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ALUMINUM—A FIELD FOR SCIENTIFIC EFFORT.

The comparatively new metal, aluminum and its alloys, which have lately attracted considerable attention and awakened some curiosity, seem to afford a promising field for the investigations and experiments of scientific men and inventors. It is singular that since its discovery, as a metallic oxide existing in aluminous earths, no cheap and rapid method of extracting it has been discovered. All clays contain it, some in a less pure state than others, but all in large proportions; in fact it forms the basis of clay. It might be supposed that chemical science, aided by mechanical ingenuity, might, before this, have found a means of producing this metal in unlimited quantities and at a low cost. The process, however, of its extraction is somewhat complicated and quite expensive. Its cost, at present, confines its use to small articles and the purposes of ornamentation. Some of its alloys make it a substitute for silver and gold, to the former of which it is superior in several respects. It is not affected by air containing sulphur; pure, it is whiter than silver and is capable of as high a polish; it is very ductile and malleable, and its tenacity is wonderful. But, perhaps, its most remarkable quality is its elasticity. When wrought by the hammer rollers, or in any other manner, and fashioned into a hollow vessel it will withstand violent blows which would permanently indent other metals.

Cryolite a species of clay found abundantly in Greenland and also in the Ural, is preferred as a material for the extraction of alumina. It is a compound of sodium, fluorine, and aluminum. In its color it is snow white. It is not unjustly called native fluoride of aluminum, and contains thirteen per cent of metallic aluminum. Fluor spar is frequently employed in combination with cryolite, for the purposes of reduction, because of its value as a flux. The emerald, the topaz, and some other valuable stones contain a large percentage of aluminum or aluminous oxide, and the metal, aluminum has been extracted from the emerald, ruby, garnet, topaz and from corundum. Of course such scientific experiments are costly, and cannot, in themselves be of immediate practical advantage; yet it would seem that so valuable a metal as aluminum distributed (in the form of an oxide) more generally and plentifully over the globe than iron is, might be procured with no greater expenditure of labor, time, and money than iron. The fact of its being presented only in the form of an oxide need not militate against its reduction from its matrix in a metallic form. Some of the best of iron—that cheapest, but most valuable of metals—is produced from its oxide. To be sure, we cannot apply the same crude means to the reduction of aluminum from its base, mother clay, that we can use in the reduction of iron; and this is just where scientific knowledge and practical talent is needed. We want the metal; the exigencies of the times demand its general use. It will readily combine with other metals, as copper iron, gold, etc., and with them forms very valuable alloys. With iron three parts, and aluminum one part, the composition will not oxidize when exposed to moisture; with copper, ninety, and aluminum ten, a beautiful metal is produced, harder than the best bronze, whiter than copper and capable of being wrought under the hammer. One part of aluminum, to one hundred parts of gold, gives a fine greenish gold color, more agreeable to the eye than that of gold, and much harder. Some of these qualities seem to recommend this metal or its alloys as a material for minting, and others stamp it as of vast value in the arts.

What we now need is its production in sufficient quantities and cheap enough to be employed in the arts.

THE VALUE AND USES OF WORN-OUT FILES.

Although the invention and use of machines for finishing work in metals has, to a large extent, superseded the employment of files, it is difficult to believe the day will ever come when the file will cease to be an important tool to the metal worker. We have planing machines, shaping machines, milling machines, and their adaptations, which do a large proportion of the work formerly performed through the medium of the cold chisel and file, directed by the expertness and skill gained by long experience; but still the file is one of the most necessary and valuable tools of the machine shop. Numerous attempts have been made to cut files by machinery, and we understand some of the later have been successful, but have had no opportunity to test the correctness of the statement. Generally, however, files are cut entirely by hand, and the skill required in their production affords one of the most beautiful illustrations of the capacity of the workman to reproduce indefinitely the results of acquired experience.

But "what shall I do with my worn-out files? shall I have them re-cut? will it pay?" asks one of our correspondents. During an experience of fifteen years we had many opportunities to solve this question. Over and over again we sent our old, unbroken, files to be re-cut, with the assurance, each time, that they would last nearly as long as new, but each trial confirmed the conviction that it was all "vexation of spirit." If there is any annoyance more aggravating to the machinist than another, it is a file that fails him when engaged on a nice job. It requires some little time for the hand of the workman to become habituated to a new file, and to have it break or refuse to cut just when his whole mind is intent upon his work, is very vexatious. We never yet used a re-cut file with any satisfaction. If one can be re-cut to give good after service, it must be a heavy finishing file, the teeth of which are fine, and the stock of which is sufficient to withstand the manipulation necessary to reproduce it. We have little faith in re-cut files; they are tender, apt to break, quickly worn, and altogether unprofitable.

Yet old files have a use. They make excellent hand turning tools. For this purpose the end merely has to be ground to the proper shape. Probably to the hand-tool turner no implement is susceptible of a greater variety of adaptations than a turning tool made from a triangular or three-cornered file, while the flat files make superior chisels for finishing plain work, and the square file becomes both a roughing and finishing tool. Old files make good scrapers. For this purpose they must, sometimes, be partially forged, enough to turn their ends at an angle to the file. In this case—and in all others where files are subjected to the action of the hammer—the portion to be forged should be ground until every mark of the teeth is obliterated. No matter how careful the heating and the hammering, if a vestige of the teeth is left the result will be a weak place, a "cold shut," or a crack in the tool. It is useless to attempt to forge a good tool, as a cold chisel or turning tool, from an old file, unless the teeth of the file and their marks are all obliterated by the grindstone; the indentations seem to enlarge and expand by the heat and show themselves in serious fractures at the most inappropriate time.

Treated in this way, old files may be wrought into dies for screw cutting, punches, small cold chisels, keys, and many other articles and appliances continually needed in the shop. The work of grinding can employ the leisure hours of apprentices, and if judiciously performed, it will, at the same time, tend to true the face of the grindstone. Any of these ways of utilizing old files we believe to be preferable to the mistaken economy of paying for their re-cutting and worrying over their unsatisfactory after performance.

IMPORTANCE OF STUDYING CAUSE AND EFFECT.—A HINT TO INVENTORS.

A very large proportion of the time, labor, and money usually spent in perfecting new inventions is often needlessly expended in the trial of experiments to determine facts which should be determined without any experiment at all. We have in mind two remarkable instances of this kind, which have come under our own observation. One was the attempted construction of an air gas light machine, in which the object to be attained was the supplying of the material (gasoline) to a reservoir in which revolved a device for charging the air with the vapor of the fluid. The condition to be observed was, that a given level of the fluid in the reservoir was to be maintained. To do this a second reservoir of the fluid was placed over the first, communicating with it by means of a tube passing from the lower part of the upper reservoir, and opening into the lower reservoir at the precise point at which the level was to be maintained. The upper reservoir was filled at the top, the communication between the two chambers being meanwhile interrupted by a stopcock, and when filled, securely seated by a stopper screwed down upon a washer of leather. It was expected that this arrangement would operate as follows: When the fluid in the lower chamber was exhausted, so as to uncover the mouth of the tube, a bubble of air would pass into it, and rising to the upper reservoir, displace a small portion of the fluid, and this operation repeated would produce the required result.

Now had the fluid been glycerin, or sperm oil, or any other non-volatile substance, the result anticipated would have been attained; but the gasoline volatilized so rapidly in warm weather, that the fluid was forced entirely out of the upper reservoir when the stopcock in the tube was left open, a result which should have been foreseen, and which was predicted by us before the apparatus was set in operation.

Even at this stage the radical fault of the device was not discovered, but the inventor strove to overcome the difficulty

by the use of siphons, tubes bent in the form of the letter S, etc.

The faults of this inventor are not, we are sorry to say, rare ones. They were his imperfect knowledge of the material with which he had to deal, and his tinkering when he should have been thinking, and searching for the information which he lacked. How much time and money have been thus wasted upon the futile attempt to construct the so-called perpetual motion! And have we not heard somewhere of a man who was to revolutionize ideas of motive power by pumping water with a diminutive steam engine upon a gigantic overshot wheel? Yes, we have not only heard of that individual, but have seen him expending his money, regardless of the warnings of those who saw and realized his folly, until a reasonable competence, which he had accumulated through a steady and industrious life, had melted away, and left him a poverty-stricken and disappointed old age. This individual is by no means a natural fool. He is capable of attaining and applying knowledge. He failed in that he substituted tinkering for thinking, and supposed himself competent to force nature to yield him obedience, without a knowledge of her mysteries. The folly of this man forms the second instance of useless and vain experiment above alluded to.

He only need expect to avoid such follies who thoroughly informs himself in regard to what has been done in the particular department to which his proposed improvement belongs; who can distinguish principles, and avoid confounding them with mechanical details; and who has mastered the philosophy of all the natural phenomena with which he has to deal. To such a man, speedy and sure success will be the reward of his efforts, or the speedy and not valueless knowledge that success is, from the nature of the case, impossible.

GREAT REDUCTION IN COST OF FOREIGN PATENTS.

The increasing disposition on the part of American inventors to secure their inventions abroad, has induced us to reduce our fees for obtaining patents in all foreign countries to the lowest maximum price. Hereafter we shall solicit patents in England, France, Belgium, Prussia, Austria, Spain, Cuba, Russia, Saxony, Norway and Sweden, Australia, and in every other country which has patent laws, at greatly reduced prices, making our terms most favorable to the inventor. We have agencies established among the oldest and most reliable foreign solicitors, with some of whom we have had business relations for nearly a quarter of a century.

It is important to the owners, that patents in foreign countries be solicited through some old established and well known agency. We have known parties to meet with great discouragement in trying to introduce their inventions in England, from the fact that the patent was solicited through obscure agents unknown to the manufacturers. The English people are very peculiar in this respect, and on the continent the same prejudice exists against patents not obtained through well established houses.

We have in press, which will be issued in June, a comprehensive work on the patent laws of all countries. A pamphlet on foreign patents with terms for obtaining them, may be had by addressing this office.

ETCHING GLASS—ONE OF THE USES OF FLUOR SPAR.

The mineral known as fluor spar or Derbyshire spar from Castleton, Derbyshire, England, where it is found in large quantities, is largely employed in the form of fluorine or hydrofluoric acid, for the ornamental etching of glass. The acid is obtained by heating the fluor spar, coarsely pounded, with sulphuric acid in a leaden vessel; glass will not do, as the acid acts powerfully on that substance. Glass to be operated upon is coated with beeswax, or a resisting substance of which beeswax is the principal component. By means of a pointed instrument, as a needle, the design is sketched so as to expose the glass where the lines have been made. A mixture of spar and sulphuric acid is placed in a leaden tray and the glass with the side on which the design is sketched suspended over the mixture, when a gentle heat, as that from a spirit lamp, is applied to the under side of the tray. The vapor of the combined acid and mineral rises and attacks the glass, producing in a short time the design with as much delicacy and distinctness as could be done with the glass cutter's wheel. If desired, the figures or tracery may be left bright and the ground etched, simply by sketching with a camel's hair pencil, dipped in melted wax, the pattern or design on the glass. The effect is very fine.

This mineral is quite extensively manufactured into articles of use and ornament, it being readily wrought in the lathe by skilled workmen. Very handsome specimens of cups, vases, boxes, etc., are produced from the Derbyshire spar, which is frequently found of a rich blue, green, red, or purple color. The pure white variety is found in large quantities in Hardin county, Ill., and in other localities in this country, the colored specimens are quite plentiful.

"THE WHEEL."

Our readers are aware that we design shortly to print, under the title of "THE WHEEL," such new or surplus correspondence on the Wheel-question as the writers desire to place in print at their own expense. The new publication will be issued May 15th, in handsome magazine style, price 25 cents. In addition to the above correspondence, "THE WHEEL" will contain a large amount of other valuable scientific matter. For example, among its contents will be found the whole of the recent splendid series of lectures by Prof. John Tyndall, upon "HEAT AND COLD," profusely illustrated. These lectures are replete with rare and instructive information, given in most attractive style. To lovers of

interesting scientific truth they will be worth ten times the price of the book. All orders for "THE WHEEL" should be addressed to Munn & Co., 37 Park Row, New York.

TO ALL WHOM IT MAY CONCERN.

MESSRS MUNN & Co.

37 Park Row, New York.

GENTLEMEN:—Whereas you have been in the habit of publishing in the SCIENTIFIC AMERICAN notices of pending applications for the reissue of Letters Patent; and whereas such publication has been declared to be illegal by Mr. Justice Fisher; and whereas we have lately filed in the Patent Office an application for the reissue of a patent owned by us; now you are hereby notified that in case you shall publish notice of our said application or the claims which we have made in the specifications accompanying the same, we shall hold you responsible for all damages that may accrue to us by reason of such publication, whether by delay in the grant of our application, or by the expense to which we may be put in prosecuting our application.

THE GROVER & BAKER SEWING MACHINE CO.,
By their Attorney,
E. S. RENWICK.

34 Beach St., New York, April 29th, 1868.

What is up now? Is there a Sewing Machine Company endeavoring to get a reissue of a patent to cover claims which they are ashamed to have the public scrutinize? or what is the matter?

On reading the first lines of the above letter we thought it a hoax, but on approaching the end our eye caught the signature to the document, and we could no longer believe the portentous threat a joke. The public will look with more than ordinary interest for the claims which the parties would restrict us from publishing. We expect some dire misfortune awaits us for not obeying "The Grover and Baker Sewing Machine Company, by their attorney, E. S. Renwick's" injunction; but the curiosity of our readers must be gratified, and we abide the result for our temerity.

P. S.—Up to the time of going to press we had not received any notice from the Patent Office which we identify as coming within the above injunction. We are looking with impatience, however, to see what it is that calls forth a letter of such threatening import.

East and West.

When we look east or west, our line of vision is of course at right angles to the meridian, and in a plane, which, being vertical, passes through the center of the earth. At the equator, this plane of east and west vision coincides with the latitude, that is, with the plane of the equator, and all countries actually east or west are in the direction which the eye takes in looking east or west. But in all other places the plane of vision deviates from the plane of the latitude, and people who think that the places set down on the map as east or west of them are actually in the direction that they are accustomed to call east and west, are generally very much deceived. The plane of latitude cuts off a slice of the earth, larger or smaller, according to its distance from the equator, north or south; but the plane of east and west vision, passing through the center, divides the earth into equal hemispheres. The plane of latitude is always equidistant from the equator; but the plane of east and west vision cuts the equator at the real horizon both ways, and comes out at the antipodes, as far south of the equator as the latitude is north, and vice versa.

This idea can be realized and made clear by the artificial globe, in the following manner: To find the regions through which the plane of east and west vision for any place passes, bring the place to the brass meridian, and also revolve the meridian till the place touches the wooden horizon. Then the plane of the wooden horizon will be the plane of east and west vision for the given place. The sun at the time of the equinox, when it stands exactly on the equator, nevertheless rises exactly in our east, though we are forty-three degrees north of the equator, and as it ascends toward the tropic, rises apparently far to the north of east, though in reality it never comes north of the equator more than twenty-three and a half degrees. These phenomena show that our plane of east and west vision cuts the tropics and the equator, and, instead of coinciding with our latitude, takes nearly a southeast direction to our antipodes, on the other side of the equator.

These facts, says a writer in *The Circular*, ought to be considered by the Jews, who are said to pray with their faces to the east, imagining that they are looking toward Jerusalem. Praying in that position from New York, they are really looking over the Desert of Sahara, and Jerusalem is far away from their line of vision to the northeast. Moreover, their line of vision is in the tangent to the curve of the earth, while Jerusalem is nearly a quarter of the way round the globe on the curve itself, and consequently far below the straightforward outlook. The real direction of Jerusalem from New York, as near as we can calculate with our rude appliances, is thirty-five degrees north of the east line, and forty-five degrees below the horizontal line. In other words, a Jew, in order to pray right at Jerusalem from New York, ought to face by compass about N. E. by E., and look at the ground about six feet before him.

Taxation.

From a very able essay from the pen of E. H. Derby, of Boston, on the position and prospects of the United States with respect to finance, currency, and commerce, we extract the following:—

"Mr. Rollins, in his last report, condemns those taxes whose collection is costly, and his objection applies most forcibly to taxes on gross receipts and incomes. On railways the cost of collection from the public ranges from fifty to ninety per cent. It now averages nearly seventy per cent on

our American railways, for two-thirds of the gross receipts are absorbed by expenses, and for each dollar of the tax collected by the railway, three and a third must be taken from the public—such taxes carry with them their own condemnation. A tax on premiums of insurance, which compels the poorer classes to pay for the privilege of guarding their houses and furniture against their most dangerous foe, is also objectionable. To avert pauperism we should stimulate rather than discourage insurance.

"It is urged that the Income tax is a tax on capital. If it be so, let it be continued on coupons and on the dividends of factories, railways, banks, and insurance companies; but when it is applied to the irregular incomes of private citizens and uncertain receipts of professions, terminable with life or health, it may well be questioned. The Income tax in 1865, then three times as high as the English Income tax, was levied on four hundred and fifty thousand people, and doubtless as many more were required to make returns to prove they were exempted by poverty from the assessment.

"If we rate the cost to each individual of posting his books and making his computation at ten dollars only, the cost to the public, besides the salaries of assessors and collectors, would exceed nine millions on the tax payers of 1866, and an equal number exonerated. The estimate of Mr. Rollins for the returns the present year is less than twenty-five millions from the Income tax, while the returns from gross receipts of railways were last year but four millions of dollars. Is it wise to continue taxes so costly to collect?

"But a still stronger objection to the Income tax is the publicity it gives to the private affairs of the citizen. He is obliged to disclose important secrets, often to the injury of his trade and credit, or to the detriment of his family and fortune. No distinction is made between permanent and temporary incomes. With people of limited means, the greenback set aside for a new suit, or to sustain the son in college or the daughter at school, obeys the peremptory call of the collector, and honesty pays what dishonesty evades.

"The operation of the tax is most unequal. Massachusetts, with seven thousand square miles only, contributes more than eight million dollars to the Income tax, while all the Cotton States, with half a million miles of surface, pay but three-fourths of that amount.

"The Income tax is a direct tax on the rents of real estate, and operates as directly and effectually as a tax on the land itself. The constitution provides that all direct taxes shall be levied in equal sums on each Congressional district; but now single districts in New York, Pennsylvania and New England pay more than twenty Southern districts. Such taxes, if continued, may be contested, and large reclamations probably demanded."

Whether an Application for a patent interferes with Another Patent is a Question to be Determined by the Commissioner of Patents.

An interesting question in relation to interfering applications has lately been decided by Judge Fisher, of the United States District Court, Washington, in the case of *Marsh vs. Dodge*. This case was before the court in February last, on the question of priority of invention of the specific devices by which a self rake is attached to a two-wheeled reaping machine, and was decided in favor of Dodge. Marsh then reconstructed his application and specifications, and began *de novo*. In the outset, he demanded that a new interference be declared between himself and Dodge, that the question might be tried again. The Commissioner of Patents refused to do this, and from his action the present appeal was taken. The following is Judge Fisher's decision:

Appeal by James S. Marsh from the Commissioner of Patents. A motion is made in this case to dismiss the appeal on the ground of a want of jurisdiction in the Judge to whom the appeal is taken from the Commissioner of Patents. The case is either the same which was decided by me on appeal in the month of February last, or it is a new case between the same parties. If it be the same case, the former decision has put an end to it, so far as respects any appeal to be had before me or any other Justice of the Supreme Court of the District of Columbia. If it be a new case, then I am clearly of the opinion that there is want of jurisdiction in any Justice of the Supreme Court of the District of Columbia, because it is not one of those cases in which appeals are provided for by the law. Since it does not appear that the application of Dodge for reissue did in the end to it, so far as respects any other patent, nor is it a case in which either Dodge or Marsh is disabled with the decision of the Court upon the question of priority of right or invention. Had there been an interference declared in this case and a decision of the Court thereon the case would have been appealable, but whether an application for a patent will interfere with another patent or another application pending, is in my judgment, a matter to be finally determined by the opinion of the Commissioner himself. The appeal in this case is therefore dismissed.

Spiritualism in the London Polytechnic Institute.

Prof. Pepper has been doing, this last winter, a great work before the thousands who nightly visit the above institution. Besides explaining the latest discoveries in electro-magnetism, light, etc., he discoursed on spiritual manifestations, pointing out the extensive impostures that have been practiced on the public in the name of mesmerism and spiritualism. He illustrates his lectures with startling illusions, such as the floating in the air of hats, tables, and even stout ladies. He does not only every thing that ever spiritualists have pretended to do, but a great deal more; with this difference, however, that he explains how it is done by well known natural and material means, whereas spiritualists pretend that they do it by unknown, supernatural and spiritual powers.

Solid Back Brushes.

Mr. George L. Cannon, 152 Broadway, New York city, has shown us some specimens of brushes comprising all styles in common use, from the tooth to the blacking brush, which are made wholly by machinery and each bunch of bristles separately secured to the back, which is solid, having no cover or veneer. No glue or pitch is used to secure the bristles, each bunch being held by a staple of wire, the ends of which are crossed and seated in a drilled hole. The crossing of the staple ends firmly locks the bristles so that they cannot be removed. It appears to be a very valuable improvement.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING APRIL 28, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Reissue.....	\$20
On application for Extension of Patent.....	\$20
On granting the Extension.....	\$20
On filing a Disclaimer.....	\$10
On filing application for Design (three and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

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.

77,157.—ANIMAL TRAP.—A. J. Adams (assignor to himself and Boyd P. Quincy), Portland, Oregon.

I claim the spring, C, and claws, B, in combination with the hinged treadles and the base, A, E, all constructed, arranged, and operating substantially as described.

77,158.—LATHE FOR CUTTING IRREGULAR FORMS.—Peleg Barker, Battle Creek, Mich.

I claim the sliding adjustable frame, G, containing the holding devices for the uncut timber, arranged relatively with the curved knife, C, when constructed and operating as described.

77,159.—CAR BRAKE.—William T. Batty (assignor to himself and G. fifth Deshart), Canton, Ohio.

I claim, 1st, The supporter, P, with axes, b and c, and crank, R, when used in connection with knuckle joint, O, substantially as and for the purpose herein shown.

2d, The peculiar arrangement and combination of the crank, R, chain, S, pulley, T, iron, W, iron, V, and car body, X, the several parts being arranged as and for the purposes herein specified.

3d, The peculiar arrangement and combination of the draw bar, K, knuckle joint, O, supporter, P, and brake lever, B, the several parts being arranged and combined substantially as and for the purpose specified.

77,160.—CHURN.—Wm. T. Best (assignor to himself and Daniel Vaughan), Scranton, Pa.

I claim, 1st, The supplementary box, B, having a converging bottom, and being provided with the slotted and perforated cylinder, C, and used with the shaft, F, and its brakers, as and for the purpose set forth.

2d, The frame, N, constructed substantially as described, and provided with a rim around its lower end for collecting the butter, said frame being used in the churn, A, and with the shaft, L, and its dashers, as and for the purpose specified.

3d, The gate, d, surrounding the slotted portion of cylinder, C, for regulating the flow of cream to said cylinder, substantially as herein specified.

77,161.—SPRING FOR CHAIRS.—A. M. Blake, Canton, Ohio.

I claim the use of the conical spring, F, in combination with the foot plate, G, plate, E, socket or spindle, D, and chair leg, C, in the manner and for the purpose herein specified.

77,162.—CARRIAGE LOCK.—J. A. Bower, Middlefield, Ohio.

I claim in the brakes for carriages the levers, B, B', hinged heads, E, E', springs, J, J', and rods, G, G', as arranged in combination with the thills, A, A', in the manner and for the purpose substantially as set forth.

77,163.—MANUFACTURE OF BRICK.—Silas H. Bowman, Half Moon Bay, Cal.

I claim the use of petroleum and peat in the manufacture of bricks, by means both of either of which a clay of which bricks are to be made, substantially in the manner and for the purposes herein set forth.

77,164.—PIANO FORTE STOOL.—Joshua Briggs, Peterboro, N. H.

I claim constructing the stool with metal legs, c, each having a flange, d, containing a socket, e, to enable the leg to be fastened by and slid from screw, f, which connects it to the seat, and pins, g, to keep the leg in position, substantially as set forth.

Also, combining with each leg, as described, the toe piece, i, of wood, driven into a socket, h, in the leg, substantially as and for the purpose set forth.

77,165.—KEYHOLE GUARD FOR DOOR LOCK.—Asa T. Brooks, (assignor to Russell and Erwin Manufacturing Company), New Britain, Conn.

I claim the combination and arrangement of the oscillating spring guard or ward bar, A, with the latch and tumblers, substantially as and for the purpose described.

77,166.—BOOT AND SHOE CONFORMATEUR.—Lorin Brooks, New York city.

I claim the combination with the horizontal scale or size stick, A, of the vertical sliding standard, B, provided with the scale, d, adjustable arm, C, and spring table, D, arranged and operating substantially as and for the purposes set forth.

77,167.—MECHANICAL POWER.—Charles P. Carter, Poughkeepsie, N. Y.

I claim, 1st, The wheel, d, with teeth, formed as shown and described, in combination with pawls, E, E', for imparting motion to flange, f, and arm, J, in the manner shown and described.

2d, The ball, h, when arranged and combined with shaft, g, and flange, f, and pawls, E, E', substantially the same as shown, and for the purpose as set forth.

77,168.—INHALING GASES.—Wm. Z. W. Chapman, New York city.

I claim, 1st, Placing the gas pipe, a, in said apparatus, at an angle with the pipe, b, for inhaling through, to obviate the necessity of a valve to prevent the return of the exhaled gases into the gas pipe, substantially as herein described.

2d, The expanding mouth piece, constructed and arranged substantially as and for the purposes set forth.

3d, A suspending device, employed in combination with the breathing apparatus, by which the same is drawn out of the way and supported when released by the operator, substantially as and for the purposes set forth.

4th, The formation of the joint of the apparatus, by compressing the elastic tube between the surfaces of two rigid tubes, as above specified.

5th, The construction and operation of the breathing apparatus, substantially as herein described, so as to administer the gas, if required, during an operation, or while the mouth is open and free for other, as well as before the patient is rendered insensible, substantially as above specified.

6th, Attaching a gas inhaler to the nose of a patient by the employment of an apparatus, substantially as herein described, in combination with said inhaler, so as to administer gas, while the operator is free to operate upon the patient without the aid of an assistant, as would otherwise be required.

7th, Attaching the apparatus either to the operating chair or other suitable permanent fixture, so as to relieve the operator or patient of the weight and annoyance of the apparatus, while it is at all times ready for use without other aid, substantially as herein described.

8th, The devices illustrated in figs. 3 and 5, adjustable or otherwise, substantially as there represented, for opening the jaws of the patient, as herein set forth.

9th, The employment of an indicator in combination with a respirator and gas receptacle, presenting to the eye of the operator at all times the state of the apparatus and the supply and quantity of gas taken, substantially as and for the purposes set forth.

10th, The diaphragm, substantially as described, to be placed in the mouth to cut off communication being the lungs and the external air through the mouth when the mouth is open.

77,169.—LOOM.—George Cliff, Memphis, Mich.

I claim the combination of the top beam, A, the lathe, B, the breast beam, C, the cloth beam, D, the frame, E, the treadle wheel, F, the shuttle thrower, G, the latch, H, the treadles, I, the pulley, J, the yard beam, K, the pins, L, the spring bar, M, the standard, N, the frame, O, the button, P, the cords, Q, the transverse tie, R, the standard, S, the oscillating frame, T, the connection, U, the spring, V, the hangers, W, the guard wheel, X, the dog and spring, Y, the geared wheel, Z, the bed, 3, and the cord, 3, when constructed, arranged and operating substantially as and for the purposes hereinbefore described and shown.

77,170.—DIE FOR MAKING THIMBLES AND FERRULES.—J. H. Cole, Milbury, Mass.

I claim jointly the die and plunger, A and B, the coating surfaces of which have the configuration herein described and shown, for the manufacture of ferrules and thimbles from disks of cold wrought iron, in the manner herein set forth.

77,171.—DRIVE WELL.—Thomas B. Conklin, Rockford, Ill.

I claim the pipe, A, with slits, a, and lips, a', in combination with bands, B, and screen, C, arranged as described.

77,172.—CHURN.—George W. Corbit, James M. Orput and George M. Case, Malta, Ill.

We claim, 1st, The combination of the cam, e, f, g, bar, f, h, and wheel, 1 2 3 4, substantially as described.

2d, The method of connecting and detaching the cog wheel, P, with the other parts by the device substantially as described.

3d, The combination of the cam, e, f, g, and wheel, 1 2 3 4, substantially as described.

77,173.—ROLLER FOR DRAWING MACHINE.—Francis Crague, George G. Crague, Lewiston, Me., assignors to Wm. N. Higgins, and said Higgins assignor to himself, F. O. Sands, W. M. Emerson and W. T. McNally.

We claim the within described roll for machines for treating cotton and wool, when constructed and operating as and for the purposes set forth.

77,174.—FARM GATE.—John Curtis, Truro, Ill.

I claim, 1st, The combination of the gate, F, with the crane, z, link or hinge g, and screw rod, E, substantially as in the manner and for the purpose herein shown and described.