ing to endorse or excuse the blunders committed by the Navy Department in constructing these vessels, it may be stated that fifteen out of the twenty have been increased in depth and the remainder altered to torpedo boats. They all float with sufficient buoyancy when fully equipped. He says that the *Dictator*, *Puritan*, *Roanoke* "are not safe for cruising at sea." Judging from my own experience with monitors I cannot but think this opinion absurd. In stating that the *Puritan* is of the same model of the *Dictator*, Y. Z., errs; the *Puritan* having some 800 tuns more displacement than her consort. It was decided to leave one turret off the *Puritan* so that the other could be made larger, in order to accommodate the 20 inch guns which have already been cast for her.

Your correspondent further says that "eight of the iron-clads were built after the model of the *Manhattan* of 844 tuns," and that "we have nine iron-clads of the *Canonicus* model of 1,034 tuns." Now as the *Manhattan* and the *Canonicus* are duplicates of the other, this statement is incorrect. Again he compares the *Monadnock* and the *Miantonomah*, having their seven inches of armor, with the *Kalamazoo*, etc., with fourteen inches of plating, and thinks "it is doubtful if they are equal to others."

It seems to me that the pointing out of these faults in his data is sufficient, without comment, to show that the conclusions of your correspondent ought not to be accepted as authority except with some reservations. In conclusion I would say that, with all their faults, our monitors stand now as superior to any war ships which float. In this I am sustained by the disinterested testimony and opinion of such a man as John Bourne, and the reports of those who have taken them into action. ENGINEER.

Boiler Explosions.

MESSRS. EDITORS:—I have been using steam for the past fifteen years and I have yet to see any thing confirmatory of the Colburn theory.

The causes of boiler explosions, apart from defect in material or manufacture, may be summed up as follows: Overheating, by which the boiler may be injured and the pressure of steam increased; irregular heating, by which one part is made very hot while another portion is comparatively cool, as when the water is allowed to get too low, thus destroying the equality of tension; or, the sudden cooling of a portion by cold water, thus contracting that portion while another part is expanded by heat.

A boiler would not explode merely by suddenly injecting a large quantity of cool water into the steam space; it would merely lower the pressure. But if the water was thrown against the hot plates it might cause an explosion, not from the amount of steam instantly generated, but from a sudden contracting of the metal.

I have known a locomotive with steam blowing off—at east ninety pounds to the square inch—to break through a bridge and be instantly immersed in water ten feet deep, without injury to the boiler. I have seen an exposed boiler working at seventy-five pounds pressure suddenly flooded with rain to such an extent that the pressure was lowered twenty pounds in as many minutes, but no explosion occurred. In both these cases the contraction of the metal by cooling was uniform. In the case of the *Ceres*, when the water rushed in upon the boilers causing an explosion, I account for the catastrophe by supposing that only a portion of the heated iron was reached at once, and that contracted before the water had time to reach the other parts. When a boiler explodes upon the starting or stopping of the engine or from a sudden jar, the inference is that it was before strained to its utmost capacity.

Mr. Colburn's theory can be easily tested. Get up steam on a boiler to, say forty pounds, then suddenly open the safety valve. The simple result will be a lowering instead of an increase of the pressure. J. J. REINHART.

Lovgootee, Ind.

Treatment of Steel in Hardening.

MESSRS. EDITORS:—Your correspondent, "V," in your issue of Feb. 16th, makes some remarks on the working of steel which are no doubt mainly correct, but I would, before indicating the color for the proper temper of the tools he enumerates, go back to the condition of the steel before it is tempered. Assuming that the steel in the bar was of a character best adapted for the desired tool, the first important question is, how has it been hammered? and next, how hardened? Some smiths hammer their steel more thoroughly than others. That the quality of their tools may be the same as others which have received less hammering, the color in tempering must be of a darker shade, and those who heat their steel a few degrees hotter to harden must give a corresponding deeper shade of color in tempering. Steel hardened in pure soft water requires more heat than the same steel hardened in brine or some metallic solution, or in other words the greater the conductibility and density of the bath the quicker the heat is abstracted from the steel. A comparatively low heat very quickly absorbed will make steel as hard as a higher heat more slowly chilled, but if we give the steel the same heat for the different baths we have different degrees of hardness that can only be regulated by difference of color when tempered.

The same subject receives a criticism from "W. L. D.," in issue March 23d, in which he attributes difference in temper to difference of color which the same steel with the same heat would assume with a fine or coarse polished surface. This is true, but I think the treatment of the steel in hammering, the heat it receives in hardening, with the density and conductibility of the hardening bath, are the chief contingencies to be considered in obtaining the proper temper, and unless due attention is paid to all of them, a standard for the degrees of heat necessary for tempering tools for different purposes will be of no avail. If a piece of steel is properly hammered and hardened it admits of more variation in the shades of tempering colors than when less attention has been paid in hammering, and will still be a good tool. B. F. S.

Connecticut, March 22, 1867.

Breakage of Chimneys.

MESSRS EDITORS:—The great cause of lamp chimneys being so brittle and breaking so easy, is owing to the material they are made from. (There is shoddy in glass as well as in cloth.) Cheapness being the order of the day a great many manufacturers make chimneys from silicate of lime instead of silicate of lead. The glass made from the silicate of lime has about the following proportions—sand, 100; soda, 45; lime, 20 to 25; nitre, 7 to 10. Lime being a non-conductor of heat the chimney will not bear the expansion caused by the heat, and if by gradual heating the chimney does not break on the lamp, a few times heating makes it so brittle that it breaks with the least effort at cleaning it no matter how much care is used.

The silicate of lead has about the following proportions;—sand, 100; lead, 40 to 50; soda, 20 to 25; niter, 10 to 15. Lead being very ductile and a good conductor of heat, a chimney made from this formula will almost melt before it will crack with the heat. The uninitiated may tell the difference of the chimneys made by these different qualities of glass by ringing them, the vibration from the lead glass chimney has a sweet bell like sound while the lime glass has a short harsh sound. The difference of the cost in manufacture is only in material, about 15 cents per dozen.

Another point is in annealing; chimneys as a general rule are not annealed; under a powerful microscope the difference can be seen in the glass, the particles in the annealed glass lie close and compact, while the unannealed seem ready to diverge.

There is more economy in using lead glass annealed chimneys at 15 cents each, then there is in using lime glass chimneys at 5 cents each. Cheap and dear are truly relative terms in this case.

AN OLD SUBSCRIBER TO YOUR VALUABLE JOURNAL.

Philadelphia, March 16, 1867.

Where the Day Begins.

MESSRS. EDITORS:—The criticisms of your correspondents on your article relative to the length of the day are very amusing. But are you not in error in supposing that the "day line" has not been definitely fixed? I am not aware of any special legislation upon the subject, but its position is practically defined by the regulations relative to the computation of longitude. The longitude of Greenwich (or Washington, if that is the starting point), is 0, and the meridians are numbered thence both eastward and westward to 180—just half-way around the earth. This 180th meridian is the "day line." For, since the day commences at midnight, when it is Monday, 12 M., at Greenwich, and midnight at 180, it is Monday throughout all the earth. A moment later Tuesday has commenced at the 180th meridian, and follows midnight westward. It is Monday still at all places westward from the place of midnight to the day line, and Tuesday from that point to the place of midnight. When it is midnight at Greenwich, it is Tuesday over all that half of the world called the Eastern Hemisphere, and Monday over the American half. It is the common practice of navigators to add a day to their reckoning whenever they cross the 180th meridian going westward, and subtract a day whenever they cross in the opposite direction. This, it is readily seen, will always bring them out on the right day of the week, no matter how many times they cruise from one day into another. It is a little remarkable that this 180th meridian from Greenwich lies wholly in the ocean, crossing scarcely a league of habitable ground. Thus is realized the ancient poetic fancy that the day is born from out the sea. D.

[The zero of longitude was not fixed upon with any reference to the question of day line, and there is no necessary relation between the two, and the agreement is not general that the meridian of 180° shall be the day line. Moreover, there are in use four different reckonings of longitude. England and the United States adopt Greenwich as the starting point, Germany and eastern Europe, Ferro (one of the Canary Islands); France, Paris; Spain, Madrid. But the reckoning of the day is practically the same all over Europe and America. When all the nations agree on a common zero of longitude, the day line will probably be made to accord with it.—EDS.

Yellow Rain.

MESSRS. EDITORS:—It seems that the days of miracles have not yet passed. On the night of the 12th inst. we in this section had a copious fall of rain of about two and a half inches, and such vessels as were left standing out were found to contain water impregnated with a yellow substance such as is contained in the inclosed vial. We learn to-day from Bowling Green, fourteen miles distant, that it was the same there, and the inhabitants, believing it to be sulphur, are somewhat alarmed, not knowing but what it is the beginning of a preparation of that great fire in which sinners expect to find themselves ensconced in a coming day! Whatever it is, we are not chemists enough to make out. Clothes that were lying out were made yellow with the substance. It seems to be odorless—has the resemblance of farina contained in the anthers of plants. It may be a fertilizer—who knows? If so, who can tell how much is received from the atmosphere in finer undiscernible particles throughout the year? Being ignorant ourselves, we would like to hear from you, who are more knowing. H. L. EADES.

South Union, Ky., March 13, 1867.

[There are many instances on record of solid substances ordinarily abiding on the ground or in the sea, falling down with the rain. Thus there have been showers of fish, frogs, insects, vegetable matters like pollen, and sand. When we remember the force of tornadoes, whirlwinds, and waterspouts, and how the moderate wind transports musketoes, we have a sufficient clue to an explanation. These extraordinary rains have always been a terror to superstitious people; in the yellow rain they smell sulphur, and in the red rain blood. A friend informs us that he has frequently seen red snow on the mountains in Colorado, and he is satisfied that the color comes from an insect. We will make a microscopic examination of the specimen received, and may be able to determine what kind of vegetable or animal it is and where it came from. Mr. Eades has our thanks for his courtesy in sending it.—EDS.

Terrific Explosion of a Spoonfull of Water.

MESSRS. EDITORS:—I see in your issue of the 23d inst., under the head, "Answers to Correspondents," some remarks on the explosive force of water when freezing. Some forty years ago, near Granville, Licking Co., Ohio, a heavy forge anvil, of some 1,000 lbs. or more, was damaged by a slight crack in one side some three inches deep, and an opening so slight as scarcely to admit the thinnest knife blade. It was tumbled out, and one terrible winter night, when filled with water, which could not have exceeded one table-spoonfull, the frost rent that mighty mass of iron in twain, with an explosion like a seventy-four pounder. In this case, wherein was the cause equal to the effect? B. F. E.

Dayton, Ohio, March 20th.

Science Familiarly Illustrated.

Adipocere.

A few days since Mr. E. Northrup a very worthy farmer of Newtown, Conn., brought us a very fine specimen of adipocere which had been taken from a peat bog. Several pounds of the curious substance had been collected by himself and neighbors, and hopes were raised that the bog might prove a veritable mine of soap and candles. To most of the villagers the substance was a great mystery, as to its nature and origin; but the theory prevailed that it was a mineral substance allied to petroleum and that it must be considered as a trustworthy "show" of oil.

It is probably the case that the word adipocere and the thing to which it is applied are unknown to most of our readers and we proceed to make the whole matter as plain as possible.

The word adipocere (derived from two Greek words which signify respectively wax and fat) indicates something of the nature of the substance, for the substance looks and acts very much like wax and fat. Most people who see a very good specimen for the first time, would be very sure that it contains each of these ingredients.

Adipocere was first distinctly noticed and described about a century ago in France. Since then it has been found and is known to be constantly produced in all parts of the world, excepting perhaps the polar regions. In 1787 there occurred an opportunity of collecting a very large quantity, and the most eminent chemists made a careful examination of it and determined its nature and some of the conditions under which it is formed. At this time, on account of the increase and encroachment of the living population of Paris, it became necessary to dig up and carry away the contents of some of the ancient cemeteries. It had been the custom to bury poor people in pits, thirty feet deep and twenty feet square. Into these pits the bodies placed in cheap boxes were packed as closely as possible without any intervening earth to within a foot of the top: this last foot was soil and the whole of the covering of mother earth which protected the remains of 1200 to 1500 human beings; for that was the number of bodies actually placed in each of these pits.

The first pit that was examined by the chemists Fourcroy and Thouset, had been filled and closed up fifteen years before. On opening some of the coffins, for the wood was quite sound, only tinged of a yellow color, the bodies were found within, shrunk so as to leave a considerable vacant space in the upper part of the coffin, and flattened as if they had been subjected to a strong compression; the linen which covered them adhered firmly, and upon being removed, presented to view only irregular masses of a soft, ductile, grayish white matter, apparently intermediate between fat and wax; the bones were enveloped in this and were found to be very brittle. The bones and the hair were the only parts of the body which were not very much changed. All else, the brain, the heart, the contents of the abdomen, muscles, nerves etc., had disappeared, and in their place was that peculiar, soft, ductile, grayish white substance which the chemists then agreed to call adipocere. The bodies were so much diminished in size and weight, and they had such a consistence, that the grave diggers found it most convenient in carrying on their work to roll them up from head to heels and thus get each one in a compact form for handling.

Adipocere partakes of the nature of wax and fat and may be used in the arts as substitutes for these. In fact it is said that large quantities of the adipocere dug out of the pits of Paris, were used in making soap and candles. To such base uses may we come at last. Great Cæsar dead and turned to waxy fat might make us soap and light and help to grease our hubs.

But all dead bodies do not turn to adipocere. To the experienced Paris grave diggers, it was not a new substance, and they had observed that it was found only in the pits, and consequently it was the fate of poor folks only. Adipocere has

been found in considerable quantity in the potters' field, of New York city, which has been removed to satisfy the necessities of our rapidly increasing population.

There are circumstances however in which a body buried by itself may change into adipocere. Probably all the conditions are not well understood, but it is certain that the change has been brought about in bodies which had been buried in running water.

As might be supposed, the formation of adipocere is not limited to the human body. The fact is that the bodies of very many of the larger animals have been found changed into it, and without doubt the body of an ox or a cat would in like circumstances be changed in the same way as the body of a man. The specimen received from Mr. Northrup, which suggested this article, no doubt originated from the body of a sheep.

As to the chemical nature of adipocere, it may be considered an ammoniacal soap. In the decomposition of the animal substances of the body, the solid fat acids, manganic, stearic, etc., combine with ammonia, to form adipocere, which being a permanent compound remains after all else is dissipated.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, March 21st, Prof. Tillman presiding.

A new portable printing machine was exhibited designed for general use not only for printing of circulars, bill heads, etc., but to be employed by the business man for transacting his correspondence, it being claimed that letters can be printed by its use more quickly they than can be written with pen or pencil. A machine of somewhat similar construction for stereotyping, was then shown. In this machine the letters, figures and some of the most frequently recurring words are arranged on the periphery of a wheel. As in the former machine, the type are operated by a set of keys as in a pianoforte: by pressing down either key the corresponding letter, figure or word is in the one case printed or, in the latter machine, is pressed into the plastic material from which may be cast a stereotype plate, ready for printing. A steam plow having the great recommendation in its favor that the spaders assist rather than retard its progress: and an improved ventilator for chimney tops, were also exhibited and their construction and advantages explained by their inventors.

BRIDGE BUILDING.

Mr. Blanchard read a paper on this subject therein proposing an easy and practical solution of the mathematical question involved, and suggesting a readier way of arriving at the old results and one better adapted to the capacities of mechanics than the formulæ laid down by engineers. He began by considering the whole span from pier to pier to be divided into such a number of shorter spans, that each may be covered with sufficient security by a single length of simple beams. The points of division between these sub-spans may be called "bearing points" and the erection of a structure containing these bearing points is what we call bridge building. As in the consideration of the circle, we make the curve as a polygon of an indefinite number of sides, so in the arch it is necessary to reason from point to point of the curve in straight lines. The bearing points of the bridge can only be supported by oblique supports acting from the ends of the structure and may act by compression, as in the arch, by tension, as in the suspension cables, or a combination of both as in the truss bridge. It is a theorem in statics that when a body is held in equilibrium by three forces acting from different directions, these forces are relatively equal to the three sides of a triangle, each side of which is drawn at right angles to the direction of the force it represents. From this it follows that if a body in equilibrium is acted upon by any number of forces, the relative magnitude of each is represented by the sides of a polygon each side of which, as before, drawn at right angles to the force it represents. By an application of this law the proportions of the timbers or irons that form the supports of the bearing points may be determined by regarding each point as maintained in a state of stability by three or more contending forces that neutralize each other. The weight of the load, a vertical force, is to be resisted by oblique supports acting from different directions. The greater the inclination of the braces the greater the strain, while the more upright they stand the less the strain becomes. By resolving the strain into thrust and weight the strain upon the tie rod at the bottom is obtained; also the strain upon straining beams which it is necessary to intrcduce between the heads of the braces when more than one is employed.

In a truss bridge the braces near the center of the bridge transfer their strain to those next nearer the ends, which have this strain in addition to their own to carry: this load is then transferred to the next, thus the strain constantly increases by regular additions from the center to the ends of the bridge. The top and bottom cords perform the secondary part of holding the braces in position, the former being the aggregate of all the straining beams placed between the heads of the braces to resist the inward thrust, while the latter is the aggregate of all the rods with which are connected the feet of each pair of braces to prevent the outward thrust. Mr. Blanchard then explained the necessity for using counterbraces when the load is unevenly distributed, illustrating his views with numerous diagrams and models. The able and interesting article by Dr. Stephens, read at this meeting, we shall refer to again at some future time.

A COATING FOR FLOORS, fire-proof, durable and ornamental, might be applied from a strong solution of soluble glass. Water of course could not be allowed to remain on it.

To Silver Glass.

1. Dissolve 10 grains of nitrate of silver in 1 oz. of water. Then add strong ammonia drop by drop till the cloudiness at first produced is cleared up.

2. Dissolve 10 grains of Rochelle salt in 1 oz. of water.

These solutions may be kept apart for any period. For use they are mixed and filtered. After mixture they must be used as soon as possible. The glass must be carefully cleaned; any foreign matter leaves streaks. The glass is placed in a horizontal position and as much of the solution is poured on as it can sustain. Or the solution may be put into an earthen or glass dish and the glass immersed in it. The silvering is completed in half an hour or more.

CAUTIONS.—The operation should be carried on in a room warmed to about 70°. Any vibration of the glass or liquid caused by wagons in the street or machinery in the workshop is fatal to success. If the liquid and glass be exposed to full sunlight the process goes on better. But all the preliminary preparations should be made in a feebler light.

This plan gives only bright silvering. To secure a mat surface seen through the glass silver leaf or paper should be used. A mat surface may be produced on the bright silver by deposition of more silver by the battery; but this will not show itself through the glass.

PROF. WHEATSTONE'S TELEGRAPH is operated by drawing through the sending instrument a strip of paper perforated beforehand with the proper characters of the despatch. The perforations give the connections, and are prepared with an instrument as rapidly as in the usual mode of telegraphing, by any number of assistants which the pressure of business may require, the line being occupied only by the rapid drawing through of the prepared despatches. An ingenious instrument by the same inventor, is used by the Emperor of the French for secret despatches. The words, sent in cypher, of which the sending operator knows nothing, are translated into intelligible print by a proper arrangement of effects in the receiving instrument; and yet the attendant of the latter is as ignorant as the former, for the printed telegram is reeled off into a locked box, as fast as printed, without allowing a letter to be seen.

PUTTING UP FLOWERS FOR WINTER.—Some of our fair friends, when about canning fresh fruits for winter store, may perhaps like to put up a few fresh flowers. We give them a newspaper method for trial. Cut choice buds just ready to open, with a good stem, say three inches long, the end of which is to be immediately covered with sealing wax. Dry the buds partially in the air, and wrap each in a piece of soft paper, clean and dry, and fasten them up in a tight dry box. When wanted, take them at night, cut off the sealed end of the stem, and put them into water containing a little niter or salt. The next day or thereabout, the buds may be expected to expand.

MR. WHITNEY, of Effingham, Ill., whose engraving of a "Coffee Roaster" was recently published in these columns, in acknowledging the receipt of his engravings, model, and patent, adds: "Thanks for the promptness you have exhibited in all your transactions with us. We have sold the state of Indiana, and probably Kentucky, and are now in correspondence with a large number of persons negotiating sales of counties in different parts of the United States. Illustrating and advertising in your paper pays.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

VENT PEG OR VALVE.—Stephen Bourne, Headstone Drive, Harrow, Eng.—This invention relates to a valve or vent peg for beer casks, etc., and consists in making the valve or vent peg of india-rubber and with one or more openings in such a manner that by the elasticity of the rubber or other material they will be held closed while by the extension of the rubber they will be opened and thus a communication established between the inner and outer faces of the valve.

HOOP SKIRT.—August Fellheimer, New York City.—This invention consists in forming loops at each end of the hoops composing the skirt by bending such end over and then securing it to the main portion, by means of which hoop loops a reliable and durable connection is established between the hoop and their sliding tubular fastenings or the tapes of the skirt, as the case may be.

LOCK.—E. P. Porter and G. W. Hallett, Waterford, N. Y.—In the lock embraced in this invention a series of spring catches are so arranged with regard to the bolt that when the bolt is out they will interlock with the same and will hold it in such position when releasing said catches from the bolt by a suitable key; the bolt is then free to be drawn in.

AUTOMATIC BOILER FEED.—Henry O. Demarest, New York City.—This invention relates to a boiler feed which consists principally of two chambers which oscillate on a suitable rod, their ends being pared off and ground steam tight against seats which are formed by the end pieces of a suitable frame. Suitable channels in the seats and chambers allow said chambers to fill and discharge alternately each chamber when full being made to descend by its own gravity and in descending it opens the communication with the steam boiler and if the water in the boiler is below the desired level steam is admitted to said chamber and the water contained in it sinks down into the boiler, and while one chamber discharges the other fills and an automatic boiler feed is obtained which when once properly adjusted requires no further attention.

CORN PLANTER.—A. M. Corbet, Bethlehem, Iowa.—This invention consists in a novel manner of constructing and aranging the slides in the seed box which are so made that the flow of seed may be regulated according to the quantity required to be sown. The slides are furthermore provided with slots or perforations in such a manner that the seed may pass from one slide to the other without clogging up; the hole in the lower slide being closed while the seed passes through the scrapers to the ground.

POUNCING HATS AND HAT BODIES.—John L. Labiaux, Newark, N. J.—This invention relates to a machine on which hats and hat bodies of various sizes and shapes may be pounced with the greatest rapidity and ease.

AIR PUMP.—Daniel Carpenter, Peekskill, N. J.—This invention relates to an air pump of novel construction which is to be applied for the purpose of creating a vacuum in boxes or vessels, which are to be used for preserving meat, vegetables or any other article. This invention will prove to be of especial value for long journeys on ships, but also for many other purposes

MANUFACTURING MATCH SPLINTS.—Emry Andrews and William Tucker, Portland, Me.—This invention consists in a rack arranged with slats which are strung on wires with washers interposed between them in such a manner that the match splints can be firmly clamped between the slats and the principal strain is thrown on the wires. The rack is fed down by a compensating feed composed of a feed bar which moved down against the action of springs by means of cams on the driving shaft and which is so constructed that it moves the rack for the thickness of one slat for each stroke of the head which pushes the cards against the knives. The slats of the rack are opened by suitable wedges so that the match splints can readily enter between them. The cards are driven against the knives by a toothed feed plate which drives the splints clear through the knives. Said knives are firmly secured on two screws supporting the ends thereof and they are kept apart by washers interposed between them. A portion of the knives are placed in the rear of the others so that they do not all cut simultaneously and the wood is relived of a part of the compression which it would receive were all the knives in a line. The cutting edges of the knives are concave whereby a drawing cut is produced each way from the center of the card and the knife is less liable to follow the grain of the wood than it is when made with a rectilinear cutting edge.

TOOL HANDLE.—William Runde, New York City.—The object of this invention is to so arrange a tool handle that all kinds of shoemakers' and saddlers' tools may be easily held therein, and that they may be easily removed therefrom and replaced without trouble.

CLOTHESPIN.—William M. Doty, New York City.—The object of this invention is to make a clothespin or fastener in the simplest and least costly manner, and to construct it so as to be strong and easily applied to or removed from a clothesline as may be desired.

IRONING MACHINE.—P. O'Thayne, New York City.—This invention relates to a machine for ironing clothes or articles of any description, said machine being composed chiefly of a movable flat or segmental board in combination with a smoothing iron which is heated by a gas flame and which is so arranged that it can be depressed on the board and that it can be revolved if it should be desirable.

CONVERTING MOTION.—Wm. H. Hurlbut, Elgin, Ill.—This invention consists in the employment or use of a spiral flanged cam in combination with the crosshead of a steam engine, or other equivalent part of another motor and with a shaft to which a revolving motion is to be imparted in such a manner that by the action of the crosshead or other equivalent part on the spiral-flanged cam the reciprocating motion of the piston of a steam engine or the reciprocating motion of an equivalent part of another motor is converted in a continuous rotory motion of the shaft said spiral-flanged cam acting as a substitute for the crank.

DRILLS FOR OIL AND OTHER WELLS.—Washington Tingley, New York City.—The object of this invention is to improve the construction of drills for oil and other wells, so that they will penetrate the rock with ease and rapidity, ream out the bore as the drill advances into the rock, and keep the bore at its full diameter, and also gather within itself the detritus produced by the action of the drill after the manner of a sand plow.

BELTING PULLEY.—Moses Lewis and Samuel Miller, Greenville, Conn.—This invention consists in constructing pulleys upon shafts running at right angles in such a manner that the belt being at a half turn or twist the strain is equal from one belt to the other.

PAINT CAN.—Herman Miller, Hoboken, N. Y.—The object of this invention is to so arrange cans, in which ready made paint is kept for sale, that the same may be opened and reclosed with ease, and still be at all times air-tight.

PRESS.—David King, Aberdeen, Ohio.—This invention consists in constructing a screw press in such a manner that the screw after it has been turned or run down may by turning the lever by means of a rack and pinion, be elevated rapidly thus saving the time of running the screw up and down in the nut.

HOISTING APPARATUS.—George L. and Wm. M. Howland, Topsham, Me.—This invention consists in the use of a third pawl, whereby the notched bar may be raised two or more teeth at a time, which pawl can be easily thrown out of gear to test the device, operate for raising or lowering, and consists also in making the connections between the lower pawls more flexible, by the application of one more link, whereby the operation will be easier and a less amount of power required.

TOOL FOR CUTTING BOILER TUBES.—Peter Hoffman, Jersey City, N. J.—This invention relates to a tool for cutting boiler tubes which is composed of a split or sectional bar, one end of which is made to fit the tube to be cut, while its other end, which carries the cutter, is open to receive a wedge in such a manner that when the cutter bar is inserted in the tube to be cut and the wedge is placed in its slotted end, the points or teeth of the cutter catch in the inner surface of the tube and by turning the wedge and cutter bar and driving said wedge in gradually, the tube is cut in a short time and without producing the least jar in the joints of the boiler.

WAGON BRAKE.—B. B. Scofield, Woodhull, Ill.—This invention furnishes an improved brake for wagons, carriages, etc., simple in construction and effective in operation.

WIRE POINTING.—John Lockwood, Wilton, Conn.—This invention consists of a simple and convenient machine for pointing wire for drawing.

LOCKS.—Chas. Gschwine, and Chas. Reichard, Union Hill, N. J.—The object of this invention is to arrange a lock in such a manner that it cannot be unlocked, unless the position of the key is reversed. The invention consists in so constructing the spring catch and the bolt, and combining them with a dog, or pawl that the bolt cannot be unlocked, unless it is first pressed back by the dog. The latter can in turn only be operated by placing the spindle of the key into the lower end of the key hole, while for locking and unlocking the spindle is pressed through the upper end of the key hole.

FIRE ARM.—Thomas Restell, London, England.—This invention relates to certain improvements in breech-loading needle guns which are so constructed that they serve also as canes and which are operated in an easy and simple manner.

LOCK.—L. S. Chase, New York City.—This invention relates to a lock in which the bit of the key acts on a series of pins or spring stops which are inserted in a revolving disk and which correspond in number and position to a similar number of pins inserted in suitable cavities in the lock plate. Said revolving disk is provided with a circular ward which extends clear up to the inner lock plate and prevents the feeling of the lock, and a bridge in this ward protects a portion of the tumblers and pins. The bit of the key acts on the tumblers but the bolt is thrown by a nose projecting from the circumference of the velocity disk.

HOT BLAST FOR FURNACE.—Job Froggett, Youngstown, Ohio.—This invention consists in a novel arrangement for heating the air which is forced into furnaces for smelting and other purposes.

CHURN.—Daniel C. Merrill, South Paris, Maine.—This invention consists principally in the construction of the dasher, in making the horizontal arm of the standard adjustable, so that it may be extended or contracted to accommodate different sized churns; in combining an adjustable slide or socket with the balance wheel for the reception of the end of the adjustable sliding arm attached to the dasher handle.

DRESS IMPROVER.—John Stademann and Henry Sanerbier, New York City.—This invention relates to a device to be applied to male and female garments for the purpose of giving it fullness. It is more especially designed for giving fullness to the chest of male wearers and to supersede the use of padding in the upper part of the fronts of vests and also to give prominence to the waists of ladies' dresses in front of the breasts. This result is attained by having the swaged wire cloth or wire gauze divided into two parts and connected when necessary by hooks and eyes, slides or elastics, so that they may be attached to or inserted in the garment.

METER ATTACHMENT.—Isaac P. Tice, New York City.—This invention consists in applying a plurality of meters to a still in such a manner that the amount of low grade spirits, or that which requires to be re-distilled, and has passed through the still, will be made known or indicated to a government official or detective, so that the government cannot be defrauded of revenue by an inaccurate statement of the amount of low spirits, or that below proof, produced by any distillation or series of distillations.