vogel, of Berlin, have resulted in a discovery which cannot but have an important influence upon the art of photography. Scarcely any phenomenon has more puzzled chemists than the fact that, whereas light has no action whatever on pure iodide of silver, the presence with that salt of a little nitrate of silver renders it exceedingly sensitive to the action of light; and the puzzle was only increased by Poitevin's discovery that iodide of silver can be similarly "sensitized" by tannin. Dr. Vogel's researches leave no doubt as to the *rationale* of these facts. He shows that there is an exact analogy between the chemical action of light and that of heat. Heat, for example, will decompose oxide of gold or oxide of silver without any other body being present, but can decompose oxide of iron or of manganese only when such oxide is in contact with some substance, such as carbon or hydrogen, which can combine with the oxygen of the oxide as fast as it is liberated. The similarity between the action of heat upon the oxides of the noble metals and that of light upon certain haloid salts, and especially chloride of silver, has long been recognized; and now Dr. Vogel shows that there is as close a similarity between the action of heat upon oxide of iron in contact with carbon and that of heat upon iodide of silver in contact with either nitrate of silver or tannin. Chemists have long been aware of an important difference between the results of the action of light upon chloride of silver and those of its action upon sensitized iodide of the same metal. They have long known that, whereas free chlorine is given off when light acts on chloride of silver, free iodine is not evolved by the action of light on sensitized iodide of silver; but no one, until Dr. Vogel, seems to have suspected this non-evolution of iodine to be due to what Dr. Vogel shows to be its true cause—viz., *the absorption by the sensitizing substance of the iodine which the light separates from the sensitized iodide.* Dr. Vogel proves conclusively, not only that this absorption takes place, but also that it is simply by virtue of their power of absorbing iodine, or rather of combining therewith, under the influence of heat, that the presence with iodide of silver of either nitrate of silver or tannin enables light to decompose that compound, just as it is by reason of the power of carbon to combine with oxygen, under the influence of heat, that the presence of that element enables heat to decompose oxide of iron. Dr. Vogel moreover shows—and it is herein that the practical value of his discovery consists—that, so far from nitrate of silver and tannin being the only bodies which will sensitize iodide of silver, that salt is rendered sensitive to light by *any* substance capable of readily absorbing iodine. The number of substances which can be used as sensitizers for iodide of silver is thus very great, and an excellent authority anticipates that some of those which have not hitherto been employed in this capacity must be "capable of application in modes which will give new powers to photography." He looks to Dr. Vogel's discovery "inaugurating a new era, in which dry-plate photography shall entirely supersede wet processes."

CHEAPEST ARTIFICIAL LIGHT FOR PHOTOGRAPHY.

The Council of the Edinburgh Photographic Society recently appointed a committee to inquire into the respective advantages, for photographic purposes, of the various kinds of artificial light, and this committee has reported that the artificial light by means of which a given amount of photographic effect can be produced *at the least cost*, is that of ordinary coal-gas. Although gaslight is thus, considered absolutely, the cheapest artificial source of actinism yet known, it is not, however, one which is practically available to the photographer. Gas will give a great deal of light for a very little money, but the proportion of actinic rays contained in its light is so small that, in order to the obtainment by means of gaslight of the results required in photography, a most inconveniently large quantity of gas must be burnt. For example, to produce, by means of gaslight, a negative of the usual carte-de-visite size, requires the combustion of not less than nine cubic feet of gas. Nine cubic feet of gas cost only a half-penny, but that quantity of gas cannot be burnt, in a single burner of ordinary dimensions, in less than fifty minutes, and although it might be burnt in one minute by using fifty burners, yet, as a cotemporary has remarked, if the light of these fifty burners could be "concentrated so as to illumine a sitter, it is probable that he would be roasted as well as photographed, from the intense heat evolved." Sixty grains of magnesium, costing little more than a penny, would produce as much actinic effect as the nine feet of gas, and could be burnt in a few seconds, and without the production of much more than one five-hundredth part as much heat as the combustion of nine cubic feet of gas sets free. For use as a source of actinism, therefore, coal-gas, despite its greater cheapness, is scarcely likely to compete with magnesium.

REDUCTION OF SILICIUM.

Some little time ago, Dr. Phipson announced that he had obtained silicon by reduction from silica by means of magnesium, and that by reducing by means of the same agent titanic, tungstic, and molybdic acids, he had obtained some new gaseous compounds of the same class as siliciuretted hydrogen. Detailed accounts of these new compounds he promised to publish so soon as his experiments should be completed.

ANOTHER NEW FIBER FOR PAPER.

Certain plants which grow abundantly on the bank of the Danube, the Dneiper, the Dniester and the Bug, and which are not at present turned to any account, except to a small extent as fuel, are stated by M. Schinz, of Odessa, to be admirably suited for the manufacture of paper. The plants in question are the typha augustifolia, arundo dunax, and phragmites communis. M. Schinz states that these plants are very rich in fiber, and contain very little silica, and that paper equal to the very best made from linen rags can be made from them without the least admixture of any other material! He also states that the cost of making pulp from them is very much less then that of making pulp from rags. If all this be so—and a French journal states that Mr. Cowan, the well-known paper-maker of Edinburgh, has tested the matter by careful experiments, and has proved that Mr. Schinz does not take at all too favorable a view of the advantages of the material he has discovered—very good paper ought to be very cheap by-and-bye. Full particulars of M. Schinz's experiments may be found in the last number of the "Bulletin de la Societe d'Encouragement pour l'Industrie Nationale, or in the last number but one of "Dingler's Polytechnisches Journal."—*Mechanics' Magazine.*

FARMERS' CLUB.

The Farmers' Club of the American Institute held it's regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, May 30th, the President, N. C. Ely, Esq., in the chair.

SPAN WORMS.

Dr. Trimble presented some specimens of the span worm, which is so destructive to the shade trees of this city, and stated that he had been trying his plan of shaking them off in one of the parks, and had succeeded in completely ridding the trees of this pest. Some of the worms exhibited were dark brown, and others of a high green color; and the speaker explained that the change of color resulted from the shedding cf his coat by the worm.

Dr. Trimble also presented specimens of the canker worm, which devours the leaves in the fruit trees of New England, and observed that this pest is extending its ravages westward to New Jersey and other States. This worm is, like our span worm, one of the family of *geometra*, or earth measures, and is very similar to the span worm in appearance. The different manner in which the two worms attack the leaves was illustrated by green branches which had been subjected to their depredations. The span worm eats holes in the leaves, while the canker worm strips the ribs of the leaf clean, and then curls them into a tangled mass.

Dr. Trimble said that wherever trees are so situated that the cedar birds can come to them without fear, they are effectually protected from the depredations of the canker worm. This bird is the natural enemy of the canker worm; and the New England people, instead of shooting these beautiful pets for our market, would do well to pass stringent laws for their protection.

MANURE FOR STRAWBERRIES.

Mr. Bergen said that he had been led by the earnest recommendations of Mr. Pardee, whom he respected as high authority, to attempt to raise strawberries on land moderately rich, Mr. Pardee saying that good corn land was better for strawberries than land highly manured, but after years of trial he was fully convinced that the land should be made very rich indeed for strawberries.

Mr. Carpenter remarked that he had had precisely the same experience. The finest strawberries that he ever raised were grown on ground which had been manured two spades deep with all the manure that could be got into it.

THE WAY TO MAKE STRAWBERRY SHORTCAKE.

Mr. Thomas Cavanagh, in the course of a discussion on cooking strawberries. gave directions for making strawberry shortcake as it ought to be done. The shortcake, some three inches thick, is first baked, and then cut into slices three-fourths of an inch in thickness. Upon one of these slices a layer of strawberries is spread, and covered with genuine cream, when a second slice is placed over it, thus sandwiching the strawberries between the two. The cake thus prepared is placed for a moment in the oven to warm the strawberries through, when it is eaten hot.

TO KEEP HENS FROM SITTING.

Solon Robinson read a communication making enquiry for the best method of preventing hens from sitting.

Mr. Ely: I have a gate made of laths, which proved too light for service as a gate, and I have laid it down upon some blocks which support it about two feet from the ground, and have placed a coop on it. Whenever I have a hen that wants to sit at an unseasonable period, I put her under that coop; the wind drawing up between the slats makes it too uncomfortable for the fowl to sit down long, and she soon gets out of the inclination.

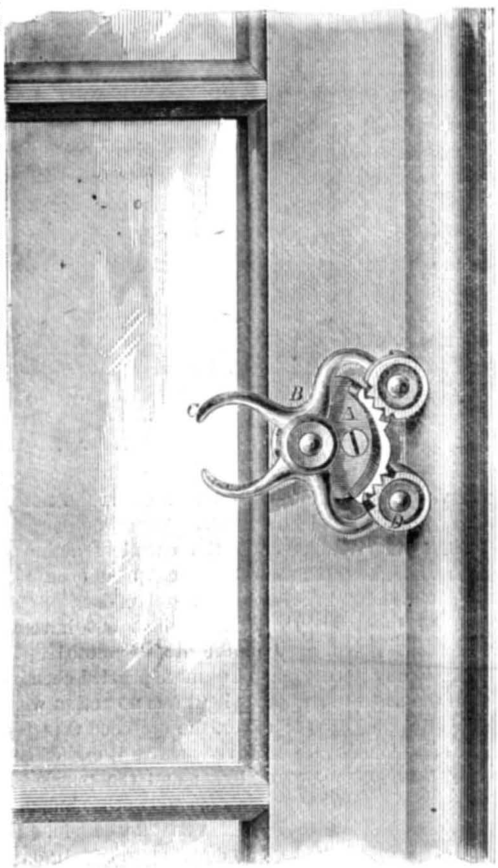
Mr. Carpenter: Tie a bright red rag to her tail. When a hen nestles herself into her seat she always takes a very composed look at her surroundings, and as she catches a glimpse of the fiery object behind her, it is very amusing to see how quickly she will start and run from her nest.

THE American Peat Co., of Boston, by an advertisement in another column, invite an examination of their works. We understand from reliable private sources that this company is making a very superior article of condensed peat, and that its manufacture is attracting much attention.

CLARK'S WINDOW-SASH LOCK.

A good window fastener, or a device for holding a sash at any desired hight, is a useful thing, and always in demand. If there were forty good ones in the market all would find ready sale, for each variety would have its friends.

The invention herewith illustrated shows a very neat and substantial appliance for the purpose. It is made of brass, handsomely lacquered, and is easily put on in a short time by any one who can drive a screw. It consists of a metal back, A, and two toothed levers, B. These levers are united at the center by a joint, in which there is a spring, tending to keep them together. When the ends, C, of the lever are forced together the jaws are opened, and allow the sash to be raised; on relaxing the pressure the toothed rollers, D, on the ends of the levers, B, bite against the side of the window frame like a tog-



gle joint, and hold the sash firmly, preventing it from being raised from the outside as well. It will be seen that with this supporter the sash can be held at any point without the use of catches or other auxiliaries let into the side frame. These latter mar the wood work very much. One screw and two spurs on the back hold this catch securely on the sash, and it is both ornamental and efficient. For cars, especially, it would be much better than the inefficient and clumsy concern now in use. They are made of iron, with white or black Japan finish, or of brass, or silver plated, and are manufactured by Clark & Co., Mt. Pleasant, Iowa. Agents are wanted in every State. Patented Dec. 8, 1863.

A Perpetual Motion Clock.

Some attentive well-wisher to the SCIENTIFIC AMERICAN takes the trouble to send us the following paragraph from "Nelson, New Zealand," thus showing that our friends at the antipodes do not forget us:

A "Perpetual Motion Clock"—such is the title of a clock exhibited in the New Zealand Exhibition, and is described as follows in the *Lyttleton Times:*—"The other wonder is a perpetual motion clock, in which there is no deception. The workmanship and the secret of the invention both belong to a Mr. Beverly, a watchmaker, long resident in Dunedin, who has before invented some excellent apparatus of a similar character. The clock has nothing recondite about its appearance; extreme simplicity indeed is its characteristic. An oblong case, the upper half of which is glazed and the lower boxed in, stands on end, and supports the works within it; and there is no apparent opening. A dial of the ordinary kind, a singularly looking but not novel 'torsion' pendulum, three little weights, balancing one another on what seems an endless chain passing over two wheels, and a single upright attached by way of support, and passing down into the boxed part of the case below, these are all the parts visible. The inventor does not make a mystery of the principle; he has had a clock openly going in his house for the last fifteen months without being touched, and there seems no reason why it should not continue to go as long as the material will wear. The principle is so simple as t carry conviction of its truth at once. The alterations in temperature of the atmosphere are applied to create motion, and the motion so created is applied to work always in the same direction, winding up the weight, whose gravitation keeps the clock going. The principle is simple, but the application of it is the difficulty. Mr. Beverly has a right to claim the whole merit of applying a novel force, even though it should turn out, which does not appear likely, that the idea of utilizing the natural alternations of temperature, in expanding and contracting fluids, had occurred to some one before. I have not yet met any person with pretensions to scientific acquirements who questions the propriety of calling Mr. Beverly's invention one of perpetual motion. This alone is worth a long journey to see."

The Virtue of Application.

Working as an ordinary hand in a Philadelphia shipyard, until very recently, says the Philadelphia *News*, was a man named John L. Knowlton. His peculiarity was that, while others of his class were at ale-houses, or indulging in jollification, he was incessantly engaged in studying upon mechanical combinations. One of his companions secured a poodle dog and spent six months in teaching the quadruped to execute a jig upon his hind legs. Knowlton spent the same period in discovering some method by which he could saw out timber in a beveled form. The first man taught his dog to dance—Knowlton, in the same time, discovered a mechanical combination that enabled him to do in two hours the work that would occupy a dozen men, by slow and laborious process, an entire day. The saw is now in use in all the ship-yards of the country. It cuts a beam to a curved shape as quickly as an ordinary saw-mill rips up a straight plank.

Knowlton continued his experiments. He took no part in parades or target shootings, and in a short time afterwards he secured a patent for a machine that turns any material whatever into a perfectly spherical form. He sold a portion of his patent for a sum that is equivalent to a fortune. The machine is now in operation in this city cleaning off cannon balls for the government. When the ball comes from the mold its surface is incrusted, and the ordinary process of smoothing it was slow and wearisome. This machine, almost in an instant, and with mathematical accuracy, peels it to the surface of the metal, at the same time smoothing out any deviations from the perfect spheroidal form.

Within a few days the same plain, unassuming man has invented a boring machine that was tested in the presence of a number of scientific gentlemen a few days ago. It bored at the rate of twenty-two inches an hour through a block of granite, with a pressure of but three hundred pounds upon the drill. A gentleman present offered him ten thousand dollars upon the spot for a part interest in the invention in Europe, and the offer was accepted on the spot. The moral of all this is that people who keep on studying are sure to achieve something. Mr. Knowlton does not consider himself by any means brilliant, but, if once inspired with an idea, he pursued it until he forced it into tangible shape. If everybody would follow copy the world would be less filled with idlers, and the streets with grumblers and malcontents.

[Mr. Knowlton is one of the most enterprising inventors in the country; he has taken out many patents in this and foreign countries.—EDS.

How to Clean Quicksilver.

There are few things which cause more trouble in saving gold than the impurities which often exist in the quicksilver used for amalgamating. These impurities often consist of lead, sometimes of some greasy substance, and often of copper and other metals held in metallic or mineral form. To separate these impurities from the quicksilver has, by many, been found a difficult matter. We are assured that the cleaning or separating may be readily accomplished by retorting, but in doing so the mercury in the retort should be covered an inch deep with pulverized charcoal, which at once absorbs all the impurities, and leaves the mercury clean. This method is extensively practiced in some of our mining countries, and is said never to fail in its results. We recommend it to our miners.—*Colorado Miners' Journal.*

WELDING STEEL AND CAST OR MALLEABLE IRON.—Mr. Wm. Carson Corsan, of Sheffield, has provisionally specified the use of a composition, consisting of borax, 50 parts; Calais sand, 30 parts; emery, 10 parts; and manganese, 10 parts, in the welding of steel and cast or malleable iron; but he does not restrict himself to these precise proportions.

The Cactus Plants of California.

The San Francisco *Bulletin* says:—"The cactus—the celebrated family of the floral kingdom, the glory of the hot-houses of Europe and the wonder of travelers, whose flowers and fruits are seen in every league of surface in South California, Arizona and the Peninsula—has never sufficiently attracted the attention of our florists or farmers. Fifty-five species of cactus are known in the botany of these sections, and they include some with magnificent flowers and of extraordinary appearance, forming beautiful ornaments when in the vicinity of other vegetation. If the different species, all covered with thorns, could be got together in a California garden, they would form one of the most singular and unique displays it is possible to conceive in gardening, and it is to be remembered that the fruits are as valuable for human food as the flowers are for feasting the eye.

"The cactacia have an immense range in the altitudes of Central North America, or in what we may term the California *simulacra* of climates and soils, as they are found from the parallel of Cariboo to Cape St. Lucas, and from the eastern slopes of the Rocky Mountains in North Dakota to the Gila river. They are met with in all latitudes between the Gila and Panama, from the line of perpetual snow to that of the sea-shore. Some two hundred different species of this singular family of American plants are enumerated in the botany of Mexico, ranging from the shape of a cabbage to that of a grape-vine, and looming high as a tree and umbrageous as a small oak. Their flowering is of extraordinary splendor and loveliness, and is from the purest white to vermillion, including every mixture of the prismatic colors. But it is the fruit, the standby of the poor and the Indians in the seasons of drouth and famine, that unfolds this providential blessing of the desert in all its value.

"Engleman, of St. Louis, an eminent writer on this family, enumerates as indigenous to Arizona and South California four genera of the cactus; that is, thirty-seven species of the cereus or perpendicular stems, six cumamalarias or mamacs, and six echinocactus or cabbage heads. Almost every one of these is found in the mountain ranges and deserts of Los Angeles, San Bernardino and San Diego counties. In Lower California many specimens are met with which are foreign to our parallels and latitudes, one of which, a climbing variety, is found in the dryest months to be full of the purest water. One of the opuntas has a small fruit, specific in scurvies and blood impurities, while others have fruits with the flavor of pine-apples, of strawberries, peaches, plums and cherries, of the luscious cheramoya and mangostein, of the fig and grape, and of the lemon, apple and pear.

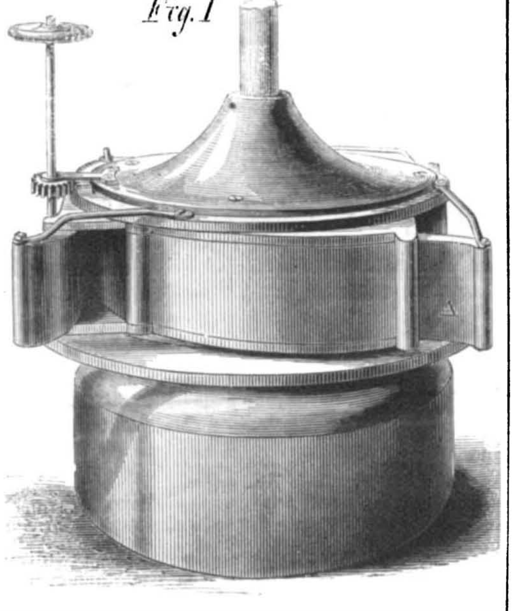
"The *Cactus Opuntia*, or Indian fig of Mexico—white and red—was introduced into the mission gardens of our State from Santa Clara to San Diego in the early settlement of the country, some seventy years ago; but they are also found indigenous to the mountains of the Colorado, in San Bernardino and San Diego counties. Near all the southern missions below Point Conception they grow luxuriantly, particularly at Santa Barbara, San Fernando and San Gabriel. At the two last named places they are extremely abundant and luscious. These varieties of the prickly pear are valuable additions to the food of our State, as the fruit is not only very plentiful in summer and fall but is highly nutritive and agreeable, and can be gathered at will, and the plant requires no care. When stripped of the prickles they can be boiled down to an excellent conserve or sirup, or dried in the sun for preservation, as they contain a large quantity of sugar and gum. The plant is easily propagated by slips or seeds, and has a wonderful endurance, vitality and hardiness. It comes to perfection in three years. Its seeds, which are very abundant in the fruit, are toasted by the Indians as a substitute for corn. The mucilage of the leaves or fronds is thrown into water and used in making cements and white-washes, and gives great strength to those house-building materials in the arid districts of Mexico. It is in common use around Los Angeles.

"Being such plentiful and excellent producers of sugary fruit, so necessary to the laboring man in our dry and attenuated atmosphere, this matter should be attended to by our people, as well as the arts of making molasses from maguey, pumpkins, melons, watermelons, grapes, pears, beets, cornstalks, and the wild sugar-cane or panoche-carisso of the Tulares. All these fruits are well known to the Indians and Mestizoes of Sonora and New Mexico, and those of Chihuahua and Coahuila, as producing sugar; and particularly the Cactacea and Agave, among the Pimos and Papagos of Arizona, who consider the cactus and the maguey as gifts of the gods, for from them they receive food, clothing, shelter and fencing. The reduction of these articles to conserves and molasses is often facilitated among these simple people by a concentrating process of roasting and baking, and boiling down slowly afterwards, with a little water, to a viscid sirup which never ferments in their keeping, though several of them are also used in the fabrication of mescal or spirits. Of such an exhilarating quality is this fire-water that when 'in the spirit,' they would not give a *claquo* to call themselves king, priest or judge, for they often give for such alcoholics weight for weight in silver, and bless the vender for his trade."

VANDEWATER'S TURBINE WATER WHEEL.

The engravings published herewith represent one of Van Dewater's improved water wheels. These

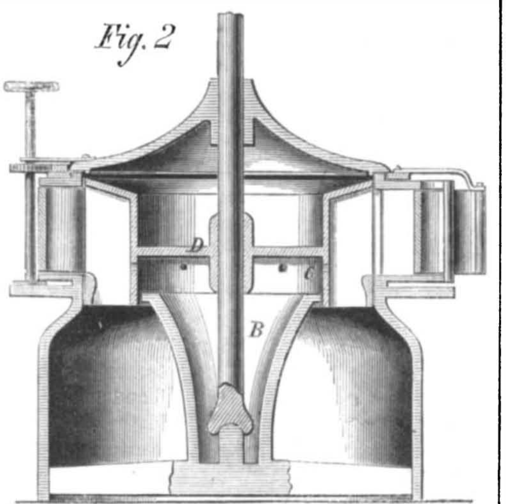
Fig. 1



wheels are quite celebrated and are in use in all parts of the country. We have seen testimonials from different parties now using them, who express the greatest confidence in, and satisfaction with them. Mr. Van Dewater says:—

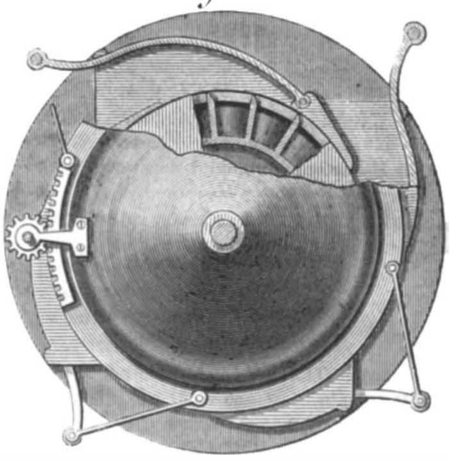
"My experience for upwards of twenty-three years has enabled me to become thoroughly acquainted with all the difficulties that each and every water wheel of the day is subject to, and I have made effort to avoid them; from my certificates I think that manufacturers and mill owners will be able to convince themselves of its utility and superiority. My long experience in building turbines has enabled me to construct my buckets so as to gain a maximum speed of the velocity of the water on all their points at the working speed of the wheels.

Fig. 2



"I am ready at all times to contract with manufacturers and mill owners to construct and set in operation my Improved Jonval Water Wheel, from 3 to 350 horse-power, upon the most reasonable and satisfactory terms. The wheel is highly finished, and

Fig. 3

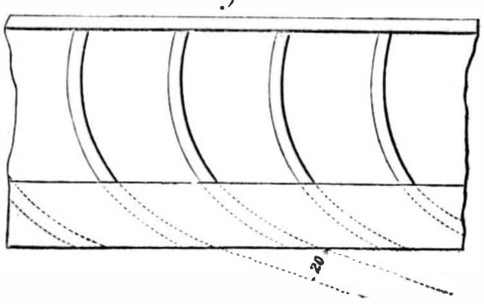


the buckets are polished, and so constructed that they can be built of iron or steel. I am willing to warrant my wheel to work up to my table, which yields the most horse power from the amount of water used. The great outlay of building penstock is avoided, and under a fall from 15 to 25 feet the pressure is so great that the floom must waste more or less water in time if the wheel is not located near the upper level of the fall. It can be located at any point, or between two levels of the fall or set in the bottom of the floom."

An 18-inch wheel, under 6 feet head, 24 inches of water, makes 189 revolutions per minute at work—giving, according to Mr. Van Dewater, 1·81-horse power; and he says he has yet to learn of a single instance where they have failed to give satisfaction.

The several engravings depict the following views:—Fig. 1 a perspective, Fig. 2 a vertical section, Fig. 3 a plan, and Fig. 4 a section showing the shape of the buckets. In Fig. 1 the inlet gates, A, are represented with the mode of operating them; in Fig. 2 the section shows the buckets and the device for balancing the wheel, so as to avoid excessive friction on the step. This is attained by making the step chamber, B, water-tight, and having a series of small holes, C, in the circumference of the wheel disk. Through these wheels the water finds its way when

Fig. 4



the wheel is at work and filling the step chamber, bears up against the diaphragm, D, and finally escapes at the inside edge of the chamber. This does not in any way affect the discharge which takes place at the bottom of the buckets.

This wheel is quite different from that patented by Mr. Van Dewater on June 2, 1863, having many essential alterations which changes its character. The water passes out at the bottom of the wheel, owing to the shape of the buckets, at a tangent of twenty degrees, and the shape of the curve is shown in Fig. 4.

Mr. Van Dewater has obtained several patents on his wheels, and one is now pending on this through the Scientific American Patent Agency; for further information address H. Van Dewater, Buffalo, N. Y.

HOWDAN FOWLS.—In the vicinity of Paris great attention is paid to poultry breeding. The Howdan breed has the advantage of great precocity. Fifteen weeks suffice to enable them to attain their development, and eighteen or twenty days complete the fattening process, on barley meal mixed with milk, without water.

Correspondence.

Another "Mysterious" Boiler Explosion.

MESSRS. EDITORS:—I once built a small boiler of tin, and suspended the same over a flame of gas, with the valve tied down, and left the same to natural consequence, the boiler containing rather more than two-thirds its holding capacity of water. Steam soon raised, and shortly after a trifling rupture appeared in some part of the boiler (as indicated by the sound, seemed to be somewhere in the water region); the water escaped through the aperture, striking the support of the boiler, oversetting the same, causing it to drop down from its resting spot, alighting on top of a table about one foot below, whereupon it instantly blew to pieces, tearing the end completely out.

The flame of the fire did not reach above the water line during the heating process; and why it should so violently explode after being removed from the fire, and a small amount of its contents escaped through the started place, is more than I can conceive, as the quantity of water on the table and about the floor plainly showed that there was still plently left in the boiler after falling for safety, as far as that goes (water, I mean).

Being a reader of your journal I address you for your opinion, if consistent with your views and regulations. QUERY.

The Curious Clock.

MESSRS. EDITORS:—The clock seen in Montgomery street, San Francisco, is a very common thing in Italy. Two discs of glass are suspended on a double glass column. One of these discs has the figures marked upon it, and is stationary; the other has a pin fastened to it which passes through a hole in the first, and to which the hand is attached; on the outer edge of this disc are teeth, which are moved by an endless screw or cog work attached to the inner glass tube. The tube is put in motion by machinery below and turns the movable plate of glass round in just one hour. A speck or any slight scratch will show the movement after a little patient watching. It is a beautiful toy, and the frame work around the face of the clock is so small that the delusion is almost perfect. H.

[We have seen clocks of this kind, but the one in San Francisco was described as having the dial upon a square plate of glass. It is possible, however, that the observer may have forgotten in relation to this point.—EDS.

Inducing Sleep.

MESSRS. EDITORS: I have just read, with some degree of curious satisfaction, a paragraph in the last number purporting to be extracted from "Anatomy of Sleep," and, although but little given to scribbling for newspapers, just wish to say that the remarkable fact there stated, as to the method of procuring sleep, has been known to myself, and, as occasion required, been practised for a number of years. I have never spoken, to my recollection, of its curious effects to a single individual, and was much surprised to find the precise manner of moving the eyes so minutely and accurately prescribed. The rationale of its operation is strictly correct and accords with my own views of psychology. Next to a "conscience void of offense" I know of nothing so remarkably efficacious in bringing to our pillow "balmy sleep, tired nature's sweet restorer," as the method indicated. B. J. C.

Philadelphia, Pa.

Cleaning Wool with Glycerin.

MESSRS. EDITORS: In your paper of the 20th inst. we find some remarks of Mr. J. H. Smith about the application of glycerin for wool. To prevent the gumming of the wool, we would suggest to wash it after it has been cleaned with soda or soap in diluted glycerin, which will draw out any resinous matter the wool may yet contain. Apply afterwards the concentrated glycerin in the same manner as oil. The diluted glycerin can always be saved from the wash-water of the manufactured wool in which concentrated glycerin has been used. Glycerin is a great solvent; it mixes readily with water, and will neither evaporate nor become dry; hence we think it will answer in many cases as well lard oil, being cheaper, and requiring no soap to wash it out of the manufactured goods. HARTMANN & LAIST.

Cincinnati, Ohio, May 27, 1865.

Col. Rutherford's Method of Exploding Torpedoes.

MESSRS. EDITORS:—Your remarks, introducing an article in relation to Col. Geo. V. Rutherford's invention of a "submarine battery," were erroneous in attributing to him the writing or sending of that article. It was prepared and sent by one interested in having justice done to him. Please make the correction necessary to relieve Col. Rutherford of the opprobrium of asserting his own merits. R. C.

Quincy, Ill., May 26, 1865.

[We cheerfully make it. All articles not written by us are always introduced in the manner described, for the reason that inventors sometimes tell prefer to their own story.—EDS.

Trial of a New Patent Brake.

The Detroit *Free Press* gives a lengthy account of the trial of the Patent Railroad Brake, of A. I. Ambler and Isaac Crane, upon the Detroit and Milwaukie railroad:—

The train to which the brake had been attached left the depot at the usual time of starting in the morning. By request the engineer moved slowly through the yard, setting the brake to enable those interested to see that everything worked smoothly and in line. This test being satisfactory, and finding that the brakes were under his control, they were constantly and simultaneously released, and the train moved on at its usual rate of speed. Mr. J. McGregor, of the car department, accompanied the train as far as Royal Oak, but the full capacity of the brake for the most rapid stopping was not made until the train reached Drayton Plains, it being used, however, in a suitable manner for every-day business, until that point was reached, bringing up the train in about half the distance required by the hand brake system. Before reaching Drayton Plains, Mr. Ambler requested the engineer, Mr. Oscar Holmes, to give the brake a trial for still more rapid work, so as to test its capacity for stopping the train in case of imminent danger or disaster, and instructed him to run boldly up to the station at as high a rate of speed as though he intended to pass the station without stopping; to suddenly apply the power and leave the brake to do its work. These instructions were strictly followed, and with a wet and slippery track (it having rained all the way), without braking the tender or using the brakes—without sand or reversing the engine, and with a speed of over thirty miles per hour, the train was brought to a dead stand in 350 feet! being the best braking ever accomplished. And this, too, without sliding the wheels, and without concussion of the cars, producing an effect so perfect and uniform as to astonish those who witnessed its operation. The engineer accomplishes the wonderful result with an application of power which he can move and control with his finger with the most perfect ease. The braking was continued and the power used at every station until the engine was exchanged at Holly; the services of the brakeman for operating the hand brake being in no instance required during the trip. The hand brakes remain, however, by the application of this brake intact, their efficiency and reliability being entirely unimpaired by its action.

Depression in the Iron Manufacture.

The American Iron and Steel Association met on Thursday morning, May 25th, in the County Court Room, Chicago, pursuant to adjournment.

President Ward remarked that, before commencing business, it might be interesting for the members of the Association to be informed that a steel rail had been rolled at the Chicago rolling mills on the previous day. The ordinary rollers had been used, and the steel rail had been rolled most effectually. The flanges, he might say, were very perfect, but they would have an opportunity of judging for themselves, as it was intended to bring the rail into the room in order that all the members of the association might inspect it. On the previous evening several of the gentlemen reported in regard to the condition of the furnaces and rolling mills in their several districts, in order to show the real state of the iron trade at present. It was most important that this should be known, and he hoped that the returns that were to be made that morning would be full and complete.

Mr. C. Grant reported that in Southeastern Ohio there were four rolling mills, the capacity of which was 16,000 tuns per annum. All were idle now. Forty blast furnaces, whose capacity was 60,000 tuns per annum, are now only producing 30,000 tuns.

Seventeen other reports were made in relation to the manufacture in various sections of the country, all showing a general depression of the business. At the close of the proceedings a specimen of steel rail made at the Chicago Union rolling mills, by the pneumatic process, and manufactured from raw pig iron in twenty minutes, was exhibited to the meeting. It was claimed that the steel rail possessed ten times the durability of the old iron rail. The Chair predicted that within two years nine-tenths of the roads in the country would be laid with the new steel rail.

Respiratory Apparatus.

A series of experiments was made a few days ago, in Paris, with an apparatus, invented by M. Galibert, to enable a man to breathe in the midst of deleterious emanations. A quantity of flour of sulphur was set fire to in a cellar, and a sufficient quantity of sulphurous acid being thus evolved, a fireman, who had never used M. Galibert's apparatus, which is a combination of air tubes communicating with a sort of knapsack, filled with compressed air, entered the cellar, and stayed twelve minutes in it, without experiencing any injurious effects. His nostrils during the time were strongly compressed by a sort of spring, and his eyes protected by a pair of spectacles made for the purpose. The man did not leave the cellar until called by his colonel. The cellar was then filled with a dense and acrid smoke, and another man went in with the same success. At length Colonel Willerme himself put on the apparatus, and stayed a considerable time in that atmosphere of suffocating vapors of every description, and convinced himself by his own experience that a man could breathe as freely with the apparatus as if he were in the open air. Similar experiments have been performed at Versailles, and lately in one of the cellars of the Societe d' Encouragement. When the air in the reservoir has become foul by the action of breathing, fresh air may be introduced; the knapsack, which is of metal, has a tin bottom, but the lid consists of a skin or leather bag. To drive out the foul air this leather bag has only to be pressed down, and to fill the space with fresh air the bag is pulled up again. To fill a larger space, like that of a goatskin, with air, M. Galibert uses a pair of bellows, a slower process, but better adapted to the size of the recipient.—*Galignani.*

Man Engines.

The man engine is a machine in use in a few of the deep mines in Cornwall, Saxony, the Harz, and Hungary, as well as in some of the deep collieries in Belgium and the North of France; but, although it was originally introduced in the Harz in 1833, the whole number of mines in which it has been adopted in Europe up to the present time probably does not exceed 30. In its original form, it consists of two vertical rods placed parallel to each other, and extending through the whole depth of the shaft: the heads of the rods are connected with the crank shaft of a rotary engine, by a long connecting-rod and two reversed angle levers, by which a reciprocating motion is imparted to them, one rod rising while the other is falling, and *vice versa*. A series of small platforms project from the face of the rods, the distance between them being equal to the length of the stroke. The miner wishing to ascend steps on to the lowest platform of one or other of the rods at the moment that it commences its upstroke, and is carried up during the time that the other rod is descending; at the moment when the rod stops at the change of the stroke he has arrived opposite to the next higher platform on the opposite rod, and stepping across to it he is lifted through the same amount before stepping back to the rod on which he started, and so on until he arrives at the top; the amount of lift during each revolution of the driving shaft being equal to twice the single length of the stroke in the shaft. In the newer forms adopted in Cornwall a single vibrating rod only is used, and the miner who is traveling up at the end of the stroke steps off the rod on to a fixed platform, and waits until after the next change the rod again moves in an upward direction. In either case the method adopted in descending is the reverse of that adopted in coming up.

Carver's Pump.

Aaron Carver, of Little Falls, N. Y., patented a pump in June, 1864, and it is said he sold the patent for $100,000. This pump is applicable to domestic use, and also for gardens, but is chiefly intended for oil or other deep wells. Mr. Carver has recently invented another pump, which, like the former, is meant for use in the oil regions, where it is said to be in triumphant operation. We cannot explain the points of the last invention, because the case is now pending in the Patent Office, but Mr. Carver informs us that he has already sold one half of the invention for $25,000.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening May 17, 1865, the President, S. D. Tillman, Esq., in the chair.

After some miscellaneous business the President opened the discussion of the selected subject, "The best method of drawing street rail cars," by describing

THE NEW AMMONIA ENGINE.

M. Tellier, of France, has recently invented a means of storing and using mechanical power, by condensing ordinary ammoniacal gas to the liquid state, and applying it for propelling omnibusses, and other vehicles, in places where steam power would not be admitted. The conversion of gaseous ammonia into a liquid by pressure, and its application for locomotion is not new, but the mechanical arrangements by M. Tellier embrace several novelties. The small vessel, containing liquid ammonia and gaseous ammonia above it, may be compared to an ordinary steam boiler; when the valve is opened a portion of the gas, having a tension, at 60° F., of about 100 lbs. per square inch, presses against a piston within a cylinder filled with common air. This movement of the piston transmits power through a crank, and at the same time condenses the air before it in the cylinder. At the completion of this stroke a little water is injected into the cylinder, behind the piston, when the ammonia is instantly absorbed by the water and a vacuum is produced. The pressure behind the piston being thus removed, the compressed air on the other side of it is brought into play; thus the piston comes to its original position and the crank has completed one revolution. After the ammoniacal water has been drawn off the piston is ready to receive another charge of ammonia. It will be perceived that this apparatus would work more steadily if two cylinders were used; M. Tellier proposes to use three. This arrangement, or any other in which a gas passes from the liquid state at a nearly uniform pressure, has many advantages over that employing atmospheric air as a secondary motor. The President then directed attention to

THE NEW CARBONIC ACID ENGINE.

A contrivance for drawing cars on street railways, by means of liquified carbonic acid, is soon to be tried in this city by Dr. Barbour, of Auburn, N. Y. The gas is liquified by a stationary engine, and in that state is kept on the car, in a strong receptacle. The whole apparatus is modeled after the steam engine, but is of much smaller dimensions. After its use the gas escapes from the exhaust into a large gas-proof bag upon the top of the car, when the car returns to the stationary engine the gas is withdrawn from the bag, and again condensed into a liquid, and is thus used over and over. In many particulars carbonic acid is preferable to ammonia. 1. It has at the melting point of ice a tension of 575 lbs. to the square inch, and would occupy only $\frac{1}{16}$ the room required for the ammonia arrangement. 2. It is brought from the gaseous to the liquid state at one operation, by means of the force air pump driven by steam; while the use of ammonia on Tellier's plan requires a large quantity of water for its absorption, the weight of which increases the amount of power required to draw the car. At the end of the route the ammoniacal water must be subjected to heat, and the gas, thus disengaged, is reduced to a liquid by means of a force pump driven by steam. 3. The statement of Tellier that a vacuum is produced is not strictly true, for ordinary ammoniacal water when relieved from atmospheric pressure loses a portion of its ammonia. The tension of the gas in Tellier's cylinder is, however, so greatly reduced as to allow the reaction of the compressed air to carry the piston to its first position. 4. The unavoidable leakage of minute quantities of ammonia would make a car more offensive to the olfactory nerves than the stable. 5. The cost and trouble of preparing carbonic acid is much less than that required to produce ammonia.

AVAILABILITY OF OTHER GASES.

The query naturally arises, cannot other gases be used as reservoirs of power? All known gases have been liquified, excepting oxygen, hydrogen, nitrogen, carbonic oxide, coal gas, nitric oxide and common air. An application of several thousand pounds per square inch, at the greatest degree of cold known —220° F., has failed to reduce them to a liquid state; yet they are regarded by the highest chemical authorities as vapors of highly volatile liquids.

At the melting point of ice, the tension of anhydrous sulphuric acid is about 21 lbs. per square inch; of cyanogen 35½ lbs.; hydriodic acid 45 lbs.; sulphuretted hydrogen 150 lbs.; nitrous oxide 480 lbs.; arseniuretted hydrogen 135 lbs; and hydrochloric acid 393 lbs.; that of olifiant gas at 0°F is 145 lbs. This list might be greatly extended, and include those gases which are liquified under atmospheric pressure by cold alone. If the chair was requested to select from the gases the most feasible agent of force, he would name nitrous oxide (protoxide of nitrogen), commonly known as laughing gas, for the following reasons:

1. It has a tension, when liquified, but little less than that of carbonic acid; these two gases have about the same specific gravity.

2. It is solid at —150° F., while carbonic acid is solid at —70° F.; it cannot, therefore, be so readily frozen by its own rapid expansion, and thus thrown into the state in which it exerts no pressure.

3. Its boiling point is —126° F.; that of carbonic acid being —109° F.

4. To increase its pressure in the proportion of from 2 atmospheres to 3, requires 30° additional of heat; the same increase in the pressure of carbonic acid requires 32½°; of ammonia 60°

5. It has neither acid nor alkaline qualities.

6. It holds within itself the means of regulating its own temperature; when mixed with bisulphate of carbon, and evaporated *in vacuo*, it produces the greatest degree of cold known—220°F.

7. No dangerous or unpleasant effects would follow from its escape into the atmosphere. However, until some cheaper mode of preparing nitrous oxide can be devised, carbonic acid will be found most available.

The use of any liquified gas to propel cars must be regarded as a temporary expedient for the displacement of horses. The time will surely come when steam, the cheapest of all motors, will be applied directly to draw, not only city cars, but all vehicles containing heavy loads. With properly constructed pavements more than three-quarters of the power now expended in locomotion would be saved. The first step in the great reform must be the introduction of self-moving cars on the street railways, and we will now have the pleasure of hearing Dr. Barbour explain in detail his plan for accomplishing that object.

CARBONIC ACID GAS ENGINE.

Mr. Barbour proceeded to give an exceedingly lucid description of his carbonic acid gas engine. This is not designed as a prime motor, but simply as a compact and portable reservoir of power which is first generated by a steam engine, and is designed especially for driving cars on street railroads. A very strong wrought iron cylinder, about three feet in length and one in diameter, with a capacity of about two cubic feet, is nearly filled with liquid carbonic acid, which is allowed gradually to expand into the gaseous form, and is worked in that form through a small engine precisely similar to a steam engine. The gas is liberated from marble dust by sulphuric acid, or obtained in any other economical manner, and is condensed by means of a steam engine. After being used it is exhausted from the engine into an india-rubber bag placed on the top of the car, and on the return of the car to the station, it is drawn by a fan from the bag into a reservoir ready to be condensed for use again.

The speaker explained that the condensable gases only are adapted for use as portable reservoirs of power. If atmospheric air be compressed to a pressure of forty atmospheres, and then more air be forced into the vessel, the pressure will rise in proportion to the additional quantity; but if carbonic acid be compressed to forty atmospheres it begins to condense to the liquid state, and then as further quantities are forced into the vessel they are immediately condensed, and occupy so little space that they do not add perceptibly to the pressure.

Mr. Reid:—How is your reservoir made?

Mr. Barbour:—The one that I have now was made of five-sixteenths iron, welded along the seam, with heads of one inch wrought iron also welded in, and hooped with five-sixteenths iron sweated on, as it is called, that is driven on red hot. But I shall make the next of five-eighths iron without hoops.

Professor Everett:—Have you provided any means to prevent the solidification of the carbonic acid in your reservoir by the rapid absorption of heat in the evaporation of the liquid?

Mr. Barbour:—Yes, I have two plans. By one, a small vessel communicates with the reservoir by pipes at the top and bottom, the lower pipe having a valve loaded to 700 lbs. to the inch, or whatever pressure I desire, so arranged that when the pressure rises above this, the valve will open and allow a flow from the large to the small vessel. Then I warm the contents of the small vessel, and any excess of gas generated flows over into the large reservoir. About one pint of petroleum will generate enough heat to evaporate the whole of the liquid. But I think that heat for this purpose will be absorbed with sufficient rapidity from the atmosphere. When I first started my engine, the pressure, according to my gage, was about 900 lbs.; it soon fell to about 650 lbs., and after that it remained nearly constant while the engine was running. The next morning the pressure was about 1100 lbs. The gage was not correct, giving in all the cases too high indications, but the proportions were probably about right. I suppose heat was absorbed from the atmosphere about as fast as it was made latent by the evaporation. The reason that the pressure was greater the next morning than at the commencement of the work was that I had the reservoir surrounded by ice during the condensation, and in the morning it was at the temperature of the atmosphere.

Mr. Reid:—Have you tried this engine practically?

Mr. Barbour:—Yes, I have placed one on a car, and run it with a little gas which I condensed by hand. To accommodate the apparatus it was necessary to alter the wheels in a way that multiplied their friction, but the engine not only propelled the car, but when this car came in contact with another, it drove both along. I allowed the gas to follow full pressure, three-fourths of an inch, and worked the rest of the stroke by expansion. I regulate the power and speed by varying the cut-off. The cylinder is 2½ inch bore, by 12 inch stroke.

Professor Everett:—Will there not be danger of your reservoir exploding from variations in the temperature of the atmosphere?

Mr. Barbour:—The range of temperature in our climate will cause a variation in the pressure from about 450 lbs. to about 900 lbs. to the square inch; and I have tested my reservoir up to 5,000 lbs. to the inch. I think the safety is far greater than with a steam boiler, as there is no burning out of the reservoir or other deterioration to diminish its strength. It is true that the liquid carbonic acid has a corrosive action upon iron, but to prevent this I line my reservoir with a coating of wax, which has proved so completely effectual in protecting soda-water fountains. The carbonic acid gas does not corrode iron in the least; wherever this only comes in contact with the iron of my engine, the metal is as bright as when it first left the lathe.

Mr. Bartlett:—What is the weight and power of your engine?

Mr. Barbour:—The whole apparatus weighs about 450 lbs., and I compute the power at one and a half horse.

Mr. Tillman:—Have you ever tried nitrous oxide —laughing gas?

Mr. Barbour:—I have not. I claim the application of my combinations to any condensable gas. I have tried ammonia, but under high pressure it is impossible to confine it. The advantage of carbonic acid is that it is of a coarser nature than either ammonia, or atmospheric air, or steam. It does not leak through my ball valves even under 1,000 lbs. pressure to the inch. I have had my valves covered with water and not a single bubble of gas came through.

[Carbonic acid has a strong affinity for water, and might there not have been an escape of gas which was absorbed by the water surrounding the valves? —EDS. SCI. AM.

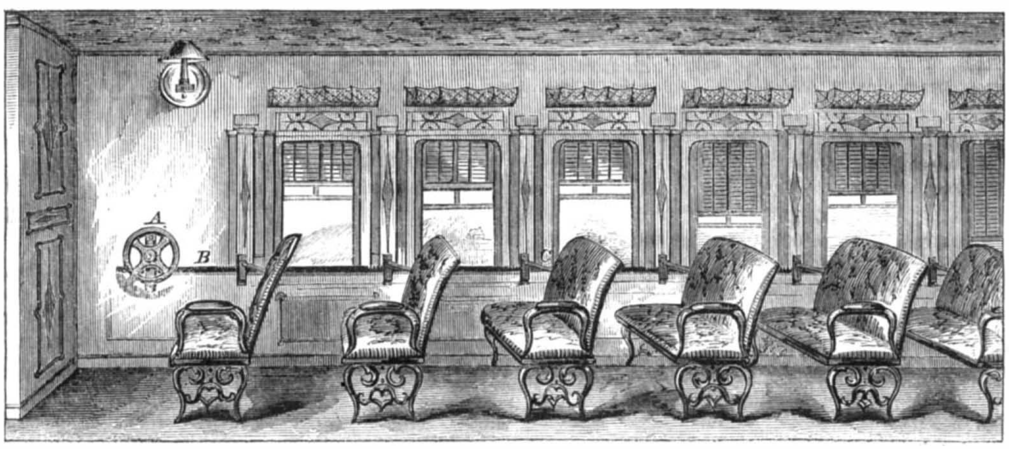
WHILE strawberries are in bloom is the time to examine the beds and eject such as are valueless. Those which are termed male plants, i. e. staminate, do not usually produce any or but very little fruit, and their number should not be over one in ten to fifteen of female plants.

Improved Reversible Car Seat.

When a car reaches the end of its route all the seats have to be reversed before it returns, and as there are many seats and many cars, it is a work of some time and labor to turn each one individually. The inventor of the plan illustrated herewith proposes to turn every seat at once, by mechanical means. All that is necessary, then, is to operate a certain part, when every seat is turned over with one movement.

By inspecting the engraving, a wheel, A, may be seen at one end of the car; this wheel has a pinion on the shaft, which meshes into the rack on the bar, B; this bar runs the whole length of the car and has a rack at each seat. There are pinions also on the ends of the arms, C, which reverse the seats. It is easy to see, therefore, that by turning the hand wheel, A, the bar, B, communicates motion to all the pinions at once and reverses all the backs thus preparing the car for the return trip at one movement. These fixtures also prevent persons from turning two seats into one, and monopolizing them when other parties are standing.

This device was invented by E. F. Shoenberger, of Germantown, Pa., and was patented January 3, 1865. For further information address him as above.



SHOENBERGER'S REVERSIBLE CAR SEAT.

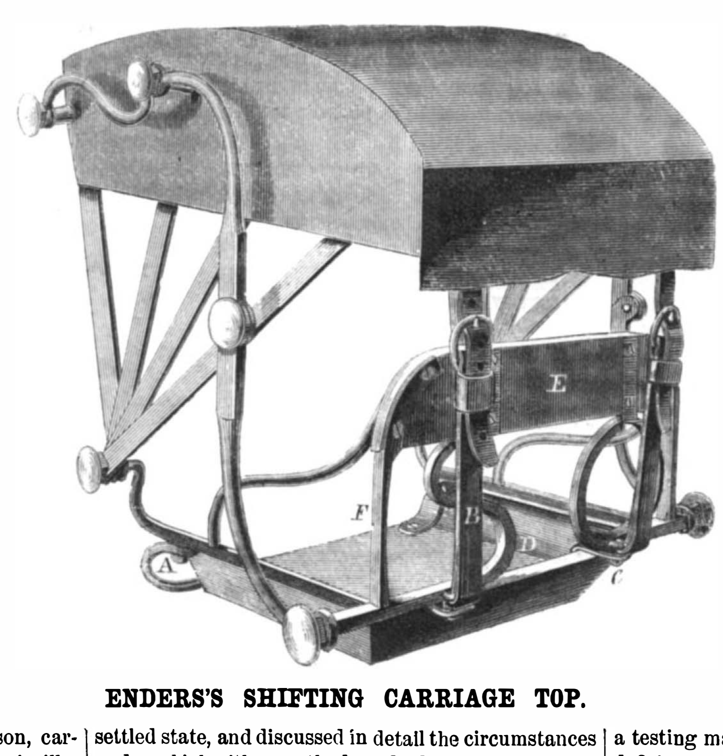
Improved Shifting Carriage Top.

This invention is an improvement on carriage tops and is designed to render them stronger at the point of attachment to the back of the seat, as also to make them removable at pleasure, and convertible into a "no top" wagon when desired. The top is fastened to the seat by a clasp fitting firmly under a stout iron brace, as at A; and the whole frame of the back, and that which supports the top, is made in one piece, so that when the forward clasp is disconnected from the brace the entire top may be lifted off. The straps, B, at the back, enable persons using this top to strain it back, when necessary, so that the clasp will be prevented either from getting loose and being detached spontaneously or rattling.

At the back of the vehicle there are also two fastenings or clips, C, which retain the top at that point, and prevent it from shifting laterally, and the irons, D, which carry the back, E, are made in the shape of an S or of an annular form, as shown, the object being to render them capable of a slight spring or compression, so that they can be connected to the clips before spoken of. The upright braces, F, also afford support to the back, E, and remove the strain, says the inventor, from the seat itself.

This top is claimed to be a great improvement on the old plans.

A patent is ordered to issue. For further information address Enders & Severson, carriage manufacturers, 213 Jefferson street, Louisville, Ky. Patent solicited through the Scientific American Patent Agency.



ENDERS'S SHIFTING CARRIAGE TOP.

Combined Cylinder Engines, Surface Condensers, Etc.

At a recent meeting of the Royal School of Naval Architecture, London, Mr. Robert Murray gave his experience on marine engineering, as follows:—

Surface Condensers.—It was found that the water while free from salt was apt to become very foul, the result being that the tubes of the condenser got blocked up, while the boiler was exposed to even more rapid deterioration than under the influence of hot brine. There was a set off, but not an adequate one, in a diminished consumption of coal. Mr. Murray thought that, on the whole, there was little or no saving in their use at present.

Combined Cylinder.—By a comparison of the performance of the *Poonah*, *Delhi*, and other vessels of the Peninsular and Oriental Company, with the *Saxon* and *Roman*, of the Cape Mail Company, Mr. Murray was led to the conclusion that there was no such advantage over the single cylinder as would compensate for the increased weight and complexity of the combination.

Superheating.—Mr. Murray stated that it might now be considered as certain that this process is desirable for all vessels which make long voyages, and which use expansion in the cylinders to any considerable extent. In the smaller class of coasting and river steamers, where the trip was short, and the engines not worked so expansively, superheating did not answer so well. In any case the temperature of the steam at the superheating should be limited to 320 deg. or 350 deg. at the utmost.

Screw v. Paddle for Ocean Steaming.—Mr. Murray considered that this question was by no means in a settled state, and discussed in detail the circumstances under which either method had advantages over the other. He remarked that screw vessels were often placed under circumstances disadvantageous for comparison by being under-powered.

Shafts.—Mr. Murray stated it as an established rule, that shafts, whether paddle or screw, will not last beyond a limited time, failing sometimes after five years' work, in other cases lasting ten or twelve years, but always being deteriorated by use. After discussing the cause and manner of this deterioration, he stated circumstances which led him to form a favorable opinion of the recent introduction of steel instead of iron for the shafts both of paddle and screw engines.

A DRY PORTABLE VINEGAR.—Wash well half a pound of white tartar with warm water, then dry it and pulverize as fine as possible. Soak that powder with good sharp vinegar, and dry it before the fire or in the sun. Re-soak it as before with vinegar, and dry as above, repeating this operation a dozen of times. By these means you will have a very good and sharp powder, which turns water instantly to vinegar. It is very convenient to carry in the pocket, especially when traveling.

Heavy Rolling Mills---Testing Castings.

"Recently," says the London *Engineer*, "we went to the works of Messrs. T. Perry & Son, of Highfields, near Bilston, and inspected a fine lot of work intended for the manufacture of ship and armor plates and bars, for the use of the arsenals of our own and one or more Continental governments. The rolls will be used in the working of steel as well as iron; and the steel will be produced by the Bessemer process. The machinery in course of completion and now ordered consists of one 24-inch train for armor plates; one 24-inch train for the largest sections of angle and T-iron for shipbuilding; one 26-inch train for steel plates; one 24-inch train for steels; one 22-inch trains for steel rails and large sections of angle steel. Each of the above trains is provided with massive reversing gearing, the iron and steel being rolled backwards and forwards so as to avoid the labor and loss of time incurred in lifting the bars and plates over the rolls, as is the practice in ordinary rolling mills. Some idea may be formed of the strength and massiveness of the above from the fact that the housings or frames of the largest rolls weigh thirty tuns per pair. In addition to the above there are one 22in. train for puddled bars; one 16-inch merchant train for steel; one 14-inch train for iron; and 10-inch ditto for steel. The engines for a part of the machinery described are also being made by Messrs. Perry. They include three high-pressure engines of very large size, capable of working up to 1,305 indicated horse power. The driving machinery is of the strongest and heaviest description, including (among others of proportionate strength) three enormous driving wheels, 20 feet diameter and 8-inch pitch, weighing about 32 tuns each: eight large fly wheels from 25 to 35 tuns each, and most of the driving shafts are 24-inch diameter. Messrs. Perry tells us that they have for several years adopted the plan of ascertaining the actual strength of every casting of importance which they make, and the results are duly registered in a book kept for that purpose. A trial bar is cast from each ladle of the melted iron, and these bars are afterwards broken in a testing machine made for the purpose. Should any deficiency of strength appear the casting is broken up the same as if it had been a 'waster' from any other causes."

THE "LINNÆUS" RHUBARB.—This plant, so highly esteemed for pies, is being cultivated and improved very much. From being coarse, stringy, sour and astringent, it has been rendered exceedingly fine and delicate in flavor. The Linnæus is the finest sort, and is justly celebrated. We learn from Mr. R. W. Holton, of No. 32 John street, New York, and from other reliable sources, that it is perfectly hardy, exceedingly fine-grained, and well flavored, and, what is quite important, that it requires but little sugar to render it palatable. Considering its good qualities, it should be widely cultivated.

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VOL. XII. NO. 24...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JUNE 10, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

THE EFFECTS OF THE WAR UPON THE INDUSTRIAL ARTS.

Grote, Gibbon, Sismondi, Macaulay, Irving, Prescott, Motley, and nearly all the great historians, have been in favor of free institutions; a large study of human affairs bringing conviction that these institutions are most efficient in promoting the happiness and well-being of communities. Buckle, in his learned "History of Civilization," says, that all the great reforms have been the removal of some obstruction to human freedom. Such a reform, more radical and thorough in the scope of its operation, and wider in extent than any which preceded it, has swept over our Southern States, converting 4,000,000 of the inhabitants from simple chattels into freemen.

The most important effect of this stupendous reform will be experienced by the mass of white inhabitants at the South, in bestowing upon them and their children the priceless boon of education. Among all the inhabitants of the country those who will be most benefited by the suppression of the rebellion are the rank and file of the Southern armies, who have been fighting with such blind desperation to prevent this result, for, they will now enter upon that path of forethought, economy, advancement and prosperity which is the invariable accompaniment of popular education.

One of the necessary consequences of the extension of education will be a far greater variety of industrial pursuits. Ignorance was essential to the existence of slavery, and this ignorance was incompatible with the skill and intelligence requisite in the construction and management of machinery, and in all the mechanical operations. Hence the devotion of Southern labor to the raising of rice, tobacco, cotton, hemp, and other agricultural products. To these pursuits the whites, as well as the blacks, were mainly devoted. No pretension could be more ridiculous than that the white men of the South have scorned to labor; there, as elsewhere, the great mass of the people are poor, and must work or starve. We know from personal observation that throughout the South there has been no difficulty in hiring thousands of white men to work at the market wages. Abbott Lawrence once wrote a letter of advice to the people of Virginia, urging them to embark in mining iron ore and smelting it, on the express ground that their ignorant and unskilled labor would be adapted to this industry. But Abbott Lawrence underestimated the obstructions which slavery and its concomitants offered to even the rudest mechanical pursuits, and it was found impossible to follow his advice.

Now all these obstructions are removed, and no man can estimate the results; he whose imagination is capable of the boldest flight will come nearest to the truth. A vast horde of skilled laborers from the Northern States and Europe will pour into the South, and mining, manufacturing and mechanical industry will spring at once into life and vigor; the ribs of the mountains will be blasted asunder; the streams will be turned into mill courses; cities, canals and railroads will be constructed, and wealth will be accumulated with a rapidity unparalleled in the history of mankind.

To aid all this varied industry there will be a demand for new machinery, new implements and new devices in endless variety. This immense enlargement of the area of freedom is a corresponding expansion of the call and the reward to inventive genius.

CREDITING EXTRACTS.

It requires but little experience in journalism to convince any one of the wisdom of citing the authority on which any assertion is made. Any statement in relation to the expansion of steam on the authority of Rankine; in relation to the strength of iron on that of Fairbairn; in relation to ichthyology on that of Agassiz; in relation to chemistry on that of Prof. Seely, is of a hundred fold more value than the same statement would be if made anonymously. A journal which omits to name its authorities, simply throws away a large portion of the value of its reading matter. Besides this, it makes itself responsible for all the errors and blunders of the investigators whose results it publishes.

We have been forcibly reminded of this truth by a little incident which has just occurred. Finding in the *Shoe and Leather Reporter* a translation from the *Gerber Courier*, describing the mode of manufacturing a certain kind of French leather, we cut it out and gave it to the printer, the credit being accidentally omitted. When the forms were ready for press the omission was noticed and regretted, but it was not deemed of sufficient importance to have the forms unlocked, and it was allowed to pass. The next number of our cotemporary contained this complaint:—

"We notice that a translation of ours, which was duly credited by us as translated from the *Gerber Courier*, on the manufacture of French leather, was very coolly abstracted from our columns and inserted as original by a cotemporary a few days ago. Any of our articles are at the service of our cotemporaries if they will only be kind enough to credit us. In the present instance an injustice was done not only to ourselves but to the *Gerber Courier*."

At the same time we received a letter in French, from a French tanner, saying that the extracted article was ridiculously erroneous. We translate this letter as follows:—

"MESSIEURS THE EDITORS:—I have read in the last number of your journal, page 309, a piece entitled 'The Manufacture of French Leather.' As I am a tanner myself, and as I have worked at this trade in France for ten years, I take the liberty of informing you that the person who rote that is entirely ignorant of the manner of making the leather, which we call *vache lissie*, and not '*vachen*,' as he says. That is a word which I have never heard pronounced in France.

"*First*, The leather is not treated with hot ashes, but with lime.

"*Second*, The leather is not greased.

"*Third*, The tables used are not of marble, but of oak or walnut, 11 feet long and 5 feet wide.

"If you desire to know the manner of making this leather, and will inform me through the medium of your journal, I will communicate it to you.

"I have read the extract referred to, to several French tanners, who have laughed at it (*qui en ont assez ri*), because it was in no sense correct.

"Your servant, M. A. DURIF.

"Wellsboro, Pa., May 15, 1865."

We should be pleased to receive from our obliging correspondent a correct description of the method of making this kind of leather in France. In the mean time we inform our New York cotemporary that if we had credited the article referred to it would have been to the *Gerber Courier*, and not to the *Shoe and Leather Reporter*. We translate a great many articles from foreign journals, but should never expect to receive credit for them ourselves. When the *Reporter* becomes as accustomed to having its own original articles plagiarized as we are, it will receive the matter with more philosophy. We have now before us a copy of the *New York World*, containing an article with a large heading on refining petroleum, credited to the *Pittsburgh Commercial*, and on examining it we find that it is copied verbatim from page 112 of our current volume—the original article having cost us two days' labor to prepare. We have also seen our editorials copied extensively into our own and the Canadian papers, and credited to the *London Chemical News* and the *Technologist*. These plagiarisms, so far from giving us offence, have gratified our pride. They showed that the English editors who published our articles as their own, not only endorsed the soundness of our views, but tacitly acknowledged that the style in which they were expressed was better than that of which these editors were capable.

THE SUEZ CANAL.

The great canal for connecting the Red Sea with the Mediterranean is so far advanced as to be navigable for small barges through its whole length, with the exception of one point where a large lock is in process of construction; a transshipment is required at this place. The advance of the work to this stage was celebrated on the 7th of April by what was called "an opening of the canal," this being the second "opening," which has been publicly celebrated.

The canal when completed will be about 100 miles long, and 330 feet wide at the water line, with its bottom 20 feet below the level of the Mediterranean. The projector of the enterprize is M. F. de Lesseps, a Frenchman, who obtained a grant in 1854 from the Egyptian Government of the right of way for 99 years, on condition of paying 15 per cent of the net profits to that Government. He then formed a joint stock company, with a capital of $40,000,000, on condition that 75 per cent of the profit should be divided among the stock holders, 15 per cent should be paid to the Egyptian Government, and 10 per cent should go to the originators of the enterprize. On these terms the stock was taken up, $18,000,000 by the Egyptian Government, and the remainder by capitalists in Paris and London. It is stated that contracts have been made for the completion of the several parts of the work by the 1st of July, 1868. The distance from New York to Bombay, in India, is now by the Cape of Good Hope, 18,600 miles; by the way of the Suez canal it will be 11,283 miles, the new route thus shortening the voyage more than 7,000 miles.

DRILL CHUCKS.

Of late a demand has sprung up among machinists for a small universal drill chuck, or a tool to hold drills of all sizes, with straight shanks, from a sixty-fourth to three-eighths of an inch. The necessity for employing such a tool was rendered greater by the introduction of the Manhattan twist drills, which are now extensively used by all good workmen. These chucks should not be cumbrous or costly, and should be capable of speedy adjustment, and hold the drill firmly, for it sometimes happens in drilling deep holes that the drill binds, bends and breaks in the chuck if it slip. They are also exceedingly useful for holding wire to make small screws or taps, or to take small rods that have to be cut to a certain length. Some makers apply the chuck to the body of the lathe center, so that it fits on it; others screw the chuck on the mandrel when the lathe is small, and still others make a common taper spindle like a lathe center. All varieties have their good points. Some very good tools of this class are now in market,

Coal-mining Machines Wanted.

At a recent meeting of the American Iron and Steel Association, Mr. A. C. May, of Milwaukie, offered the following, which was referred to the Executive Committee:

Resolved, That the Executive Committee of this Association are hereby authorised to investigate and report at the next quarterly meeting the expediency of offering such inducements or suggestions to inventors and machinists as shall furnish a practical machine for mining coal and iron ore.

The Association meets at Cleveland on the 23d of August next.

FROM a report submitted to the Italian Government on the education of the people, it appears that out of 21,777,534 people, 16,999,701 are unable to either read or write! An Italian who cannot read is not so ignorant as an Englishman in that position, but there is, nevertheless, ample work for the schoolmaster. In Piedmont, only, is half the population able to read.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office lass week; the claims may be found in the official list:—

Machine for Cutting Sheet Metal.—This invention consists in the use of two pairs of shears adjustable for any desired bevel and length, and applied in combination with a treadle or other suitable mechanism, in such a manner that the bevel end from curved pieces of sheet metal can be cut with little loss of time and with perfect accuracy; it consists, further, in the application of adjustable gages in combination with the adjustable shears, in such a manner that the apparatus can be readily set for pieces of sheet metal of any desired width; it consists, finally, in providing the shears with crooks in the cutting edges, fitting one another in such position that by their action the pieces of sheet metal are notched at the same time the bevel ends are cut off, and each piece, when taken from the shears, is ready for soldering without requiring any further proposition. Hosea Low, of Waukon, Iowa, is the inventor.

Combined Hydraulic and Pneumatic Pump.—This invention relates to a pump for raising water from deep wells or reservoirs, and is more especially designed for oil wells, mining purposes, etc. The invention consists in the use of an air pump in connection with a water receiver arranged in connection with valves and pipes in such a manner that water and other fluids may be raised from great depths by means more simple and less expensive than the force pumps now used for such purposes. G. M. Woodward, of New York city, is the inventor.

Steam Boiler.—This invention consists of certain improvements in the construction of vertical steam boilers, wherein a combustion chamber is employed, and the flues, both downward and upward, are made to pass through the water space, and wherein the upper parts of the apparatus are so arranged that the products of combustion and heated gases are made to superheat the steam in the steam space of the boiler. Thomas Main, of Green Point, N. Y., is the inventor.

Operating Slide Valves.—This invention consists in a novel mode of operating slide valves of steam engines, so that they may be made to cut off steam at any desired part of the stroke, and be also moved with a quick stroke, one of the features of the invention being the communication of the motion of the valve stem to the valve through a vibrating lever whose upper end, which is free, is made the fulcrum of the said lever. John B. Cochrane, of Brooklyn, N. Y., is the inventor.

MARKET FOR THE MONTH.

During the month of May the price of gold fell from 150 to 130, and recovered to 137, most other values, of course, going down and up with it. The following are the comparative rates at the beginning and close of the month:—

	Price April 26.	Price May 31.
Coal (Anth.) ℔ 2,000 ℔	$11 00	$9 00
Coffee (Java) ℔ ℔..........	33 @ 35	33 @ 36
Copper (Am. Ingot) ℔ ℔....	34 @ 36	30
Cotton (middling) ℔ ℔.....	50 @ 51	51
Flour (State) ℔ bbl....	$7 00 @ 7 90	$5 85 @ 6 95
Wheat ℔ bush....	2 20 @ 2 50	1 90 @ 2 20
Hay ℔ 100 ℔..................	1 32	1 00
Hemp (Am. drs'd) ℔ tun..	275 00@350 00	260 00@270 00
Hides (city slaughter) ℔ ℔.	8 @ 9½	8 @ 9½
India-rubber ℔ ℔............	51 @ 90	46 @ 75
Lead (Am.) ℔ 100 ℔......	9 75 @ 9 87	8 25 @ 8 50
Nails ℔ 100 ℔....	7 00	5 50 @ 5 75
Petroleum (crude) ℔ gal....	37 @ 37½	35½@ 36
Beef (mess) ℔ bbl.....	$12 00 @20 00	10 00 @18 00
Saltpeter ℔ ℔....	28	25
Steel (Am. cast) ℔ ℔.......	14 @ 22	21 @ 22
Sugar (brown) ℔ ℔	10¼@ 15	9¼@ 15
Wool (American Saxony fleece) ℔ ℔......	75 @ 85	75 @ 77
Zinc ℔ ℔....................	13½@ 14	12 @ 12½
Gold.........................	1 51¾	1 37
Interest......................		6 @ 7

MISCELLANEOUS SUMMARY.

COUNTRY readers, fond of toilette fineries, can perfume the water in which they wash by throwing violets into the pitcher, and letting them remain for some hours.

THERE is a paper collar manufactory in Springfield, Massachusetts, that turns out ten thousand dollars worth a day.

To SOFTEN IVORY.—In three ounces of spirits of niter and fifteen of spring water, mixed together, put your ivory a soaking. In three or four days it will be soft so as to obey your fingers.

To dye ivory thus softened dissolve in spirits of wine such colors as you want to dye your ivory with. And when the spirit of wine shall be sufficiently tinged with the color you have put in, plunge your ivory in it, and leave it there till it is sufficiently penetrated with it, and dyed inwardly. Then give that ivory what form you please

To harden it afterwards, wrap it up in a sheet of white paper, and cover it with decrepitated common salt, crumbled by heat, and the driest you can make it to be; in which situation you shall leave it only twenty-four hours.—*Ancient Work.*

QUALITY OF MILK.—It is sometimes forgotton that the last gill of milk drawn from the cow's udder is the best part of every milking. Careful experiments made in England, (according to a report lately published), prove that the quality of cream obtained from the last cup taken from most cows exceed that of the first in proportion of twelve to one. The difference in the quantity also is considerable. Hence, a person who carelessly leaves one pint unmilked loses in reality as much cream as would be afforded by six or eight pints at the beginning, and loses, too, that part of the cream which gives the richness and flavor to the butter.

A NEW company for the manufacture of pocket cutlery has been formed at Rochester, Pa., under the title of the "Pittsburgh Cutlery Company." The men comprising it are all practical English workmen. They will employ from forty to fifty hands, beside using all the most improved machinery.

IF you have a lathe job to do, clean your lathe first, keep it clean while you are at work, and clean it when you get done. The lathe will last longer, the work will be better, and you will get a reputation for neatness.

THE owner of the McRae farm, 160 acres, lying east of the Coquette well has been offered and refused $900,000 for it.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MAY 30, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

47,911.—Waxed-thread Sewing Machine.—Hosea P. Aldrich, Spencer, Mass., assignor to himself and George Jenks:

I claim, First, Heating the pressure pad and cloth plate of a sewing machine, or either of them separately, by steam or otherwise, for the purpose of preventing waxed thread from sticking thereto while passing through the machine, substantially as and for the purpose specified.

Second, Inclosing the tension wheel, or other tension device of a sewing machine, over which the waxed thread passes in a heated chamber or casing, for the purpose of preventing waxed thread which passes around it from sticking thereto, substantially as herein described.

Third, Combining with the steam chest of the wax receptacle, D, the casing which contains the tension wheels, substantially in the manner and for the purposes specified.

Fourth, The combination with the wax receptacle D, and its steam chest, a, the pipes, G O K, hollow pressure pad, B, and hollow cloth plate, C, substantially as and for the purposes specified.

47,912.—Thread-waxing device for Sewing Machine.—Hosea P. Aldrich, Spencer, Mass., assignor to himself and George Jenks:

I claim, First, The combination of the wax-receptacle, A, with the water tank, D, water jacket, E, and chimney, C, substantially as and for the purposes described.

Second, Attaching the wax receptacle to the sewing machine by passing a rod through the hollow tube, I, which tube performs the function of a thread guide for immersing the thread under the surface of the wax, substantially as herein described.

Third, The combination of the tube, L, india-rubber plug, O, and screw, M, substantially as and for the purposes described.

Fourth, Making the india-rubber plug, O, convex at both its ends, in combination with socket of tube, L, and that on screw, M, substantially as and for the purposes set forth.

Fifth, The application to thread-waxing devices of the tube, L, when constructed as and for the purposes described.

47,913.—Shade Holder for Lamps.—Lewis J. Atwood, Waterbury, Conn.:

I claim, First, The combination of mortises and rivets or eyelets, with the springs for securing the latter to the ring, as set forth.

Second, In combination with the springs for holding the lamp shade upon the chimney, I claim the ring formed of thin sheet metal, stiffened by corrugations running around it, for the purposes and as specified.

Third, I claim securing the exterior ring by projections from the springs, in the manner set forth.

47,914.—Compound for Removing Scale from Boilers.—Albert B. Auer, Babcock's Grove, Ill. Antedated April 27, 1865:

First, I claim the compound herein described, composed of gum catechu, salt and saltpeter, substantially as and for the purposes specified.

Second, I claim, in combination with a compound for removing boiler incrustations, the employment of flaxseed, as and for the purposes herein described.

47,915.—Desk.—Frederick Baltz, New York City:

I claim the arrangement and combination of the levers, B C and D, with the desk and cover of the desk or table, and with the furniture, in such a manner that the opening or shutting of the cover or door will pull the desk outwards or inwards, substantially in the manner and for the purpose described.

47,916.—Potato Digger and Separator.—John M. Bartlett, Harmer, Ohio:

I claim, First, The combination of the iron frame, A2, scraper, E, endless apron or chain, F, main shafts, G, spur wheel, H, with gearing, as stated, or their equivalent, by means of which the machine is made to dig and automatically separate potatoes, as set forth.

Second, The platform, X, in combination with the chute, Y, and sacking device, X', in the manner and for the purpose set forth.

47,917.—Apparatus for Applying Paint to Stencil Plates.—Caleb Bates, Kingston, Mass.:

First, I claim the apparatus herein set forth for applying paint or ink to stencils, constructed and operated substantially as above described.

Second, I claim the plate, I, for compressing the brush at the time it receives paint or ink from the hopper, substantially as above described.

[This invention consists in an apparatus for applying paint or ink to stencil plates by means of a revolving brush, to whose surface the paint is applied from a hopper, the brush and hopper being carried upon a truck, which is made to travel over the stencil plates, and the brush being revolved by means of gearing which is connected to one of the shafts of the truck.]

47,918.—Coupling Conducting Wires.—G. W. Beardslee, College Point, Long Island, N. Y.:

I claim for effecting the insulating coupling or union of electric conductors, the combination of the metallic disks, or the equivalents thereof, on the conductors, the coupling tube and nut, or its equivalent, and the elastic plug interposed between the metallic discs and the coupling tube and nut, substantially as and for the purpose specified.

47,919.—Hay Spreader.—Horace Beers, Brookfield, Conn., assignor to Smith & Burham:

I claim the employment of the revolving head piece, D, provided with spirally-arranged teeth, in combination with the supporting pieces, E E', and with the movable journal box, J, all arranged in the manner and for the purposes substantially as herein described and set forth.

I also claim the arrangement and combination of the coil springs, L, platform, M, and lever, K, in the manner and for the purposes substantially as herein described and set forth.

47,920.—Bridge.—John Boles, Jr., Boston, Mass.:

I claim the combination as well as the arrangement of the lacing, b, with the truss composed of the posts, top and bottom chords, braces and vertical tie rods, as specified.

I claim the construction of the truss with the arrangement of the several curved braces, and the several curved counter braces divergent with respect to each other, as described, whereby the crossings thereof are increased from the top to the bottom chord, as specified, and in combination therewith I claim the two tension wires or cables, c c, arranged as specified.

47,921.—Sorghum Evaporator.—Jesse Brockway, Oswego, Ill.:

I claim, First, In combination with an evaporator, the heater, B, constructed and operated as and for the purposes specified, substantially as described.

Second, In combination with an evaporator, the damper, E, constructed and operated as and for the purpose specified, substantially as set forth.

Third, In combination with an evaporator having various compartments, the conductor, C, when used as and for the purpose specified, substantially as set forth.

Fourth, In combination with an evaporator having various compartments, the gates, D, constructed and operated as and for the purpose described.

Fifth, An evaporator, having sides that overlap the furnace upon which it rests, and extending down the outside thereof, for the purposes specified, substantially as set forth.

47,922.—Piano-forte Action.—Stephen P. Brooks, Somerville, Mass. Antedated May 21, 1865:

I claim the combination of the hammer arm, D, with the standard, C, and fly lifter, F, in connection with the escapement on the rail, G, substantially as and for the purpose specified.

I also claim extending the hammer arm through and in the rear of the standard, in connection with the back catch, H, for the purpose of holding the hammer after the blow is struck, as set forth.

I also claim placing the back catch, H, in the rear of the hammer arm, substantially in the manner and for the purpose specified.

I also claim the combination of the standard, C, upon the key lever, B, the hammer arm, D, the fly lifter, F, with the button and spring, the escapement, g, and the back catch, H, substantially as shown and described.

47,923.—Damper for Stovepipes.—H. C. Brown, Buffalo, N. Y.:

I claim the combination and arrangement of the annular disk, C, and hollow perforated cones, D D', with the pipe, A, substantially as and for the purposes herein specified.

47,924.—Washing Machine.—Hiram Brown, Burton, Ohio:

First, I claim the beaters, H, when constructed and arranged as herein specified, in combination with the ribs, F, for the purpose set forth.

Second, I claim the slotted arm, H', in combination with the arm, p, plate, n, lip, p', and key, l, when constructed and arranged in the manner, substantially as and for the purpose set forth.

47,925.—Blasting Rock.—George C. Bunsen, Belleville, Ill.:

I claim the application for blasting purposes of a disk, a, when used either with a cylinder, d, or support, c, or in combination with both cylinder and support, substantially in the manner and for the purposes specified.

47,926.—Harvester.—Wm. H. Burkhart, Bucyrus, Ohio:

First, I claim arranging the spring, 1, so that it is pendant from near the reel shaft, upon the reel post, and so that it supports the pulleys, 5 5, near the lower end of the reel post, in the manner and for the purpose described.

Second, The arrangement of the pendant spring, 1, swivelling pulleys, 5 5, reel shaft, 3, pulley, 4, and driving chain or cord of the reel, in the manner and for the purpose described.

47,927.—Whitewash Brush and Handle Attachment.—W. B. Burtriett, New York City, and J. P. McIntosh, Brooklyn, N. Y.:

First, We claim securing a handle to a brush by means of a screw fastening, which is applied to the rounded portion, D, constructed substantially as described.

Second, The adjustable section, C, having a screw formed on it, in combination with a hemispherical slotted speed, D, and ferrule, B, substantially as described.

47,928.—Die for Spike Machine.—Samuel Cameron, Pittsburgh, Pa. Antedated May 17, 1865:

I claim the use of dies for spike machines made to overlap each other, each having two convex operative faces at right angles to each other, one such face being horizontal and the other perpendicular, for the purpose of making spikes with fluted shanks, substantially as described.

Also the use of a removable clip for forming the point of the spike, so constructed as hereinbefore described, as that its operative face may be ground down from time to time whenever it may be necessary to dress off the head of the die, so as to compensate for the reduced length of the die, and thereby obviate the necessity of using new dies, when the head end of the die becomes worn, substantially as hereinbefore set forth.

Also the use of dies for spike machines, having plain operative faces for a short distance below the head of the spike, and convex operative faces elsewhere, for the purpose of making a fluted spike with the square neck, substantially as described.

[This invention has for its object to produce an implement for use by miners and those engaged in boring artesian and other wells, by means of which they can recover from the bottom of the bore broken pieces of drills and other comparatively light objects.]

47,929.—Grapnel for Wells.—Jackson R. Carr, Ellemville, F. Y.:

I claim the grapnel above set forth for recovering fragments of metal and other refractory substances from the bottoms of wells constructed and operated substantially as described.

47,930.—Boot and Shoe Sole.—John Chilcott, Brooklyn, N. Y. Antedated May 19, 1865:

I claim as a new article of manufacture a compound sole, composed of an inner sole of leather and an outer one of india-rubber or gutta percha, united by sewing or other means, with a projecting margin of leather, consisting simply of a portion of the inner sole, substantially as herein set forth.

47,931.—Mash Tun.—John Chilcott, Brooklyn, N. Y. Antedated May 15, 1862:

I claim the collecting trough or basin, C, strainer, d d, and gates or shutters, D D, in combination with each other and with the mash tun, substantially as and for the purpose herein specified.

47,932.—Slide Valve.—John B. Cochran, Brooklyn, N. Y.:

First, I claim the combination of the valve stem, C, with the lever, G, whose lower end is pivoted to the back of the valve, and whose upper end is movable, so that the fulcrum, by means of which the valve is moved to and fro, is a movable one for each throw of the valve, substantially as above described.

Second, I also claim the combination of the rod, H, and its nuts, e e, operated as set forth, with the lever, G, substantially as described.

47,933.—Steam Generater.—Isaac E. Craig, Cleveland, Ohio:

I claim, First, The pipes, D and E, when in combination with the boiler and furnace, as and for the purpose herein set forth.

Second, I claim the blower, C, when in combination with the pipes, D and E, together with the boiler and fire-box, snbstanstantially set forth.

47,934.—Washing Machine.—Amory Davidson, Clinton, Mass:

I claim the slots, J J and K K, in the legs, G G, in combination with the shaft, L, and wheels, P P, substantially as and for the purpose described.

7,935.—Tack Driver.—Biram C. Davis, Herkimer, N. Y:

I claim, First, The descending incline plate, A, and guide, B, as shown and for the purpose described.

Second, I claim the driver, C, slide, D, bent arm, E, dividing slide, F, expanding dies, H H, the whole being arranged substantially as described and for the purpose set forth.

47,936.—Steam Pressure Gage.—John Davis, Alexandria, Va:

I claim, First, The pendulonsweight, J, when used in combination with the steam pressure gage, and getting into the gage, the method being unnecessary to describe, it being a well known one adopted in all similar cases. These will be seen at the lower end indications of such packing.

Second, The combination and arrangement of the pendulous weight, J, piston, F, rock, G, cog wheel, M, sector, L, toothed wheel, O, bracket, N, friction roller, H', substantially upon the principle and in the manner as herein set forth.

47.937.—Molding Core.—J. P. Davis, Middleton, Conn:

I claim a skeleton arbor for green sand cores, constructed with supporting plates, a a, and handles, C C, arranged as herein specified.

[This invention consists in a novel construction of a core-arbor for molding articles of cylindrical form, by the use of which one can make green sand cores, with branches of any shape.]

47,938.—Apparatus for Oiling Wool.—B. A. Earl, Media, Pa., and Henry Holcroft, Philadelphia, Pa:

We claim the combination of a box or reservoir, B, containing lubricating material, with a shaft, F, carrying a strip of wire gauze, or its equivalent, and having the within described movement imparted to it by the devices herein described or the equivalents to the same, for the purpose specified.

47,939.—Metal Cans or Boxes.—Horace Everett, Philadelphia, Pa:

I claim a metal can or box having a body secured by a lap joint, the projection formed by which is arranged on the inside of the can, as and for the purpose herein set forth.

47,940.—Line Wires for Telegraphs.—Moses G. Farmer, Salem, Mass., and Geo. F. Milliken, Boston, Mass:

We claim as a new article of manufacture a telegraph wire, reinforced for the purpose of strength with a core or cover of iron or steel, the wire being made by drawing a compound bar of the two metals.

47,941.—Process for Treating and Compounding Marl.—R. B. Fitts, Philadelphia, Pa:

I claim, First, The employment of sulphuric acid, in combination with night soil, for acting upon the marl, substantially in the manner described, and for the purpose specified.

Second, I also claim in combination with the marl, night soil, and acid, treated as described, the addition of the saltcake, gas lime, and animal charcoal, substantially in the proportions and manner described, and for the purpose specified.

47,942.—Gang Plow.—Philo M. Gilbert, Kewanee, Ill:

I claim, First, The combination and arrangement of the plow-beams, D D, the connecting adjustable straps, f f, and the removable pivoted connection, Z, with the tongue, O, as and for the purposes herein specified and described.

Second, I claim the combination of the plow-beams, D D, the jointed lever, I J, the supports, H, the lever, F, and the standard, E, arranged and operating substantially as and for the purposes specified and shown.

Third, The combination of the plow beams, D D, the reciprocating beam, C, the rear support, N, and the tongue, O, pivoted to said beams, arranged and operating as and for the purposes shown and set forth

Fourth, I claim the combination of the plow-beams, D D, reciprocating beam, C, the axle, A, provided with the slots, a a, the bolts, b b, rack, c, pinion wheel, d, and lever, e, arranged and operating as and for the purposes specified.

47,943.—Steam Brake for Rail Cars. Samuel N. Goodale, Cleveland, Ohio:

I claim, First, The arrangement of the steam cylinder, B, placed within or beneath the center of each car, and having double piston heads, C C', with guide rods, E and E', attached to their rods for operating the brakes, G, substantially as specified.

Second, I claim coupling the pipes, I, by means of the hollow pistons, K, working through stuffing boxes, I', as described

Third, I claim connecting the hollow pistons, K, by means of flexible tubes, as specified.

Fourth, I claim the arrangement of the pipes, I, and stop cocks, O, for the purpose specified.

47,944.—Cloth-dotter.—Sylvanus S. Gould, Worcester, Mass:

I claim, First, The combination with the body, A, of the valve rod, B, caps, C D, and valves, d b, substantially as and for the purposes set forth.

Second, The combination with the caps, C and D, of the spring, a, and packing, b, substantially as set forth.

Third, The combination with the valve rod, B, of the point, h, and supporting tube, c, substantially as set forth.

Fourth, Making the lower end of the valve rod, B, with a series of grooves, f, for the purposes set forth.

47,945.—Stove Pipe Drum.—George D. Greenleaf, 3 Mile Bay, N. Y:

I claim the combination in heat radiators for stoves of the drum, A, flues, a' a'' a''' a'''' a''''', arms, d d, and rod, D, substantially as and for the purposes set forth.

[This invention relates to a new and improved heat radiator to be applied to stove pipes for the purpose of radiating the heat, which would otherwise escape into the chimney.]

47,946.—Augers.—Charles Lee Griswold, Chester, Conn:

I claim the pointed floor lips, substantially as described.

47,947.—Fire Grates.—John Habermehl, Wheeling, West Va:

I claim, First, A fire space, C, above a fire grate, A, having its wall in the form of a section of a sphere, with its front edge in a plane inclined relatively with the fire grate, substantially as and for the purpose set forth.

Second, The semi-circular sliding damper, D, pivoted at its extremities to the forward part of the wall, b, and adjusted by the rod, e, substantially as and for the purposes set forth.

Third, Constructing the fire grate, A, with curved bars arranged so as to form an inclined front, substantially in the manner as and for the purposes set forth.

[This invention relates to a new and improved manner of forming the walls of the fire space over or above the fire grate, whereby the heat, which has hitherto escaped up into the chimney or flue, is thrown or radiated into the room or compartment, while at the same time smoke, gases, and other products of combustion are allowed to pass up into the flue or chimney. The invention also relates to an improvement in the construction of the grate, whereby ashes is not allowed to choke or clog up the same, and the grate allowed to throw out the heat much better than those constructed in the usual manner. The invention further relates to a new and improved damper or draft regulator for the purpose of regulating the draft as herinafter set forth.

47,948.—Manufacture of Silvered Glass Ware.—John W. Haines, Somerville, Mass:

I claim the stoppering of the hole on the bottom of double glass ware silvered with a metallic stopper, as herein described.

47,949.—Harness.—Emery E. Hardy, New York City:

I claim, First, The plate, A, constructed in the form and manner shown, and connected to the other parts, as herein set forth.

Second, In combination with plate, A, I claim the blocks, B and B', when so arranged as to form the channel for the strap, C, and otherwise constructed as described.

Third, I claim the copper plate, E, when constructed and fastened in place, as shown and described.

Fourth, I claim the slotted plate, e, screw, h, and nut, f, or their equivalents, when constructed and arranged to operate as and for the purpose set forth.

Fifth, I claim the method of securing the terrett, F, as shown, whereby an open space or channel is left underneath it for the strap, C.

Sixth I claim the self-adjusting back strap, when arranged to operate in connection with the other parts, as herein shown.

Seventh, In combination with the strap, C, I claim the slotted plate, e, clamp, f and i, and screw, h, constructed and operating substantially as described.

Eighth, I claim the hook, C, provided with the square shank, U, and used in combination with the bolt, l', and crupper plate, t, as and for the purposes herein set forth.

77,950.—Hay Press.—Axel Hayford and Ambrose Strout, Belfast, Maine:

First. We claim the combination and arrangement of the follower, toggle lever, and two cords, with the capstan, in the manner substantially as and for the purposes set forth.

Second, The combination of the door, catch bar, and a single button with the frame, when arranged substantially as and for the purpose set forth.

Third, The combination of the lever, R, the end lining, O, and wedged braces, P and Q, with the box, B, substantially as described for the purpose set forth.

47,951.—Clothes Wringer.—S. S. Hemenway, Boston, Mass. Antedated May 19, 1865:

I claim as an improvement on the clothes wringer, patented by Sylvanus Walker, June 17, 1862,

The employment of the cross-slat, J, in combination with the detached groved sockets, D D, and screw bolts, E E, substantially as set for h and for the purpose described.

47,952.—Churn.—Wm. Hosier, Washington Township, Ind.:

I claim the foam-dash, h, in combination with the guides, x x, and lower dashes, w w, when said dashes are arranged as described and operated by means of the devices attached to one half of the lid, e, as set forth.

47,953.—Crupper.—Frederic Howes, Boston, Mass.:

First, I claim combining with a crupper an extension-bar or piece for the purpose of raising and supporting the tail of a horse, as set forth.

Second, Making the supporting bar adjustable, so that it can be set and held at any desired angle with the crupper, as set forth.

Third, The combination of the ratchet ring, extension bar and spring-pall, as described.

47,954.—Wire Pointing Machine.—C. Jillson, Worcester, Mass.:

First, The combination with the adjustable stand, C, which supports the wire shaft, the swinging arm, F, cutter stand, I, and hanger or wire support, G, whereby the latter is connected wit the cutter stand but moved laterally as the wire is fed forward, substantially as and for the purpose specified.

Second, Combining the cutting and holding devices in a wire pointing machine with the stand which supports the wire in such a manner that the machine can be used for simply pointing wire or for pointing and cutting off the pointed pieces, substantially in the manner described.

Third, The combination of the pivoted stand which supports the hollow wire staff with the sliding table, B, for the purpose of adjusting the taper of the wire to be pointed, substantially as and for the purposes specified.

Fourth, Securing the wire within its hollow shaft by application of a slotted eye piece, o, substantially in the manner and for the purposes specified.

Fifth, The combination of the cutter and stand for supporting the wire in a wire pointing machine in such a manner as that the cutter remains stationary during the operation of pointing the wire substantially as described.

Sixth, The combination of mechanism in a wire pointing machine in such a manner as to cause the wire that is being pointed to recede from or approach the cutter by a simple movement of the standard which holds the wire to be pointed in a line parallel with the ways or base of the machine, substantially as herein described.

Seventh, The combination with arm, F, of sliding hanger, G, for supporting the wire, snbstantially as set forth.

Eighth, The combination with arm, F, of hanger, G, slotted arm, K, and guide, u, substantially as set forth.

47,955.—Machine for Pointing Wire.—C. Jillson, Worcester, Mass.:

First, I claim in combination with the hollow wire shaft the extension grade frame, E, sliding block, G, and self-adjusting supporting eye, d, substantially as and for the purpose specified.

Second, The combination with the cutter, s, the supporting sleeve, r, for adjusting and feeding the cutter as and for the purposes specified.

Third, The combination with the guide block, G, and supporting eye, d, of the yielding and self adapting weight, H, substantially as set forth.

Fourth, The combination with the arched frame, E, of the guide block, G, and supporting eye, d, as and for the purpose set forth.

Fifth, The combination of the circular bed piece, P, and table, O, for supporting the cutter stand, R, substantially as and for the purposes set forth.

Sixth, The combination with the table, A, of the bed piece, P, table, O, and operating lever, M, substantially as and for the purposes described.

47,956.—Wire Cutting Machine.—Lewis W. Johanning, Jr., San Francisco, Cal.:

I claim the combination and arrangement of the plank or platform, A, with the stationary cutter, C, vibrating cutter, D, cam lever, F L, curved guide, G, and gage, H, the whole constructed as described for the purposes set forth.

47,957.—Composition for Blacking Leather.—Paul W. Keating, Norwich, Conn.:

I claim the composition of matter of the ingredients, in the proportions and mixed in the mode above described.

47,958.—Shoulder Strap Slide.—George D. Kellogg, Troy, N. Y.:

I claim connecting the straps with each other at he point where they cross upon the back in the manner and for the purpose, substantially as set forth.

47.959.—Attaching and Detaching Tops of Vehicles.—D. A. King and V. N. Gardner, Livingston, Ky.:

We claim the mode herein described of attaching the top of vehicles to the movable piece, d, resting on the false bottom, e, and sustained by the bearers, f, and with the movable piece, d, held in position by the buttons, K K, or their equivalents, all constructed and operated as above described, and for the purposes set forth.

47,960.—Saddle Tree.—Adolph Koehler, Holyoke, Mass.:

I claim casting the saddle tree in one piece with a recess, a, in its under side in connection with the plate, B, to fit in the recess, a, and having the check rein hook, e, at its front end and the loop, b, to receive the breechen or back strap, at its near end, and the two screws, D E, to secure the saddle, C, and plate, B, to the tree, substantially as set forth.

47,961.—Jar for Oil Tools.—Robert H. Lecky, Allegheny City, Pa.:

I claim the use of the guides, E and C, when used in connection with "jar" for oil tools, said guides being arranged and operating subs antially as herein described and for the purpose set forth.

47,962.—Sash Fastening.—Robert Lee, Cincinnati, Ohio:

I claim the arrangement of spring latch, F, and catch, J, with their described or equivalent accesso ies the whole being combined and operating to form a secure sash lock, substantially as set forth.

47,963.—Furnace.—Joseph Leeds, Philadelphia, Pa.:

I claim connecting together the fire-chamber and the escape flue chamber of furnaces or stoves for air heaters, by means of the series of flat smoke or gas flues, C C, the said flues being con structed and arranged substantially in the manner described and set forth, for the purpose specified.

47,964.—Tobacco Pipe.—Frederick Killer, Baltimore, Md.:

I claim the above described smoking pipe as a new article of manufacture.

47,965.—Soldering Iron.—William K. Lewis, Boston, Mass.:

I claim a shield applied to a soldering iron in the manner, substant ally as shown and described.

[This invention relates to a new and improved soldering iron designed more especially for hermetically sealing cans, and similar purposes in which a small iron is generally used. The invention consists in the employment or use of a shield applied to the implement in such a manner as to prevent the radiation of heat therefrom, and retard the cooling of the iron, or rather copper, as well as to protect the operator from the heat thereof.]

47,966.—Evaporator.—F. A. Lord, Aurora, N. Y.:

I claim in evaporating liquids or fluids of any kind, the combined use of a tight or open boiler, and an open circulating vat or vats, the two connected by pipes so that the fluid may continuously flow or circulate through the boiler and through the vat or vats, substantially as and for the purpose herein described and represented.

47,967.—Machine for Cutting Sheet Metal.—Hosea Low, Waukon, Iowa:

I claim, First, The employment or use for this purpose of any single stationary frame or of two frames with the open ends pointed in the same direction, in either case, with two pairs of cutters, whether the frame or frames or the cutters be adjustable towards the working center, or the center adjustable towards the cutters and especially if the cutters are so placed in relation to the center or swivel that a right line drawn through the cutting points of contact between the cutters will pass through the working center in any position of adjustment, substantially as herein set forth.

Second, The clamp, D, and radius bar, c, constructed in such a manner as to lengthen and shorten at the center and the part that clamps the tin so formed as to pass by one pair of cutters or between two pairs of cutters, in combination with any stationary frame or frames with one or two pairs of cutters and with or without the gages, substantially as and for the purpose described.

Third, The gage, k, provided with a longitudi al slot, l, in combination with two oblique slots, m, in the squaring frame, E, constructed and operating substantially as and for the purpose specified.

47.968.—Steam Boiler.—Thomas Main, Green Point, N. Y.:

I claim the combination in a vertical steam boiler of the fire chamber, B, the enlarged combustion chamber, C, surmounting the said fire chamber and surrounded by the water space, the descending flues, f, and ascending flues, g, passing through the said water space, and the upper flue space, e, surrounding the steam dome, d, all as herein described.

47,969.—Hoisting and Lowering Weights.—William C. McGill, Cincinnati, Ohio:

I claim, First, The mechanical movement composed of the parts, A B C E I and J, or their equivalents, the whole being combined and operating substantially as set forth.

Second, The combination of the spider, I, and annulus, J, constructed and operating as set forth.

47,970.—Sorghum Evaporator.—J. H. Merrill, Quarqueton, Iowa:

I claim the pan, N, in combination with the evaporator, D, the whole constructed and arranged as and for the purpose substantially as herein set forth.

47,971.—Barometer.—Garret V. Money, New York City:

I claim the use of the new article of manufacture which I have designated the "Fine Registering Barometer and Themometer," made substantially as described and for the purposes herein before set forth.

47,972.—Snap Hook.—Hermann Mund, Chicago, Ill.:

I claim a snap, D, for a hook provided with or composed of three arms, b c d, arranged with a spring, E, within the shank, B, and pivoted to the shank, in the manner substantially as and for the purpose set forth.

[This invention has for its object facility in opening the snap so that it may be easily engaged with the strap or part designed to be connected with it, and also readily disconnected therefrom.]

47,973.—Edge Plane.—Martin Newman, Unadilla, N. Y.:

I claim the construction of an edge plane with the guard, c, and the diagonal knife, D, in combination with the s ock, A, substantially as and for the purpose herein set forth.

47,974.—Hat.—Robert S. Nickerson and James Wallace, Philadelphia, Pa.:

We claim as an article of manufacture a hat made of cloth having meshes substantially as described, and a perforated hat body.

47,975.—Combined Cultivator and Seeder.—C. Norwood, Bloomington, Ill.:

I claim the bars, E E, provided with the seed boxes, H H, and rollers, G, and pivoted at their rear ends to pendants, F, at the back part of the farming, A, in connection with the bars, L L, pivoted at their front ends to the pendants, M, at the front part of the farming, A, and provided at their rear ends with the coulter projections, b, and the forks, a*, and connected to the seed boxes, H, by the links, g, all arranged substantially as and for the purpose herein set forth.

Second, The arrangement of the bent pivot bars, I I, seed boxes, H H, and connecting bars, T, substantially as and for the purpose herein specified.

[This invention relates to a new and improved machine for planting and cultivating corn, and it consists in a peculiar construction and arrangement of parts, whereby it is believed that several advantages are obtained over the generality of machines now employed for that pur ose.]

47,976.—Means for Feeding Wool and other Fibrous Material to Picking, Carding, and other similar Machines.—S. R. Parkhurst (assignor to Emily R. Parkhurst), Bloomfield, N. J:

I claim. First, The combination of a vibrating comb with a toothed cylinder for removing wool or other fiber and foreign substances from the teeth of said cylinder, and also cleaning the teeth of said comb, substantially as specified.

Second, I claim the feed rollers, b and c, in combination with the vibrating comb, substantially as specified.

Third, I claim the combination of a feeding cylinder, b, vibrating comb, e, and burring cylinder, d, for the purposes and substantially as specified.

Fourth, I claim the combination of a shell with the vibrating comb and toothed cylinder, d, for the purposes and substantially as specified.

Fifth, I claim the heads, f f, connecting bars, g, and eccentrics, in combination with the vibrating comb and cylinders, b and d, as set forth.

Sixth, I claim the combination of the burring cylinders, b, m, and strippers, l and n, with the feed cylinder, b, and vibrating comb, e, substantially as specified.

Seventh, I claim the combination of the burring cylinder, m, the stripper, p, the worker, q, and the carding cylinder, o, substantially as specified, whereby the stripper, p, transfers the fiber from the burring cylinder to the carding cylinder, as set forth.

47,977.—Road Scraper.—Wm. Patterson, Salem, N. J:

I claim, First, a road scraper, having its scraper proper, A, made in the curved form and arranged obliquely to the line of draft as described and set forth, the said scraper, A, being supported in its place by means of arms, c1 c2, bent downward behind, and hinged or looped to the back of the said scraper, A, as described, so as to allow the latter to tilt forward from its upright position before the arms when required, as and for the purposes described.

Second, The arrangement of the adjustable notched lever, f, in combination with the curved bar, C, and scraper, A, as and for the purposes specified.

Third, The curved connecting bar, C, when arranged in combination with the tongue, D, and scraper, A, so as to be adjustable at its connection with the said tongue, substantially as described for the purposes specified.

Fourth, The arrangement of the carrying wheels, E E, or their equivalents, in combination with the scraper proper, A, substantially in the manner described for the purpose specified.

47,978.—Glass Presser Feet of Sewing Machines.—Robt. E. Paterson, Jr., Philadelphia, Pa.

I claim the glass presser foot, with its longitudinal recess, adapted to receive the edge of the guide plate, substantially as described.

47,979.—Rolling Pin.—C. E. Phillips, Abington, Mass:

I claim, First, Forming a rolling pin, at one end or through its whole extent hollow, or with a suitable aperture or receptacle for receiving such implements as are generally used in the manipulation and ornamentation of pastry, etc.

Second, Combining with the rolling pin a removable handle which will also serve as a cutter as described.

Third, The combination and arrangement of the removable handle and cutter, f f, with the pastry smoother, h h

Fourth, The combination of the rolling pin, a a a, nutmeg grater, c c, and biscuit cutter, f f, as described.

47,980.—Horse Rakes.—Daniel Prest, Marlborough, N. J:

I claim the combination of the levers, E E, with the bar, D, clearers, D', and teeth, A', the whole being arranged to operate substantially as herein described.

47,981.—Lathe Chuck.—William A. Reilly, Cincinnati, Ohio:

I claim the above described lathe chuck, provided with the slide, H, arm, I, and slide, K, with the adjusting screws, M and L, substantially in the manner and for the purposes set forth.

47,982.—Horse Hay Forks.—R. Reynolds and Charles Young, Stockport, N. Y:

We claim, First, The toggle joint and lever D D, in combination with the hinged jaws, B B', of the fork, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The ring, C, when the same is arranged on one side of the center of the fork and operates in combination with the toggle arms, D D, and jaws, B B', substantially as and for the purposes set forth

[This invention consists in combining with two hinged tined jaws two levers or toggle arms in such a manner that when said toggle arms are straightened out, the jaws are firmly closed, and a load of hay taken up by them can be hoisted up to any desired hight, and by a slight pull on one of the toggle arms they are thrown out of line, and the jaws open to dump their load; and, furthermore, by the action of the toggle lever the operation of entering the fork in the hay is facilitated. It consists, further, in placing the ring which takes the hoisting rope out of the center of the fork and in such position in relation to the toggle arms and to the pivot connecting the two jaws, that by the strain on the hoisting rope the opening and the closing of the fork is facilitated.]

47,983.—Tube Sheet Cutter.—D. E. Rice and William Everett, Detroit, Mich:

We claim the sleeve, B, arranged to carry the cutters or tools in combination with the spindle, A, and feed wheel, C, or its equivalent, constructed and operating substantially as and for the purpose set forth.

Also the combination of the revolving rest, E, with the spindle, A, sleeve, B, and handwheel, C, constructed and operating substantially as and for the purpose described.

[This invention consists in the employment or use of a center point inserted in the end of a bore spindle in combination with a longitudinally sliding sleeve and cutter head, and with a handwheel or other equivalent device, in such a manner that by means of the handwheel the cutters in the cutter head can be set up, while the center point turns in the center of the hole to be cut, and the necessity of first drilling a hole, so as to allow the center point to follow the longitudinal motion of the cutters, is avoided.]

47,984.—Sugar Press.—D. C. and L. S. Riggs, Omaha City, Na:

We claim the combination of the pressing box, F, base block, D, and bottom wedge, I, constructed and arranged to operate substantially as described.

[This invention relates to a press intended for the purpose of separating molasses from crude sugar. Said press is cheap, durable, and easily operated, and it does its work perfect.]

47,985.—Car Coupling.—Henry M. Rulon, Monmouth, Ill.:

First, I claim the coupling pin, C, when constructed and operating substantially as and for the purpose set forth.

Second, The combination and arrangement of the coupling pin, C, the weight, D, and the draw head, A, when all constructed and operating as herein delineated and set forth.

Third, I claim the combination of the draw head, B, with the coupling pin, C, constructed, arranged and operating substantially as and for the purpose herein specified and shown.

47,986.—Apparatus for the Manufacture of Gas.—Silas C. Salisbury, New York City:

First, I claim the combination of the washing and purifying chambers and automatic regulator, so that the gas passes through them in succession, substantially as described.

Second, The arrangement of the washing and purifying chambers and automatic regulator described, so that they constitute one apparatus, substantially as and for the purposes set forth.

Third, The combination of the washing and purifying chambers and automatic regulator with the cooling chamber, substantially as and for the purposes set forth.

Fourth, The combination of the cooling chamber, constructed substantially as described, with a retort for the production of fixed gas.

Fifth, The purifying chamber, C, constructed substantially as described, and for the purposes set forth.

Sixth, The combination of the movable vessel or gas receiver, d, with the faucet in the supply pipe, 2a, connecting the vaporizer, 2, and retort, 3, so as to constitute an automatic regulator of the supply of the vaporized products of the vaporizer to the retort, substantially as and for the purposes set forth.

Seventh, I also claim the combination of the movable vessel, d, with the stop cock of the air-supply pipe, so as to constitute an automatic regulator of the supply of air to the gas, substantially as described and for the purposes set forth.

Eighth, I also claim a washing chamber, constructed substantially as described; that is to say, of a vessel in the lower part of which is a conduit for gas, perforated with numerous small holes, so that the supply of gas is finely divided and compelled to enter the water in numerous small jets, substantially as and for the purposes set forth.

Ninth, I also claim the combination of a washing chamber, so constructed with an apparatus for producing a current of air to cause the gas to more certainly be passed through the water, substantially as described and for the purposes mentioned.

Tenth, I also claim the combination of the cooling chamber, constructed as described, with the washing and purifying chambers, and also with the naphtha fountain, substantially as set forth, so that it can be used as a cooling chamber and also as a naphtha reservoir or chamber in the production of fixed or vapor gas, substantially as set forth.

47,987.—Corn Planter.—Matilda Saviers, Wyandott, Ohio, administratrix of the estate of M. Saviers, deceased, and W. N. Ayres, Bristolville, Ohio:

We claim the reciprocating slide, K, provided with the projections, d d', arranged to work in relation with the perforated bottoms of the seed boxes, J, in connection with the cam, M, bar, L, and spring, N, all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved marking device, whereby the corn may be planted in check rows without previously marking the ground. The invention also relates to an improved seed-dropping device and to an improved seed-covering arrangement, whereby the seed may be dropped or planted with certainty by an automatic mechanism, and covered with earth in a proper manner.]

47,988.—Corn Sheller.—Frederick H. Schroeder, Bushnell, Ill.:

I claim the employment of the stop valve, S, provided with flexible flanges, when constructed and operating substantially as herein described.

47,089.—Gang Plow.—Jacob Seibel, Manlius, Ill.:

I claim the combination of the seat, I, fulcrumed at J; perforated standard, M, the spring, K, provided with the pin, a, the lever, L, or its equivalent, for operating said spring and pin, the rod, N, and plow beams, P, arranged and operating substantially as and for the purposes herein specified and shown.

47,990.—Corn Planter.—Jacob Seibel, Manlius, Ill.:

First, I claim the combination of the cutters, x x, and runners, P, arranged and operating substantially as and for the purposes herein shown and described.

Second, I claim the combination and arrangement of the cutters, x x, the runners, P, jointed at the front end, the cross bar, N, standards, R, levers, H, cross bar, I, and standard, J, operating as and for the purpose delineated and set forth.

47,991.—Air-cooling Apparatus.—N. S. Shaler, Newport, Ky.:

I claim the apparatus, substantially as explained; that is, consisting of the series of cells, the tortuous passage, and the propeller, or the equivalent thereof, arranged in manner and so as to operate as and for the purpose specified.

47,992.—Ambulance.—William Slatter, Allegheny City, Pa.:

I claim attaching the thills to the underside of the axle, and bracing the thills and axle together by braces running from the center of the springs to the thills, constructed, arranged and operating substantially as herein described and for the purpose set forth.

47,993.—Boring Jar.—Joseph Slusser, Cincinnati, Ohio:

I claim the mode of constructing a well-boring jar, of two pans of quarter round bars or sectors, confined to each other by sleeves, and closing each other's interstices in the act of sliding together, substantially as set forth.

47,994.—Farm Gate.—Wm. F. Smelley, Vevay, Ind.:

I claim the combination of the rack, H, with the pivoted truss, G, and gate, A B C F, substantially as and for the purposes set forth.

47,995.—Corn Harvester.—John W. Smith, Iowa Point, Kansas:

I claim, First, In combination with the sled runners, the movable platform, B, operated substantially in the manner described.

Second, Making said platform in two parts, with front end hinged to the main body of the platform, and arranged to move up or down the inclined plane, H, in the manner shown and described.

Third, I claim the rule, G, constructed substantially as described, and revolved by the pressure of the stalks upon its arms, when used in connection with the guides, for the purpose specified.

47,996.—Rotary Digger.—Henry Stanley, Troy, N. Y.:

I claim, First, The combination of the H-formed, g, with the tooth links, f, provided with lugs, h, all being constructed as specified.

Second, I claim having the ends of the teeth made of conical form when fitting into corresponding-shaped sockets in the links, substantially as described.

Third, I claim the lips, k, to prevent the turning of the teeth, substantially as described.

Fourth, I claim the employment of one or more intermediate shaft supporters, H, in combination with the chain rollers, substantially as herein described.

Fifth, I claim the employment of the toothed segment, O, in combination with the wheels, L, substantially as described.

Sixth, I claim the combination of the lever by which the digging teeth are raised and lowered with the driver's seat, substantially as described.

Seventh, I claim the pawls, S T, in combination with the lever, R, and ratchet, Q, substantially as decribed.

Eighth, I claim the employ ment of a locking device, V, or its equivalent, in combination with the raising mechanism, substantially as and for the purpose described.

Ninth, I claim the employment of an adjustable driver's seat, in combination with one or more endless chains of digging teeth, substantially as described.

Tenth, I claim the combination of the cranks, N N, with the rear roller, substantially as described.

Eleventh, I claim the employment of the raising lever in combination with the segment or its equivalent, substantially in the manner herein shown and described.

Twelfth, I also claim the adjustable handle of the raising lever in combination with the raising lever and the adjustable driver's seat.

47,997.—Lathes.—John Stark, Waltham, Mass:

I claim the combination as well as the arrangement of the sliding contractor, D', and its operative mechanism, E and l, with the tubular arbor, A, and the clamp, C, having the cone, c, and being fixed to the arbor so as to operate therewith, substantially as described.

I also claim the combination of the chamber, h, and the socket, e, with the tubular arbor, A, tubular clamp, and its contractor, D, provided with screws, E and l, constructed, combined and arranged substantially set forth.

47,998.—Time Keeper.—James Stephenson, Canandaigua, N. Y.:

I claim, First, A detent consisting of a cylindrical block, D', formed with a rim, d, and adapted to operate in connection with a balance wheel, F, to regulate the escape wheel, substantially as and for the purpose set forth.

Second, I claim communicating motion from the detent to the balance wheel, and vice versa, through the medium of a segmental rack, E', and pinion, F', substantially as and for the object specified.

47,999.—Exercising Machine.—T. P. Thorpe, New York City:

I claim the springs, P P, or their equivalent, combined with the walking beam, marked, C, and the shaft, N, together with the post, B, for the purpose herein described.

I also claim the device as a new article of manufacture, as above described, for the purpose herein intended and described.

48,000.—Grate.—Wm. I. Towne, Newton, Mass.:

I claim suspending the journals, b, of the grate on rollers, d, substantially as set forth for the purpose specified.

48,001.—Sawing Machine.—A. E. and I. V. Warner, Norwalk, Ohio:

We claim the above described arrangement of the cross-cut and circular saws when operated substantially in the manner and for the purposes set forth.

48,002.—Artificial Arm.—Thomas Uren, New York City:

I claim the arrangement of the straps for securing the artificial arm to to the body and on the stump of the upper amputated arm, without any strap passing across the chest, in combination with the wing of the upper artificial arm extending in front of the shoulder, substantially as and for the purpose specified.

I also claim the means herein described for holding out the covering of the open part of the artificial arm at the junction of the upper and lower arm, and in combination therewith, substantially as and for the purpose specified.

I also claim connecting the turning wrist piece with the fore-arm by a turning flute joint, in combination with the two cords attached to the cross-bar in the wrist piece, and hitched to the fore-arm and on opposite sides thereof, substantially as and for the purpose described.

I also claim the cord which is attached to the upper arm, and passes through the fore-arm and hand, and is attached to the thumb and fore-finger, to open the thumb and finger by simply depressing the hand so as to bring the fore-arm in line or nearly in line with the upper arm, in combination with the cord to elevate the fore-arm and close the thumb and finger by a forward movement of the stump of the natural arm, substantially as and for the purpose described.

And I also claim, in combination with the hinged fingers, the employment of a cord or cords attached to the fingers, and which can be hitched to a pin or its equivalent outside to hold the fingers in a partially closed position, substantially as described.

48,003.—Locking and Stopping Window-blinds.—John Weitzel, Mott Haven, N. Y.:

I claim, First, The spring catch, E, and notched rod, D, applied, in combination with each other, with the stile, A, and with arms, C, or their equivalents, at one end of the slats, and operating substantially as herein specified.

Second, The pivot arms, C, each cast of one piece, with its respective pivot, c, and with a dovetail groove in one side, substantially as herein described, to enable it to be secured to the slat without nails, screws, or other fastenings.

48,004.—Boring Machine for Artesian Wells.—George Washington Wicks, New York City:

I claim, First, The apparatus described, when constructed substantially as shown, for imparting to the drill the alternate vertical and rotary motions, as described.

Second, Spur gear, c, with its rods or frame work and the slide piece, x, in combination with the tripper, D, and drill Z, operating together substantially in the manner and for the purpose described.

48,005.—Explosive Shell.—Lewis E. Williams, Peekskill, N. Y.:

I claim a series of radial chambers extending from a common central chamber to the inner perimeter of the short, for the purpose of dividing the interior of the shot into a series of separate and distinct chambers to contain explosive material, substantially as described.

48,006.—Drill for Boring Oil Wells, Etc.—D. H. Wiswell and George W. Shaw, Buffalo, N. Y.:

First, We claim the rotating frame, H, in connection with the cross-head, F, uprights, e e, guides, r and m, pawl and ratchet, j j, substantially as herein described.

Second, Frame, H, in combination with pawl, N, and ratchet, M, all constructed and operating in the manner specified.

Third, An automatic rotating drill, constructed and arranged substantially as herein set forth.

48,007.—Sewing Machine.—August Wittneben, New York City:

First, I claim the employment and use of a revolving wheel, F, with internal cams acting through movable pins the lever, E, in the manner and for the purpose substantially as described.

Second, I claim the arrangement of the lever, E, moving on a universal joint and combination with the feeding pad, I, and operated by the wheel, F, and the spring rod, W, or its equivalent, in the manner as specified.

Third, I claim operating the needle bar, P, from the end of the lever, E, by means of the lever, M, and rod, N, in the manner substantially as set forth.

Fourth, I claim the arrangements of the plate, V, on the end of the lever, E, for the purpose of regulating the amount of feed, operating substantially in the manner specified.

Fifth, I claim the application of the feeding pad above the material operated upon, when arranged and operated in the manner substantially as described.

Sixth, I claim the combination of the revolving ring, F, with internal cams, the pins, a' b' c', lever E, feeding pad, L, spring rod, W, lever, M, rod, N, and needle bar, P, when arranged and operating in the manner and for the purpose substantially as set forth and specified.

47,008.—Street Steam Railway Car.—Joseph P. Woodbury, Boston, Mass.:

I claim, First, The combination of the geer wheels, C C' (or cranks and rods, as shown in Figure 7), on the axles, E E, with the crank shaft, Y, and pinion, B', and vertical boiler, S, and engines, U U, when constructed and operating in the manner and for the purposes described.

Second, The combination of the friction clutches, M' M' N' N' with one or more pinions, B and L, and geer wheels C' C' and K' K', in the manner and for the purpose set forth.

Third, The rack, W, and pinion, V, when combined with the circular platform, I, in the manner and for the purpose herein described.

Fourth, The stop-pins, a a, and bolt, b, in combination with the platform, I, in the manner and for the purpose herein set forth.

Fifth, Connecting the driving shaft, Y, rigidly with the circular platform, I, by means of the hangers, H' H', when constructed and arranged in the manner and for the purpose herein set forth.

48,009.—Air Pump.—G. M. Woodward, New York City:

I claim the air pump, D, provided with adjustable or reversible valves, b b, in combination with a receiver, A, the latter communicating with the air pump, and provided with an eduction tube, B, and all arranged substantially as described.

48,010.—Compressing Cartridges around Bullets.—John S. Adams, Taunton, Mass., (Assignor to himself and William C. Dodge, Washington, D. C.):

I claim the jaws or levers, C, and D, constructed and operating substantially, as and for the purpose herein set forth.

Second, Connecting the jaws, C, and D, by the arm, a a, and strip E, or their equivalents for the purpose of securing a positive uniformity of motion in the two, by means of one handle.

Third, The shield or plate, F, or its equivalent for the purpose of preventing any lateral movement of the jaw, C, and prevent it from being bent laterally by operating the handle.

Fourth, The cartridge case rest, n, to ensure the union of the ball and case on the same axial line.

Fifth, The adjustable plug, H, arranged as described for the purpose of adapting the machine to bullets of different lengths.

Sixth, The stop pin, e, in combination with the recess or slot for limiting the movements of the jaws, C, and D.

Seventh, The washers, i, in combination with the jaws and face plate, B, as and for the purpose set forth.

48,011.—Air Injector.—J. A. Bassett, and O. C. Smith, Salem, Mass., (Assignors to Oliver Bennett, Boston, Mass.):

We claim the injection of air through adjustable openings constructed as described, into and through burning fuel, by means of the force of a jet of steam used direct from the boiler, or superheated as may be required.

[The object of this invention is to eject air into and through the ignited fuel of a furnace, by means of the force of jets of ordinary or superheated steam through adjustable openings.]

48,012.—Boring Wells.—William H. Bechtel (Assignor to himself and B. H. Bartol), Philadelphia, Pa.:

I claim the use, substantially as and for the purpose described, of elliptical or oval cog-wheels, in combination with a well boring bar or rope, and with the mechanism described or the equivalent to the same, for seizing and releasing the said bar or rope.

48,013.—Bridge.—John Boles, Jr., (Assignor to G. W. and F. Smith), Boston, Mass.:

I claim the combination of the series of arch connections, a a a, the straight braces and counter braces, and their chord or chords, the whole being arranged substantially as set forth.

I also claim the combination of the series of diagonal upright struts, E E, with the system of braces and counter braces and their chords, the whole being arranged substantially as specified.

48,014.—Cutter for Bread, Meat, Etc.—Daniel Campbell, of Elizabeth, N. J., (Assignor to Henry Seymour, New York City.)

I claim, First, The application of the knife, D, to parallel oblique slot

C C, in a frame, B, in connection with the lever, F, attached to the knife andframe, B, all arranged to operate substantially as and for the purpose set forth.

Second, The slide, K, arranged in connection with the knife, D, lever, J, pawl, I, and rack, e, on carriage, G, to operate substantially in the manner, as and for the purpose herein set forth.

48,015.—Manufacture of Water Proof Fabrics.—Thomas Crossly, Bridgeport, Conn., (Assignor to American Water Proof Cloth Company, Brooklyn, N. Y.):

I claim as a new manufacture, a fabric formed by the combination of a coarse, textile material for a base, with a finer textile material or with fibrous material in the form of a bat or felt, a face, united by a coating or sheet of india rubber or other gum, or compounds thereof, in the manner and with the result, and for the purposes set forth.

I also claim as a new manufacture the fabric having a back or base of flax, cotton, jute, wool or other textile material, coated or covered with a sheet of India rubber or other vulcanizable gums, or the vulcanizable compounds thereof, and having a face of fibrous substances in the form of a bat or felt, or of other textile material, combined and united by pressure and by the vulcanization of the gums, and dyed and printed, or dyed and printed, or colored, or stamped, or embossed, for the purposes and in the manner described and set forth.

48,016.—Paper Collar.—William L. Duff, Quincy, Ill., (Assignor to Henry C. Banks.):

I claim a collar having its lower part slitted, so that portions at the back will pass outside of the cravat in the manner and for the purpose substantially as set forth.

48,017.—Pipe Tongs.—Samuel F. Gamage, (Assignor to himself and N. M. Dow), Boston, Mass.

I claim the solid screw and fulcrum, designated respectively by the letters, f g h i, as operated by the milled nut, E, applied and arranged in he opening and slot in the stationary jaw lever, substantially in the manner and for the purposes above specified.

48,018.—Self-Centering Punches, Antedated May 16, 1865.—Samuel Z. Hall, Camden, N. J., (Assignor to himself and George Mott), Hoboken, N. J.:

I claim, First, The arrangement of the guide-socket, F, which contains the center punch within a hinged frame, applied in combination with the box, or its equivalent, which contains the centering clamp, substantially as and for the purpose herein set forth.

Second, The arrangement of the guide socket within the said hinged frame to provide for its adjustment substantially as herein described to suit the thickness or depth of the head of a belt or other headed article.

48,019.—Globe Stove.—George W. Herrick, Stuyvesant, N. Y., (Assignor to Samuel W. Gibbs), Albany, N. Y.:

I claim the drop-door, C, in combination with a foot-rest, B, when applied to a globe stove, in the manner substantially as and for the purpose herein set forth.

[This invention consists in combining a drop-door with a foot-rest, in such a manner that the foot-rest will serve as a support for the door when the latter is open, and prevent the breaking of the hinges of the door when the latter is opened or allowed to drop.]

48,020.—Coal-Hod, Ash-Sifter, and Slop-Pail combined.—Charles Jones, (Assignor to himself and Charles Hodges), Brooklyn, N. Y.:

I claim the pail, A, provided with the cover, C, in combination with the sifter, D, constructed substantially as shown and connected when in use, to the cover, C, by an upright passing through the cover, or an equivalent means—all being constructed of sheet-metal and arranged to form a combined coal-hod, slop-pail and ash sifter, as described.

48,021.—Copying Press.—Phineas Lawrence and George Jeffereys, (Assignors to themselves and Benjamin Lawrence), New York City.:

We claim a copying press formed with a cam lever to act upon the follower in combination with the ratchet and pawl for the purposes and as specified.

48,022.—Casting Shot and Shell.—Thomas J. Lovegrove, (Assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim casting shot and shell in a spherical mold, and afterwards rotating said mold on a concave or dished surface, substantially in the manner described, for the purpose set forth.

I also claim the combination of a rotating concave table having a raised conical center with a spherical mold rolling freely thereon as described.

48,023.—Rose for Door-Knob.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim in combination with the screw sleeve and hub, the pin, gib, or key, e, for holding the two firmly together when adjusted, substantially as described.

48,024.—Fastening Door-Knobs to their Shanks.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim as a fastening for door-knobs and shanks, the combined use of the turning sleeve, catch, and check-pin, with the hub and shank of the knob, substantially as and for the purpose described.

48,025.—Fastening Door-Knobs to their Shanks.—Milton V. Nobles, Rochester, N. Y., (Assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim as a means of fastening a door-knob to its shank, the combined use of a split sleeve, and a ring, or ordinary rose plate, with the hub and shank, substantially as herein described and represented.

48,026.—Drill for Oil and other Wells.—William G. Oliver, (Assignor to himself, Samuel O. Bigelow, George H. Rendel, and David P. Benson), Buffalo, N. Y.:

I claim an expansion drill, consisting mainly of the drill stock, A, hinged drill pick, D, and connecting bar, B, and operated by a vertical up and down motion thereof for the purposes, and substantially as herein described.

I also claim the bottom section, E, in combination with the drill stock, A, for the purposes and substantiall as described.

48,027.—Tool.—A. W. Park, (Assignor to himself and C. J. Winters), Norwich, Conn.:

I claim the implement above shown, comprising combined hammer claw, monkey-wrench, socket-wrench, and screw-driver substantially as described.

[This invention consists in a combination in a peculiar manner of several different tools so as to join in the same implement a hammer, a claw, a screw-driver, a socket-wrench, and a monkey wrench, the whole implement consisting of only two pieces and a nut by whichsaid pieces are connected to and adjusted with each other.]

48,028.—Stave-Cutting Machine, Antedated May 26, 1865.—M. Randolph, St. Louis, Mo., (Assignor to himself, J. Paddock, and Prescott and Burnett), St. Louis, Mo.:

I claim, First, The employment of the plungers, d d, racks, d d, and gear-wheels, f f, or their substantial equivalents, in combination with the cutter frame, D, for the purpose of removing the cut staves and depositing them under the jointers substantially as herein specified and represented.

Second, I claim the arrangement and combination of a double-jointer, g g, when constructed and adjusted to operate in such manner as to complete the jointing of both edges of the stave, at the same time, substantially as herein set forth and described.

Third, I claim operating the jointer, g g, in harmony and conjunction with the cutter-frame, D, so that the staves may be cut and jointed without removal from the machine, substantially in the manner herein set forth and specified.

Fourth, The combination of the cutter heads, m m, with the conveyors, n n, constructed and arranged to operate as and for the purposes set forth.

And Fifth. The combination and relative arrangement of the cutter-frame, D, jointer, g g, cutter heads, m m, and conveyors, n n, all being constructed and adjusted to operate conjointly substantially as and for he purposes herein set forth and specified.

48,029.—Horse Hay Fork.—Rensselaer Reynolds and Charles Young (Assignors to Rensselaer Reynolds), Stockport, N. Y.:

I claim, First, The trigger, D, provided with a lip, e, and applied in combination with the toggle arms, B B', and two hinged gripping jaws, A A', in the manner and for the purpose herein shown and described.

Second. The hand-lever, C, attached to the arm, B', and applied in combination with the jaws, A A', and toggle arms, B B' in the manner and for the purpose set forth.

[This invention relates to certain improvements in that class of hay-forks which operate with two hinged jaws in combination with toggle arms, in such a manner that, when the toggle arms are straightened out' the jaws are firmly closed, and a load of hay taken up by them can be hoisted up to any desired hight, and, by a slight pull on one of the toggle arms, they are thrown out of line, the jaws open, and the hay is dumped.]

48,030.—Amal amator.—H. H. Scoville (Assignor to himself and E. C. Preble), Chicago, Ill.:

I claim, First, Projecting each bucket on a scroll, from the discharging eye or hub of the axial shaft, substantially in the manner and for the purpose described.

Second, The arrangement of the chamber, f, and screw, d, or their equivalents, at the discharge of the scroll chamber, substantially in the manner and for the purpose described.

Third, The cylinder, f, and screw, d, constructed and working together, substantially in the manner and for the purpose described.

Fourth, The mode of attaching the screw to the machine for submerging the quartz, substantially as herein described.

Fifth, A machine which discharges the quartz from its scroll submerging chamber directly into its screw conveying chamber, substantially as and for the purposes herein described.

48,031.—Manufacture of Boxes.—William T. Slocum (Assignor to James S. Mason & Co.), Philadelphia, Pa.:

I claim connecting the two ends of the strip, A, by forming on one end of the same the lips, a, and in the other end the slots, b, through which the said lips may be passed, and then bent down to one side or the other, substantially as described.

48,032.—Cotton Gin.—John Stevens (Assignor to himself and Theodore Bowrne), New York City:

I claim the combination of the large cylinder, B, small roller, D, reciprocating plate, G, feed board, L, doffer plate, J, and pressure roller F, all arranged and operating substantially as and for the purposes set forth.

48,033.—Means of Closing Ship's Deck and Side Lights.—Edmund B. Vannevar (Assignor to E. B. Vannevar & Co.), Boston, Mass.:

I claim the hinged staple, G, provided with an adjusting screw, H, constructed substantially as described, and used for the opening and closing of deck and side lights for vessels.

48,034.—Safety Tackle.—Pierre Joseph Jamet, Paris, France.

I claim, First, The construction, substantially as herein described, of a safety tackle for the purpose of holding or maintaining weights in suspension during the intervals of pull.

Second, I claim the oscillating frame or block under the arrangement described, so that the pully or sheaves, together with the rope or cord, perform the function of brake in connection with the cross-head of the hook, substantially in the manner hereinbefore set forth.

Third, The movable cam lever or catch, whether operated by the rope or otherwise, under the arrangement described, so as to prevent brake action, in the manner and for the purpose set forth.

48,035.—Photo-electrotype.—Wm. A. Leggo and Geo. E. Desbarats, Quebec, Canada:

We claim the within described process of producing upon the surface of any transparent picture, drawing, or manuscript, by the action of light, a mold capable of yielding a cast in plaster or other suitable material, substantially in the manner and for the purposes herein set forth.

REISSUES.

1,976.—Base Burning Stove.—Dennis G. Littlefield, Albany, N. Y. Patented January 24, 1854. Reissued Nov. 19, 1861; again, August 26, 1862; again, March 3, 1863; again, Nov. 8, 1864; again, Feb. 28, 1865:

I claim the combination of a reserve fuel supplying cylinder, a separate fire pot, a chamber to receive the products of combustion, and an exhausting exit flue, substantially as and for the purposes described.

1,977.—Straw Cutter.—Warren Gale and B. B. Belcher, Chicopee Falls, Mass., assignee of Warren Gale. Patented, Dec. 18, 1860:

I claim, First, The arrangement of the knife pivot upon a step or carrier, so as to produce angular and distance adjustments of the knife to the cutting edges of the stationary blade, or mouth piece, whether the carrier is in one piece with, or attached immediately to the mouth piece, or is separate therefrom.

Second, I claim also the combination and arrangement of the carrier, C, and flanch of the pivot, G, provided respectively with the longitudinal slot, and with the bolt hole, b, and transverse slot, c, for producing the adjustments desired, substantially as herein specified.

1,978.—Horse Rake.—Ariel B. Sprout, Hughesville, Pa. Patented November 25, 1862:

I claim sustaining the weight of the gang of curved metallic teeth, which are united to a common rake head arranged behind the axle upon such a point of their length that they shall be balanced or nearly so upon a bar which is free to rotate with them, and which is independent of the draught devices, substantially as described.

DESIGNS.

2,072.—Boiler Lid.—John L. Hadden, Philadelphia, Pa.

2,073—2,077.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,078.—Lemon Press.—Isaac Townsend, Philadelphia, Pa.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

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A. W. L. McB., of Mo.—Write to Henry Carey Baird for a treatise on making sugar from sorgho.

K. L. M., of N. Y.—Bottle glass is said to be the hardest variety. Glass of any kind may be scratched with a file.

S. H. W., of Ill.—If you mean by a "storm glass" a barometer; that is made by filling a glass tube, three feet long—that has one end closed, and the other open—with mercury, and then turning the open end down and inserting it into a cup of mercury. The mercury in the tube is prevented from running out by the weight of the atmosphere resting on the surface of the mercury in the cup. As the weight of the atmosphere varies, the hight of the mercurial column in the tube, of course, varies to correspond—one balancing the other.

F. H., of Ohio.—We know of no late works on making sugar from cane. The juice is extracted by rollers, and in no other way.

L. J. L., of Ill.—Messrs. Todd & Rafferty, Patterson, N. J., have flax machines.

L. K., of Mass.—You will find the address very plainly given in the article on smelting iron by steam and air combined. As it is an English invention we know nothing beyond the article in question.

G. W., of N. J.—Stuffing birds is an art which requires practice and experience to succeed in. If you inquire at the book stores for a work on taxidermy you will learn something about the art.

J. A. H., of Ill.—You should consult an architect; we cannot give you the proportions of a church in this column.

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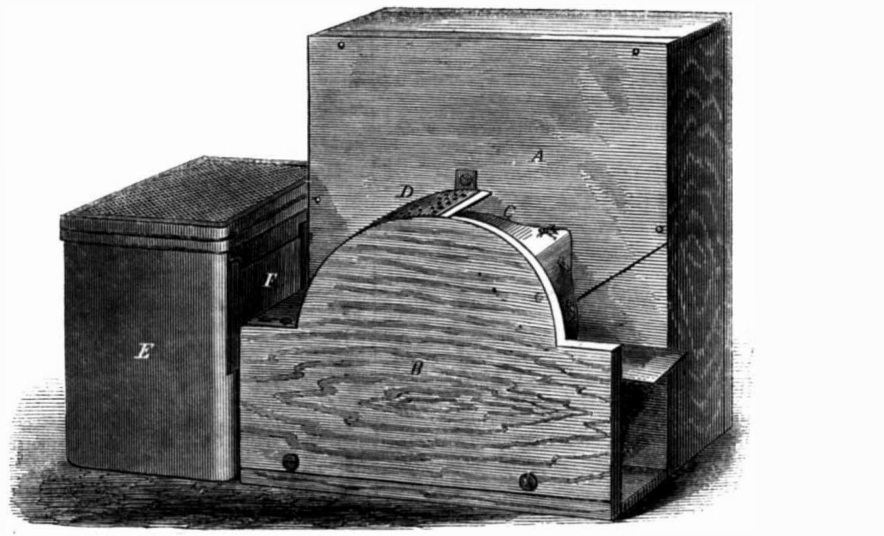
Flies are a serious nuisance in summer, for they not only annoy one by continually buzzing about and lighting on the face but they deface the wood work and walls very much.

Many ingenious devices for catching flies have been invented; they generally operate by clock-work, and are self-acting when wound up.

This engraving represents a new arrangement for the same object. It consists of a series of boxes, A and B. In the first, A, there is a train of clock-work which, when wound up, gives a slow rotary motion to the cylinder, C. This cylinder has a series of projections on it, which are to be covered with any sweet substance or material likely to attract flies, and it is



LAKE'S FLY-TRAP.

further covered with a wire gauze shield, D. As the cylinder rotates slowly the flies alight on it, and, being absorbed by collecting the sweet, move slowly under the guard, and are thus carried into the chamber, E, at the end, where they are knocked off. There is a door, F, which slides down when the box is full, so that the flies cannot escape while they are being destroyed.

By this method an apartment can be kept free from flies or other annoying insects common in summer time. It was patented June 21, 1864, and Jan. 10, 1865, by D. Lake. For further information address him at Smith's Landing, N. J.

Improved Balanced Slide Valve.

The enormous absorption of power by the slide valve is the greatest objection to its use. Engineers of experience know well how to construct a valve

Fig. 1

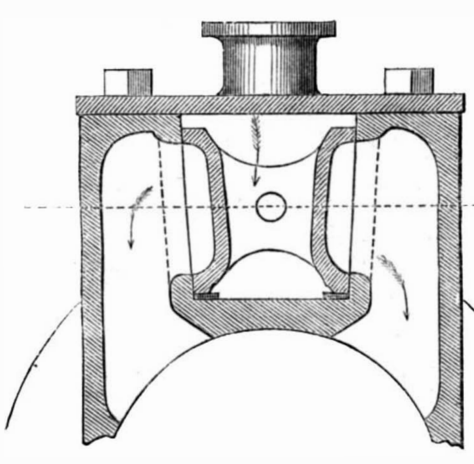
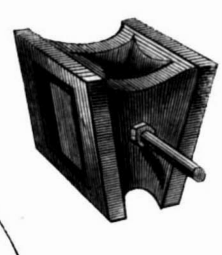


Fig. 2



HOWELL'S BALANCED SLIDE VALVE.

that shall work properly as to the times of opening and closing the ports, and the relation between the steam lead and the exhaust lead, and all are agreed that an efficient, simple and durable arrangement for equalizing the pressure on the valve face is exceedingly desirable. The friction of cast iron sliding on cast iron, unlubricated, according to Rennie's experiments, is 1·5 of the weight up to 100 pounds pressure per square inch. From this estimate we can readily see what amount of work is expended in merely moving the valve over the face to let the steam in and out.

In the engravings published herewith, we have a representation of a new method of balancing a slide valve. No springs, gears, or steam-tight joints or levers are interposed between the valve and cover, but it is of the ordinary form in its general features.

Two valves are joined together at the back, as in the isolated view, and the ports are made double, so that there are two valves and two valve faces in the chest, instead of one, as heretofore. These ports are constructed as shown in the section.

The valve faces being inclined, shed any dirt or sediment that may chance to drop upon them or be carried over from the boiler by priming, and from being inclined they wear steam tight, top and bottom, the degree or angle being suited to equalize the wear. The steam passes between the two valves, as shown by the arrow in the section, and, pressing equally against both sides, causes the valves to work freely, and yet steam tight, against the face.

Messrs. Fisher & Co., of Portsmouth, N. H., have been using one of these valves, and express their entire satisfaction with it. A locomotive is also being fitted with them in the Globe Works, Boston, and we are certain that in regard to equalizing the pressure good results will be obtained. Patented June 2, 1865.

For further information, address the inventor, J. S. Howell, at Portsmouth, N. H.

New Caloric Engine.

A caloric engine, which possesses some peculiarities, has been recently invented in Germany. Its principle consists in pumping atmospheric air into an air-tight furnace, for the support of the fuel which is introduced previously, and must be from time to time renewed. The combustion is effected within a fireplace of refractory clay, surrounded at some little distance by the closed cylinder which constitutes the furnace. The atmospheric air keeps the fuel in a state of such intense ignition that at a pressure of four atmospheres, it will fuse wrought-iron, and will change cast into malleable iron; it is at the same time greatly expanded by the high temperature. The gaseous products of combustion, mingled with a small quantity of steam—introduced chiefly with the object of lubricating the pistons—move two pistons of peculiar construction. After doing its work, the heated iar passes into the atmosphere perfectly free from smell. There is a great tendency in this engine to acquire a very high velocity, since the combustion augments in intensity in proportion to its speed.—*Stockton and Hartlepool Mercury.*

[This is essentially the same as Shaws Engine.—Eds. Sci. Am.

Book-making.—In "Burgh's Practical Rules for Modern Engines and Boilers" we find the following statement in regard to gear for working slide valves:—"The slide valve being only used in beam engines of small power, a brief notice will only be given." It seems difficult to reconcile this with some drawings we have seen of English screw engines, where the slide valves would weigh half a tun.

FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN