

umns of the SCIENTIFIC AMERICAN. Many of these trials were made under the direction of experienced Government officers, specially appointed for the purpose, and they appeared to establish the fact that the invention was one of a remarkable character. Some of the targets were clad with 6 inches of iron, with a strong wood backing; but the projectiles passed through the mass without the least difficulty. In other instances the projectile has been thrown a distance of $4\frac{1}{2}$ and $5\frac{1}{2}$ miles. Of course no such results could have been obtained had there been any tumbling or other defective operation of the shot. We are constrained to believe that in Commodore Turner's trial there was either some mismanagement in the handling of the shot, or some defect in their construction. We must have further evidence of failure before we give up our faith in what has heretofore been demonstrated to be a good invention.

One of the peculiarities of Stafford's projectile is that it is generally made smaller than the bore of the gun, the intervening space being filled up by wood or other casing, attached to the shot. This casing flies from the shot when the latter leaves the gun, giving the projectile a free flight. It is alleged that by this method a large area of explosive force is made to act effectively upon a projectile of small diameter. Immense velocity and great penetrative power are thus obtained. Engravings of the Stafford projectile will be found in No. 14, Vol. VIII (new series) of the SCIENTIFIC AMERICAN.

DISTILLATION AND EFFECTS OF HEAT.

There are two kinds of distillation, which are entirely distinct in their nature and results, and by which the effects of heat in changing the character of substances are exemplified in a most remarkable manner. These processes are called *common*, and *destructive* distillation. The former consists in applying a moderate degree of heat to a substance, such as water by which it is converted into vapor, and after this it is again converted into water by refrigeration. Or it is perhaps more clearly explained by the treatment of a liquid, such as a mash of malt, which contains ardent spirits combined with water. By the application of a lower temperature than that of boiling water, to the mash in a still, the spirits pass over in the condition of vapor, are condensed in a refrigerator, and thus they are separated or distilled from the mash. This is common distillation, by which no chemical change is effected in the nature of the substances treated. The water is first converted into vapor by heat, then converted into water again by cold; and as the spirits boil at a lower degree of temperature than water, they are separated from the water by distilling at a low temperature, and then are converted into a liquid state again by cooling.

Destructive distillation consists in applying a high degree of heat to substances in retorts, by which products of an entirely different chemical character from the substances treated are obtained. Some of the most astonishing results connected with modern chemistry and the practical arts are due to destructive distillation. For example, when a charge of bituminous coal is placed in a retort raised to red heat, a great portion of this solid is converted into the gas which is used for illumination, and it will flow unchanged for miles through tubes exposed to the lowest atmospheric temperature. Common oil subjected to the same treatment will also produce gas, but it is not converted by refrigeration into oil again. Many liquids and several solids subjected to such a degree of heat, produce similar results; hence as the character of the products is entirely changed by the operation, it has been called destructive distillation.

The wonderful effects of heat in distillation are shown in the variety of products obtained, and the study of these deserves general attention. For example, in the distillation of cannel coal, a different chemical product is obtained with almost every different degree of heat to which the coal is subjected. If the heat is gradually raised, a very clear oil first passes over, at a comparatively low temperature, then darker colored oils, then thick tar. On the other hand, if the coal is subjected at once to a low red heat, most of the matter that would otherwise have passed off as oil and tar is converted into gas, and all these products are different in their chemi-

cal characteristics. A full cherry red heat is that at which coal in a retort is treated to obtain the best illuminating gas. If the heat is raised much above this, a greater quantity but an inferior quality of gas results. The manufacture of a heavy oil and tar from distilled coal, was conducted by Lord Dundonald, in Scotland, about 1768, long before gas was made for public illumination. The tar was employed for coating the bottoms of ships, to prevent the attacks of the ship worm, before copper sheathing was generally applied. In the spirit with which the manufacture of tar was pursued, Lord Dundonald narrowly missed producing coal oil for commercial purposes, although he used a retort similar to some that were employed within the last four years for distilling coal in making kerosene.

One of the most remarkable products of distilled coal, peat, &c., is paraffine, which was discovered by the German chemist Reichenbach, about 1833, as one of the products of tar. It is a white substance, resembling wax in some of its features. This chemist also obtained oil, which he called eupion, from tar. About the same time that paraffine was thus obtained from coal tar, Dr. Christison, of Edinburgh, also produced it from Rangoon petroleum, and called it petroleine. From this petroleum he also distilled several oils, such as those which are now in common use for illumination. Prior to 1860, the distillation of coal had been carried on for several years upon a very expensive scale in Europe and America for obtaining illuminating oil; but the great supplies distilled in nature's extensive laboratory, situated in the valley of the Alleghany, have supplanted all the similar products of coal distillation, and the amount exported this year, up to the present time, exceeds fifteen millions of dollars.

A good idea of the varied and remarkable effects of heat upon coal in distillation may be communicated by stating that forty-two different substances have been separated from coal and classified, and the production of some of these engages important branches of industry. Among them are illuminating gas, coke, ammonia, naphtha, benzole, heavy oil, paraffine, tar, aniline and all those beautiful colors derived from it which are now so common on silk and woolen fabrics. Distillation, and the effects of heat upon various substances, form most interesting and instructive studies to inquirers after scientific knowledge.

BREECH-LOADING RIFLES AT THE NEXT FAIR OF THE AMERICAN INSTITUTE.

We learn from the officers of the American Institute, that a prominent feature at the Fair, this season, will be a general exhibition of breech-loading rifles. An opportunity will be given for a competitive trial of the various kinds manufactured, and a diploma or premium will be awarded to the best gun.

This will doubtless be the most attractive and popular part of the exhibition. We also suggest to the managers to permit a trial, at all ranges, between the best breech-loaders and the best muzzle-loaders, in order to settle the mooted question whether a breech-loading rifle with fixed ammunition carries as accurately as a perfect muzzle-loader. On account of the great convenience of breech-loading rifles, there is no doubt that they will entirely supersede the old-fashioned arm, provided that they carry the bullet with equal precision. But a defect in this particular will more than counterbalance all their other advantages; for, if there is anything that is sure to disgust a sportsman with his rifle, it is to have it send the bullet to a place different from that at which it is aimed. It is also asserted by some that the complication of the breech-loader is fatal to its general introduction in the army. While but few persons are found who object to the employment of this class of weapon as a national arm; there are others who maintain that the delicacy of workmanship unavoidable in a breech-loading rifle, materially detracts from its utility for field or cavalry use. These are disputed points, which we hope to see settled in favor of the breech-loader; and we desire to have the coming tests made thorough and severe. Let us have no holiday decisions; but submit the competing guns to searching scrutiny, at least as thorough as they will undergo in actual service. Let the breech-loader be exposed to a cloud of dust, such as is inevitable in a long day's cavalry ride, and then see whether the closely-fitted joints will work so that

the trooper can rely upon his weapon, with perfect confidence that it will not be found unmanageable in the hour of peril. Let moisture have a fair chance at the rifle also, so that the public may know how the parts interchange and play in this condition. Let the gun be thrown rudely to the ground, so that all interested may know to a certainty just how much rough usage a breech-loader can stand;—whether it is a bona-fide weapon, or merely a delicate combination of machinery liable to become deranged at the slightest irregular proceeding. Let us know whether it is, in gunnery, what the spy-glass is in optics; or whether it be like the microscope, which requires previous education to manipulate and understand. These are vital points in the utility of breech-loaders, which we should like to have proved or disproved beyond cavil. The greatest value of a muzzle-loading gun is that it is, under all reasonable circumstances, wholly reliable; and it is of very little importance to a trooper or sharpshooter, when his weapon fails him at a critical time, to know that a number of experts have decided that the arm then in his possession is infallible. We do not propose that unreasonable violence should be offered the weapons; but we are decidedly opposed to the sort of encomiums generally lavished upon arms, which are not at all borne out or justified by their mechanical value, or their subsequent performances.

RECENT AMERICAN PATENTS.

Oil Skimmer.—In boiling fish or other materials for the purpose of extracting the oil, and in heating other substances or liquids for the purpose of evaporation or otherwise, the surface of the liquid is generally covered with scum, and the impurities or dregs precipitate, and occupy the bottom part of the tank or still, the clear good liquid being in the middle. The object of this invention is to draw off the clear liquid from the middle, free from the scum on the top, and from the dregs on the bottom. The invention consists in the employment of a shallow saucer-shaped vessel, provided with one or more floats, and with a pipe leading from its lowest point to the barrel or other vessel which is intended to receive the oil or other liquid; said pipe being sustained by one or more floats in such a manner that the saucer-shaped vessel can be adjusted to float on a level with the surface of the clear liquid, under the scum and above the dregs; the vessel being balanced by the floats attached to it, and the pipe being sustained by the floats which are secured to the same, the clear liquid draining off through said pipe until the saucer-shaped vessel settles down on the dregs at or near the bottom of the still or tank. Address Israel Peck or W. H. H. Glover, the inventors, Southhold, N. Y.

Dredging and Ditching Apparatus.—These improvements are more especially designed to be applied in combination with an apparatus termed a "suction dredging boat," patented May 10, 1863, their object when so applied being to cut, bore, pick, break and tear up all obstructive deposits of mud, sand, clay and other matter from the beds of rivers, harbors, docks and other places, or to deepen the same, and to cut and break up turf and earth in swamps and marshes and other places, and reduce all such substances and material to a soft or pulpy or sufficiently diluted condition or get them so mixed with water as to admit of their removal by the pumps of that apparatus; also for cutting ditches and canals, and for forming dikes or embankments and filling up lots and improving swamps and marshes and other low lands, and bringing them to the grade of uplands for cultivation, by depositing upon such swamps, marshes or low lands, the material taken up in cutting the ditches or canals from the adjacent waters. The said improvements may, however, be used in connection with any other kind of boat for the purpose of bringing the matters and substances specified to a condition to be removed by the action of a natural current, or the tide or by any other suitable means; and in some instances the said improvements might be arranged upon a carriage to run upon land, where a stream of water may be obtained to effect or facilitate the carrying away or removal of the material which is loosened by the cutting, boring, packing, breaking, and tearing-up operations. William Atkinson, deceased, late of Brooklyn, N. Y., was the inventor of this improvement; and further informa-

tion relating to it may be obtained of Charles Atkinson, of Moline, Ill., or Joseph Atkinson, of Newbury, Vt.

Pulley Block.—The ordinary tackle or purchase blocks have their pulleys so arranged that they will turn as freely as possible on their axis, both in raising and lowering articles which are suspended to them. This free turning of the pulleys is of course an advantage in raising the articles, but in lowering them it is a decided disadvantage, as the operators have not sufficient control over the descent of the articles, owing to an insufficiency of friction, and frequently a great deal of time and labor is expended in lowering articles to the desired spot, and also in keeping them in a proper line of ascent. To obviate this difficulty is the object of this invention, which consists in arranging with the pulleys, ratchets, pawls and side flanges, in such a manner that, in lowering suspended articles, the pulleys will be subjected to a requisite degree of friction to give the operator full control over the tackle blocks in lowering the articles. J. J. Doyle, of No. 371 Eighth street, New York, is the inventor of this improvement, half of which has been assigned to C. L. Perkins, of No. 54 Exchange Place, New York.

Valve Chest.—The main obstacle which has heretofore presented itself to the successful use of piston valves for the induction and eduction of steam engines has been the unequal expansion of the cylindrical bearings or seats in which such valves work, which has caused the valves either to bind during a portion of their stroke, or else to fit too loosely during another portion thereof; but for this difficulty, such valves, owing to the simple manner in which they can be "balanced," would have been more generally adopted. The object of this invention is to provide for the equal expansion of the cylindrical bearing or seat throughout its whole length, and to this end it consists in a certain arrangement of a steam jacket surrounding or partly surrounding the whole length of the bearing or seat, and communicating with both ends thereof, in such a manner that the steam will heat the said bearing or seat equally throughout the whole length. T. S. Davis, Jersey City, N. J., is the inventor of this improvement.

Door Lock.—The object of this invention is to combine a bar with a lock in such a manner that the bar, which is at the inner side of the door, may be opened by means of the lock from the outer side of the door, the bar being so arranged as to extend entirely across the door, and serve as a far more secure and efficient fastening than the ordinary lock bolts, and more so than the bars and bolts which are adjusted from the inner side of the door, as the bar in this improvement cannot be raised or operated upon by cutting through the door, but only through the medium of the lock. A. Clabaugh, of Atlanta, Pa., is the inventor of this improvement.

Solar-time Globe.—The object of this invention is to arrange a terrestrial globe in such relation to a dial plate and index, that the culminating time of the sun, and consequently the true solar time and also the clock or mean time, can be observed simultaneously at any moment. The invention consists in the arrangement of a terrestrial globe on a horizontal axis, in combination with a revolving annular dial incircling the globe, and adjustable by means of set screws and with a stationary index or pointer, in such a manner that, by the index, the culminating time of the sun on any part of the globe can be observed, and at the same time the clock or mean time can be read off for a certain location for which the dial has been adjusted. T. R. Timby, of Saratoga Springs, N. Y., is the inventor of this improvement.

Sul-iron and Heater.—This invention relates to an improvement in sad-irons or flat-irons as they are frequently termed, and consists in constructing the side with a shell or case in which a sliding or adjustable heater is placed, arranged in such a manner that the iron may be applied to a coal-oil lamp, made to serve as a draught chimney for the same, and be heated very expeditiously, a cold iron being applied to the lamp as a heated one is removed, an order that the lamp may always be provided with a chimney, and a heated iron be always at command during the process of ironing. O. W. Preston and C. Barry, of Corning, N. Y., are the inventors of this improvement.



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*** 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.

39,107.—Device for operating Churns.—Henry C. Addis, Springfield, Ill.:

I claim the combination of the spring, L, and treadle, I, with the rock-shaft, D, weighted pendulum, F, adjustable arm, C, adjustable pivoted dasher-rod, B, and churn, A, all in the manner and for the purpose herein shown and described.

[The object of this invention is to obtain a means whereby reciprocating churns, that is to say, those which are provided with rising and falling dashers, may be operated with greater facility than by the ordinary application of the hands to the dash-rod.]

39,108.—Potato Digger.—Theodore Baker, Stillwater, N. Y. Ante-dated July 2, 1862:

I claim the arrangement of the flaring bars, E, and the spiral arms, L, attached to the shaft, F, constructed and operated as and for the purpose specified.

39,109.—Metallic Cartridge.—William Bakewell, Pittsburgh, Pa.:

I claim the use of metallic cartridges so constructed that that portion of the case which enters the charge chamber or breech of the fire-arm (whether tapering or having its sides parallel to its axis), shall be of such shape that a cross section at right angles to its axis will be an ellipse, triangle, square, or other curved or polygonal figure, the perimeter of which will be less than the circumference of a circumscribed circle, so that the cartridge fitting closely in the charge chamber when the piece is loaded, shall, by the expansive force of the discharge, have its longest diameter reduced sufficiently to loosen it when the piece is fired, substantially as herein before described.

39,110.—Shingle Machine.—Joseph Beaudreau, Fond du Lac, Wis.:

I claim, first, The endless chain carriage constructed of segment formed links, h₁ h₂, cross-bars or ties, h₃, the latter at each end, projecting beyond the links, and forming guides, h₄, which travel in ways m, and thereby support the bolts, as they are successively fed to the saw, in a proper position to have a shingle cut from the underside of each bolt; in combination with the tilting table, n, and horizontally revolving circular saw, c, when the whole is arranged to operate in the manner and for the purpose specified.

Second, The tilting table, n, and triangular shaft, n₁, in combination with the spring, s, and arm, n₆, or their equivalents; when arranged to operate in the manner and for the purpose specified.

Third, The pin, a, projecting from the under side of the endless chain carriage, in combination with the gear or toothed wheel, n₅, and triangular shaft, n₄, when arranged to operate in the manner and for the purpose specified.

Fourth, The worm or screw, d', and helical spring, d₂, in combination with the beveled toothed cog-wheel, c, and shaft, f, when arranged to operate in the manner and for the purpose specified.

[This machine is of that class in which the shingles are cut from bolts by horizontally revolving circular saws, a number of bolts being fed successively to the saws by an endless chain belt. This invention consists in certain novel devices, whereby the machine is made to automatically adjust itself so as to cut the shingles, top and butt alternately from each side of the bolts. It also consists in a novel device whereby the saws are protected against injury when brought in contact with a hard or knotty place in the bolt.]

39,111.—Composition for sealing Preserve Jars.—Jesse Beckley, Cincinnati, Ohio:

I claim the composition for sealing preserve jars, composed and compounded as set forth.

39,112.—Projectile for Rifled Ordnance.—Alfred Berney, Jersey City:

I claim the combination with the polygonal extension, b, of the depression, a, a, notches, d, d, and the hollow conical packing ring, E, formed with a shoulder, e, all the parts being constructed, arranged, and combined to operate together in the manner herein shown and described.

[The object of this invention is to obtain a simple mode of combining a packing ring with an elongated projectile which shall both compel it both to transmit to the projectile the rotary motion which it acquires in passing along the rifle grooves of the gun, and to remain securely attached to the projectile during the flight of the latter. It has been proposed to combine the ring with the projectile by constructing the interior of the ring of polygonal form and constructing the projectile with a polygonal projection on its base to fit the so-constructed ring but while this may have provided for the rotary motion of the projectile it has afforded no adequate provision for preventing the ring from flying off after the discharge of the projectile from the gun. This invention consists in making the front portion or portions of one or more of the sides of such polygonal projection with inward inclination, giving the said projection the character of a dove-tail by which the ring is prevented from flying off; also in providing notches or recesses in the shoulder formed upon the projectile in front of the said projection, into which portions of the ring may be driven by the action of the gases emitted by the firing of the charge of the gun and thereby made to aid the ring in transmitting rotary motion to the projectile.]

39,113.—Machine for cutting Thin Timber.—Benjamin F. Betts, Tonawanda, N. Y.:

I claim the combination and arrangement of the sliding box with oblique motion, thereby giving by movement of the block a drawing cut to the knife, in combination with the diagonal position of the knife attached to the immovable bed-plate; and the arrangement of eccentrics for elevating or depressing the movable bed-plate.

39,114.—Instrument for indicating the Depth of Water in Cisterns.—H. L. Brevoort, Brooklyn, N. Y.:

I claim the arrangement of the flexible diaphragms, b b b', to form an expanding chamber within the box, A, and in combination with a spring, i, substantially as herein specified.

[This invention relates to instruments for indicating the depth of the bilge water in a ship or other vessel, or of the water in a tank or

other reservoir by the agency of the pressure of the column of such water acting through the medium of air. In carrying out the invention there is used a series of flexible, sectional, or annular diaphragms such as are used in the bilge and leakage indicator which constitutes the subject matter of seters.]

39,115.—Tea Pot.—Alexander M. Bristol, Detroit, Mich.:

I claim as an improved article of manufacture a tea-pot and water-urn, arranged and combined in the manner substantially as set forth.

[This invention consists in having a vessel composed of two separate compartments, one for tea and the other for hot water, and having each compartment provided with a spout, whereby both tea and hot water may be obtained from the same vessel and the tea kept at a proper warm temperature by the hot water, which receives its heat from a lamp underneath the vessel.]

39,116.—Mosquito Bar.—Asa L. Carrier, Washington, D. C.:

I claim, first, A portable insect shield so constructed as to be operated from the outside, substantially as described by means of levers, A and B.

Second, Levers, A', constructed and operating as described, in combination with levers, B.

Third, Levers, B, constructed and operating as described, for the purposes set forth.

Fourth, The clasp, C, constructed and operating as described for the purposes set forth.

Fifth, The braces, D, constructed and operating as described, in combination with tension cords 1 and 2.

39,117.—Lock.—Andrew Clabaugh, Altoona, Pa.:

I claim the disk, C, provided with the spring, g, the slide, D, tumbler, F, and side, B, all arranged and combined to operate in connection with the bolt, H, as and for the purposes specified.

I also claim the circular slide or guard, K, when combined and arranged with the disk, C, slide, D, tumbler, F, and side, B, for the purpose specified.

39,118.—Mole Plow.—Stillman A. Clemens, Rockford, Ill.:

I claim, first, The mole, a, attached near its forward end by a pivot pin near to the front edge of the lower end of a cutter bar, b, substantially as described and for the purposes specified.

Second, A cutter bar, b, attached to a mole plow beam, h, by the herein described or an equivalent mode which allows free pendulous and hinge movements to the cutter-bar, substantially as described and for the specified purposes.

39,119.—Machine for preparing Tow from Tangled Flax Straw.—George F. Clemons, Springfield, Mass.:

I claim, first, The breaking rollers, K, cylinder, H, constructed with concave ends, i, and having holes, k, made in it as shown and provided with teeth, h, and wings, j, and the open endless apron, J, when all are combined and arranged to operate as and for the purpose herein set forth.

Second, The side-pieces or strips, g, g, placed over the endless apron, J, for the purpose of reducing the width of the same, when said side strips or pieces are used in connection or combination with the cylinders, D, H, concaves, E, I, breaking rollers, C, C', K, and endless apron, J, for the purpose herein set forth.

[This invention consists in a combination and arrangement of breaking rollers, toothed cylinders and concaves, and discharging and feed aprons, one of the toothed cylinders being so constructed as to serve as a fan or blower, whereby the desired work, to-wit the preparing of tow from tangled flax, may be accomplished in a rapid and thorough manner.]

39,120.—Breech-loading Fire-arm.—John Webster Cochran, New York City:

I claim, first, The safety guard or guide, i, in connection with the recoil block, b, as set forth.

Second, I claim the arm, j, attached to the hammer, f, for throwing it back to half-cock by coming in contact with another lever or spring, i', when opening the breech by throwing the recoil block down as described.

39,121.—Hooks and Eyes for Connecting Cords.—Abiel Codding, Jr., North Attleboro', Mass.:

I claim the improved socketed hook and eye, having the socket tubes, a, thereof provided with serrations, teeth, or prongs, arranged in the manner and for the purpose as specified.

39,122.—Seed Planter.—Edward Cox, Point Pleasant, Ohio:

I claim the arrangement of the slide, H, and spring, J, with the pulleys, E G, belt, I, seed cups, h, concave, F, box, D, spout, K, gate, M, and seed hopper, L, all in the manner herein shown and described.

[This invention consists in a novel seed-distributing device composed of an elevator formed of cups attached to an endless band or chain having a tension spring connected with it in such a manner that the belt or chain will always be kept in a proper state and made to operate perfectly.]

39,123.—Locomotive Boiler.—Benjamin Crawford, Pittsburgh, Pa.:

I claim, first, The arrangement of the super-heating tubes, c, c, in line with the flues, a, a, when the chamber which contains the tubes, c, c, is constructed with a vertical diaphragm, g, and the whole enclosed by the case, E, of the boiler, substantially as and for the purpose set forth.

Second, The combination of heads, d, d', flues, c, c, steam pipes, D G, and diaphragm, g, arranged and operating substantially as herein described and for the purpose set forth.

39,124.—Plumb, Level and Square.—D. G. Davison, E. Pullen, Prospect Plains, N. J., and J. S. Davison, Cranberry, N. J.:

We claim the mode of combining a plumb, level and square together, by means of forming that part of the square wherein the plumb is hung hollow or like a case, with an opening on either side at the lower part so that the plumb can be easily seen and brought to an exact perpendicular by means of marks or other indications as above set forth and as shown in the various figures, or when the aforesaid combination is attained by other means, substantially the same as those herein arranged and described.

39,125.—Valve Chest for Steam Engines.—Thomas S. Davis, Jersey City, N. J.:

I claim the arrangement of the open-ended valve cylinder, B, within the casing, A, in such manner that a steam jacket or space, a, is formed between them, which surrounds or nearly surrounds the whole length of the said cylinder and which communicates with the said cylinder at the ends thereof for the induction of the steam thereinto, substantially as and for the purposes herein specified.

39,126.—Corset.—Horace H. Dayton, Worcester, Mass.:

I claim a corset combining the adjustable shoulder-straps, D, body, A, and extensor, J, or the equivalent thereof, substantially as shown and described.

39,127.—Cooking Stove.—William S. Deisher, Hamburg, Pa.:

I claim, first, The flues, H H, provided with openings, H' and i, in combination with the air-heating space, J, and flue, L, when arranged in the manner and for the purposes specified.

Second, The combination of the flues, H and L, with the openings, b and s', valves, M S, and oven, C, when arranged in the manner and for the purpose specified.

[This invention consists in a novel arrangement of passages or flues in a cooking stove, whereby, without detracting in the least from the efficiency of the stove for cooking purposes, a large amount of heating surface is obtained which may be used for heating air and this air used for warming the apartments of the building in which the stove is placed.]

39,128.—Hay Elevator.—James M. Dick, Buffalo, N. Y.:

I claim, first, The employment of the screw, B, in the manner and for the purpose herein described and set forth.

Second, I claim the bolt, D, in combination with the flange, E, and screw, B, when used for the purpose herein specified.