kase. But for years past the American cheeses have been growing in favor, not only here, but in England. A late number of the London *Grocer* says:—"The Americans and Canadians are emulating our most successful dairymen, and really choice American and Canadian cheese may now be obtained from those English importers who have made themselves well acquainted with the best sources of supply."

If cheese could be afforded at a fair price as compared with meat, there is no reason why it should not become, in a measure, a substitute, as it seems to be especially adapted to restore the force expended by those whose work is extra laborious and exhaustive; and, indeed, it may be questioned, now, whether it is not as cheap, all things considered, as fresh meats. It is a subject worthy some consideration.

## ITEMS OF THE STATE OF IRON MANUFACTURE IN PORTIONS OF THE EASTERN STATES.

One of our reporters has recently made a flying trip through some of the Eastern States, and noticed that in general iron workers appear to be doing well, having orders enough on hand to last some time.

In Hartford, Messrs. Geo. S. Lincoln & Co., an old established and well known house, are doing their usual line of castings and machine tools. Messrs. Lincoln & Co. have built most of the tools for Colt's Armory, and large numbers of milling and other machines for Wheeler & Wilson and various sewing machine factories. Their work is first class, and in the dullest times they have been busy.

Pratt, Whitney & Co., have one of the handsomest and most convenient machine shops in the state, and the proprietors are both known as superior mechanics. They manufacture machine tools of all classes, and also the Weed Sewing Machine. Pratt & Whitney's engine lathes are most excellent machines, and are fitted with a patent attachment for turning tapers without moving the centers out of line with each other, as is the case when the tail stock is set over.

Woodruff & Beach have a lot of orders for stationary engines on hand. They make a strong, substantial, and highly-finished machine. They have built engines for the United States Government, and also for many factories throughout the country. Their engines are fitted with a variable cut-off of Green's patent which gives great satisfaction.

In New Britain, Conn., Messrs. Landers, Frary & Clark have recently erected a large and splendidly appointed cutlery establishment, near the depot, which is now in active operation. The Stanley Works are also about taking up another line of manufacture, for which they have put in one of the Shaw & Justice Hammers. Messrs. Thomas Humason & Beckley are running on their usual class of goods, cast-steel hammers, etc., etc.

In New Bedford, the Gosnold Mills are at work on horse shoes, employing a few men at present. In this town, however, we were much pleased to notice an innovation in the machine line that is creditable to the employer and beneficial in a moral point of view; namely opening a new branch of trade to female labor. These opportunities are so few that it is matter of congratulation that another chance is offered them. The Morse Twist Drill and Machine Company employ twenty-four female machinists in the manufacture of their tools, and we saw them hard at work a few days ago, cheerful and contented. These girls do filing, of a light nature, just as well as men could, and much better than boys who were "so full of the devil," as Mr. Morse stated, that nothing could be got out of them. They earn good wages, are exposed to no bad influences, being in an apartment by themselves, and seemed contented and prosperous. Beside filing they tend light machines, grind drills, and do other miscellaneous tasks. This is certainly much better than being stifled up in a noisome workroom, cramped over a needle for a miserable stipend. We wish our space permitted further mention of this admirable little shop. Mr. Morse is an alive mechanic, takes the Scientific American as a matter of course, and believes in going ahead. He has just built a large addition to his shop, and is prepared to do machine work of all kinds. Mr. Morse is an inventor of a remarkably original turn of mind, and has got up special machines for almost all his work.

In Worcester, Mass., Messrs. L. & A. G. Coes are making their celebrated screw wrenches which they have had in market for many long years. The Coe wrench is an "indispensable institution," as their orders prove conclusively.

Messrs. Ethan Allen are making their celebrated Damascus guns, and also pocket pistols and revolvers. The several machine-tool makers are doing a fair amount of work.

In Winsted, Conn., the scythe and axle makers are doing well. Mr. Hurlbut, axle maker and general forger, informs us that he has no reason to complain.

In Seymour and in various towns along the Naugatuck Railroad we find a fair activity for the season, particularly in cutlery establishments. The axle trade of this country must be something enormous, for we find establishments very busy and more going up. The Ætna Spring and Axle Company are just starting at Bridgeport, and the Spring Perch and Axle Company of that place, some time established, are doing a good business.

### New Year's.

J. B. Aiken, of Franklin, N. H., has sent us a nice bundle of warm stockings knit on his patent machine. He also sends us a package of photographs, taken by him last summer in Colorado—being his first attempt in the art. The specimens would do credit to an experienced artist. Another friend in Pittsburg has forwarded some "Old Rye," put up in one of Stoekel's patent graduated bottles. Will the donor be kind enough to inform us what he wishes us to do with the contents?

## SHOES VS. SANDALS.—THE CLASH OF ATOMS.

BY PROFESSOR CHARLES A. SEELY.

In the state of nature the feet of man are the least vital parts of his body, and as they were intended to perform heavy service they were endowed with extraordinary powers of endurance. But fashion and art long ago ignored these good designs of nature, and now our feet are proverbially weak and sore. Every one at some time has his corns, or that other disease quite as common, which make his presence hateful to his best friend. Although the feet are not the seat of fatal diseases, yet they are the open portal which invites to the lungs its most terrible enemy. We learn from the ancient poets that the feet were regarded as objects of beauty, but now our feet are so pinched out of shape, that we may search a long time for a well formed foot, unless we go to the ancient statuary, or among the semi-barbarians of the east.

This state of things did not exist in ancient times: if corns had been invented in his time, Job would surely have told us about it. And at the present day the poor Indian of untutored mind knows nothing of our fashionable diseases. Corns and mis-shapen feet are incidents of modern civilization.

Such a statement of the case as this is sufficient to suggest to the minds of most people, the cause and perhaps a remedy. The radical view of the subject is, that the cause is leather and the remedy is sandals: leather obstructs the healthful perspiration and ventilation of the feet almost as effectually as would sheet iron: the feet need no more protection than the hands or the face: down with leather. But I am no radical. The fashion of centuries is too respectable to be dealt with in a violent way. "Nothing like leather" has been too long a household proverb to be forgotten in a day.

It is entirely practicable however, to institute the beginning of reformation without making ourselves obnoxious to the reasonably fastidious. Thus: We may refuse to wear shoes which pinch us or tend to press the feet out of shape, we may prefer thin porous leather, and wear cloth shoes whenever fashion will permit us. And we may think of the reform and reason upon it with our neighbors. In these little ways, we shall strengthen ourselves in the faith and hasten so much of the millennium as pertains to the feet.

In my opinion here is to be a fruitful field for the inventor. I suggest a few problems: How to make leather less unsuitable for shoes: Better ways of uniting cloth uppers to leather soles: How to weave a shoe and attach a sole: The best fiber for a cloth shoe: How to protect the feet from rain and yet secure ventilation: To make a shoe of net work, or of perforated leather.

### THE CLASH OF ATOMS.

Prof. Tyndall and others advocate the theory that the heat of combustion and chemical action generally is only the heat of collision or percussion. In combustion of coal, for example, the atoms of carbon and oxygen rush upon each other and thus strike fire. This view of the case involves some very interesting consequences.

One pound of carbon in burning, as determined by experiment, gives out 8,000 units of heat, that is, heat sufficient to raise 8,000 lbs. of water one degree. Now the theory implies that an equivalent amount of force (*vis viva*) has been expended or converted. The mechanical equivalent of 8,000 units of heat is $772 \times 8{,}000 = 6{,}276{,}000$ foot pounds. Now on the supposition that the pound of coal is burned in one minute we have the force represented in horse-power, thus: $6{,}276{,}000 \div 33{,}000 = 187{\cdot}15$ horse-power. But we know that by pulverizing the coal and burning it in pure oxygen it may be consumed in an indefinitely short space of time. Suppose that the time taken be so long as one second, then the number of horse-power concerned in that time is $60 \times 187{\cdot}15 = 11{,}229$!

Yet this calculation gives still a very imperfect notion of the immensity of the force involved in the burning of a pound of coal. The distance through which atoms move to unite chemically is unmeasurably and insensibly small. The velocity which a pound of matter must attain in order to evolve 8,000 units of heat by percussion is $(\frac{1}{772} \times \frac{V^2}{2} = 8{\cdot}000)$ 3·514 feet per second. What must be that force which can start matter from a state of rest, and in an insensible space give it such a velocity? What the resistance that instantly destroys the momentum? Gravity, which moves the universe, requires 1,600 feet of space and 20 seconds of time.

## OUR STEAM NAVY.

It may be said with some truth that a man's rivals are his true critics. So in nations we learn of our failings from rival nations. We copy a critique on our present steam navy, from *The Engineer*, which embraces a very sensible discussion of a subject that concerns deeply the interests of our country. We may say *en passant* that the management of the engineering department of our steam national marine has offered the opportunity of which *The Engineer* avails itself. There is evident need of improvement, as may be seen by the comparison which the English periodical institutes between English and American vessels.

### MARINE ENGINES IN THE UNITED STATES NAVY.

If reliance is to be placed on the reports which reach us from America, it is not only probable but perfectly certain that the efficiency of the new navy now springing into existence in the States, will be seriously impaired by the defective nature of the machinery with which it is being supplied. The American press denounces the Bureau of Steam Engineering—a Government department of which Mr. Isherwood is chief—in no measured terms; and apparently the complaint is not without foundation. It is quite possible that all that is said of the engines of the new fleet is not perfectly true; but the arguments put forward by such of Mr. Isherwood's subordinates as have ventured to defend the practice of their chief are so weak, and the results of practical trials of his machinery are so inferior to those obtained with the marine engines of the old world, that we are forced to the belief that the tales which are told of official incompetency and the failure of engine after engine are substantially correct. Nor is it to be supposed that engines defective in design and workmanship are supplied to Government ships only by Government officials. Even private manufacturers appear to be singularly unfortunate in their dealings with the American navy. Those are not wanting, however, who with much plain speaking—to use somewhat of a euphemism—assert that the fact is due to the interference of men who are unable to supply good engines themselves, and who are unwilling to be beaten by others. In a word, both the theory and practice of American marine engineering as far as concerns fighting ships is, at present, in an extremely anomalous condition, while the literature of the subject as represented by both the editorial and correspondence columns of the scientific and daily press is simply unique in its character.

Mr. Isherwood's screw engines of the largest class are for the most part similar in type to those of the Miantonomah, already described in our pages. They are back-acting, and so far resemble Maudslay's double piston rod engines, but there the resemblance ceases. They have single piston rods laying hold of a rectangular frame consisting of a crosshead, to the center of which the piston rod is affixed; a cross tail, off which the connecting-rod works; and a pair of round side rods, one of which passes above and the other below the crank shaft. In all this there is nothing remarkable. But the capacity of the cylinder for a given power is very much less than English engineers consider sufficient; while the dimensions of the boilers and the weight of the machinery, taken as a whole, is much greater. Mr. Isherwood does not believe in expansion, and therefore his cylinders are small, because the terminal is nearly as great as the initial pressure. But his boilers are large because he uses steam uneconomically. As an illustration of his most recent practice, we may select the machinery of the *Franklin*, one of those magnificent wooden unarmored frigates intended to steam at a high speed and to carry very heavy guns, with which it is proposed to keep American commerce safe from *Alabamas* in future. Much has been heard of this new fleet in this country, and all that relates to it possesses great interest. We learn from our American advices that the *Franklin* is an enormous ship of splendid model and as strong as wood and iron can make her. It is obvious that in ships intended to act the part of police of the seas, speed is the first essential, yet Mr. Isherwood promised that he would get ten knots! out of her, and it appears more than probable that even this poor result will not be realized. The *Franklin's* machinery consists of two "back-acting"—return connecting-rod—engines with cylinders 68 inches in diameter and 3 feet 6 inches stroke. These are obviously moderate proportions for a ship of the class, and if the boilers were designed in accordance with English practice we should simply say that the vessel was underpowered. But the boilers are designed in accordance with Mr. Isherwood's practice which is sufficiently original. There are four main boilers constructed with vertical tubes under Martin's well known patent, and two superheating boilers of similar construction, the only difference being that very little water is carried in them; the steam being dried in the upper portions of the tubes. Without going into details, for which we have not space here, we may give a fair idea of the steam generating powers of these boilers by stating that they have no fewer than 583 square feet of grate area, and about 14,500 feet of heating surface. Let us compare these proportions with English practice. The *Lord Warden*, of 1,000-horse power nominal, has 700 feet of grate and 19,000 feet of heating surface. Her boilers are designed to supply three cylinders, each 91 inches in diameter and 4 feet 6 inches stroke, the steam being cut off at about one-sixth of the stroke. The displacement per revolution, omitting clearance and waste in ports and passages, being 1219·5 cubic feet. The *Franklin* has, as we have said, 583 feet of grate, and 14,500 of heating surface, intended to supply two cylinders 68 inches diameter and 3 feet 6 inches stroke, representing a displacement per revolution of 353 cubic feet only. Assuming that the engines of the *Lord Warden* are properly designed—and Messrs. Maudslay and Field do not make mistakes—we find that the proper displacement for the cylinders of the *Franklin* would be 1015·66 cubic feet, equivalent to a pair of cylinders of 113½ inches in diameter, the stroke remaining 3 feet 6 inches; or 100½ inches diameter if the stroke were increased to 4 feet 6 inches—that of the *Lord Warden's* engines. The accuracy of the deductions to be drawn from a comparison of these proportions depends, of course, on the piston speeds being the same. Assuming the number of revolutions in the case of the *Lord Warden* to be 60, we have a piston speed of 540 feet per minute. It is not likely that the pistons of the *Franklin* will be run at more than this, which is equivalent for a 3 feet 6 inches stroke to rather over 77 revolutions per minute. It is therefore obvious that her cylinders are out of all proportion too small for the boilers. Indeed they could not possibly work up the steam which the boilers ought to make, were it not that the cut-off valve does not close till the stroke is nearly completed.

It is not in the cylinders alone, however, that Mr. Isherwood's design is objectionable. Catching at the idea that plenty of surface is essential to the life and easy working of a bearing, the chief of the Bureau of Steam Engineering carries out the principle like an amateur, manifesting an utter disregard for the teachings of practice. The bearings of the crank shaft are made half as long again as the longest in use in English marine engines, and as a result they bind and cut. Americans are peculiarly attached to a system of trial which consists in lashing a vessel to aquay wall, and then running the engines, usually for a pariod of seventy two hours. During

her trial under these circumstances, instead of seventy-seven revolutions, which ought at least to have been got out of the engines as we have seen, the journals of the *Franklin's* machinery heated so much even at twenty revolutions, that that speed could not be maintained; and the engines were run for the greater part of the trial at but from fifteen to eighteen revolutions per minute. As to the condenser, constructed under Sewell's patent, it is enough to say that the vacuum never exceeded 24 inches; while the superheater acted so efficiently that the temperature of the entering steam being 270 degrees, that of the issuing steam on its way to the cylinders was 272 degrees. It is not easy to imagine a more miserable fiasco from begining to end; and yet the *Franklin* is by no means an isolated example of the defects proper to the system under which American men-of-war are engined. There appears to be a total lack of that open competition and of those fair public trials which have done so much to foster British talent and enterprise. In their stead we have a Government department not free from the imputation of corruption, and certainly ruled by the demon of red tape; and a system of trial which, assuming it to be founded on the true principles of scientific inquiry is really open to every species of abuse; while, more astounding than all, we find what should be a great naval nation entrusting the construction of its machinery on which it must like every other nation be mainly dependent for the maintenance of its power at sea, to an individual who blatantly denies the truth of principles which not only bear the test of the most searching scientific investigation, but are here verified daily in actual practice. Mr. Isherwood may, perhaps, think that we write harshly of him. Possibly he has reason to complain. He may perhaps find some consolation in knowing that in the old country little or no sympathy is felt with those who would wish to see his post taken by another. On the contrary, we believe him to be the right man in the right place. Indeed we could wish to see his principles and his practice adopted by every naval power in existence—except Britain. —*The Engineer.*

### Simple Device for Printing Pictures.

Professor Towler, in *Humphrey's Journal*, suggests the following simple and excellent method:—

"We will premise that the piece of opal or porcelain plate is of the same size as the negative, is quite flat, has already been sensitized by the collodio-chloride process, and is now ready to be placed on the negative. With a diamond cut off two corners from one end of the porcelain plate: these corners are about the same size as the glass corners of an ordinary printing frame. Be careful not to interchange these corner pieces, so as to put the right corner piece on the left side and *vice versa*, and do not turn them wrong side up, but place each in its place from which it was broken off exactly as it was before the diamond was used. Now take a small fragment of shell-lac, or a little piece of shoemaker's wax or of pitch, and melt it upon the lower side of these dissevered corner pieces, and place it upon that corner of the negative on which the prepared porcelain will rest when in position. Apply heat to the corner of the negative until the piece of opal is accurately cemented in its place. The other corner piece is now cemented in its place on the opposite side, and in such a manner that the sensitized porcelain plate, when placed in the negative, shall be in accurate apposition with the triangle pieces that were cut off.

"By holding this combination so that the lower end rests on the table whilst the plate itself is inclined at an angle of about forty-five degrees, it is evident the porcelain plate will slide down until it is stopped by the two corner pieces, which originally belonged to it. You may remove the porcelain plate as often as you like, it will always regain the same position when restored to the negative under the conditions mentioned. It remains only, therefore, to clamp the two plates together with four clothes pins, one in the middle of each side: more may be used when the plate is large, as for instance, a plate twenty-two inches long and seventeen wide.

"During exposure the cdmbination is reared against a blackboard, or a board covered with a piece of black velvet or cloth to exclude all light from the back."

### To Light a Dark Room.

The London *Builder* recommends a plan for lighting a dark room in which the darkness is caused by its being situated on a narrow street or lane. The *Builder* says if the glass of a window in such a room is placed several inches within the outer face of the wall, as is the general custom in building houses, it will admit very little light, that which it gets being only the reflection from the walls of the opposite houses. If, however, for the window be substituted another in which all the panes of glass are roughly ground on the outside, and flush with the outer wall, the light from the whole of the visible sky and from the remotest parts of the opposite wall will be introduced into the apartment, reflected from the innumerable faces or facets which the rough grinding of the glass has produced. The whole window will appear as if the sky were beyond it, and from every point of this luminous surface light will radiate into all parts of the room.

WELDING WITHOUT HEAT.—It is a curious fact that iron, and even steel, can be welded by pressure, or by pressure combined with friction or rubbing. This may be seen in the action of the nail machine where two or three nails or tacks come together between the header and the dies. In this case we may saw across the sections of the connected tacks without discovering any evidence of separation. So sometimes the steel point of an upright shaft turning under a great pressure will weld itself to the step if this is of a metal similar to the steel.


## ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JAN. 8, 1866.

*Reported Officially for the Scientific American.*

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

| | |
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| 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 | $50 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| 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.

60,987.—BOOTS AND SHOES.—David M. Ayer, Lewiston, Me.

First, I claim forming air cells or spaces between the outer and inner soles of boots and shoes by means of corrugated or fluted sole leather, substantially as described.

Second, in combination with air cells or spaces between the outer and inner soles of boots and shoes, formed by corrugated or fluted sole leather, as described, I claim air ducts or passages communicating with the outer air, substantially as described.

60,988.—PADDLE WHEEL.—Eli Banks, Millport, N. Y.

I claim the combination of the spoke, A, and paddle, B, when made as described and used for the purpose set forth.

60,989.—COMPOSITION FOR LUBRICATING JOURNALS.—Bernard Battle, Pittsburg, Pa., assignor to Daniel Coyle, Soho, Pa.

I claim the preparation of a lubricating compound composed of the above-named ingredients, viz.: animal grease or residuum plumbago, sulphur, steatite, carbonate of magnesia, glue, resin, and hydrate of lime, with or without molasses, substantially as above set forth, and in the proportions and for the purposes above designated.

60,990.—FURNACE FOR STEAM BOILERS.—John Best, Lancaster, Pa.

I claim the prolongation of the outer cylinder, B, of the boiler beyond the flues, when closed with a partial head, N O, and doors, D D, so as to form a chamber, C, directly over the front part of the furnace or fire box, F, constructed in the manner and for the purpose specified.

I also claim the vertical partitions, P, in boilers, in combination with a partition or chamber, I M, for conveying the heat first under, then through a series of flues, E', on one side of the water level, and returning it on the same place on the other side of partition, P, through the flues, E' E'', to the rear of the boiler, substantially in the manner specified.

60,991.—STEAM GENERATOR.—William Branagan, Burlington, Iowa.

I claim applying a jacket, D, to a boiler, which is constructed substantially as described, so that this jacket can revolve around the boiler, substantially as specified.

60,992.—CIDER MILL.—E. W. Branch, East Henrietta, N. Y.

First, I claim the windlass wheel, K, having three separate functions of operation, composed first of the side pin, h, and rod, M, for rapidly turning up the screw wheel, H.

Second, The hand pieces, f, for imparting the initial pressure.

Third, The ratchets, g, and lever, L, for producing the final pressure, arranged and operating conjointly with the screw wheels, H H, and follower, D, substantially as set forth.

Fourth, I also claim the employment of a series of inverted troughs or tiles, V V, closed on their upper sides, but provided with apertures, k k, on a level with the face of the bed, to receive and conduct away the expressed juice, substantially as set forth.

60,993.—HARVESTER RAKE.—Franklin Brua, Gordonville, Pa.

I claim the peculiar construction of the horizontal wheel, o, with its stops or lugs, P, centrally-elevated radiating arms, M, with slots, m, in combination with the elbowed heel, K L, of the rake shaft, T, the whole being arranged and operated in the manner and for the purpose herein set forth.

I also claim the arrangement of the double head, B, center pin or shaft, I, bracket, D, pinion, F, and slotted cog wheel, O, when constructed and operated in the manner and for the purpose set forth.

60,994.—MACHINE FOR MAKING TIN CANS.—Walter S. Buck, Philadelphia, Pa.

First, I claim the cast iron base plate, A, with its recesses, B and G, in combination with the steady pin, L, for the purpose substantially as described.

Second, The expanding metallic cylinder, S, when constructed and adjusted substantially as described.

Third, The combination of the slotted blade, H, with the slotted and vibrating arm, C, and set screws, O, arranged and operating as described.

Fourth, I claim the sliding guides, y, in combination with the cylinder, S, substantially as described.

Fifth, I claim the combination of the pressure arm, C, baseplate, A, and expanding cylinder, S, when arranged and operating for the purpose substantially as described.

60,995.—ROTARY PUMP.—W. Butterfield, Madison, Wis.

First, I claim a rotary pump, having a circular cylinder and the chamber, E, in the casing, so arranged that the valves in passing under the chamber shall force the water out in the opposite direction, as described.

Second, I claim constructing the end plates, H, with the concentric rings, n, forming a bearing for the springs, a, substantially as set forth.

Third, The combination of the cylinder, C, provided with the buckets or valves, D, and set eccentrically in the case, A, in combination with the chamber, E, and the side plates, H, provided with the rings, n, when arranged and operating as set forth.

60,996.—EXTENSION TABLE.—Nelson Carl, Cincinnati, Ohio.

I claim the combination of the central-boxed slide, F, and legs, G, with the ends, A B, of the table, forming the outer slides, the whole constructed and arranged to operate as and for the purposes described.

60,997.—BUTTON.—Hector Carlos (assignor to himself and Henry C. Watson), New York City.

I claim, as a new article of manufacture, the novel button herein described, composed of the body, A, shank, B, confining pivot, C, and pointed hinged part, D D', combined and arranged so as to be applied to the garment and secured thereon, substantially in the manner and for the purpose set forth.

60,998.—BREECH-LOADING FIRE-ARM.—M. J. and H. M. Chamberlin, Springfield, Mass.

First, We claim using the trigger as a brace to support the recoil block, substantially in the manner herein set forth.

Second, So combining and arranging recoil block, hammer, and trigger, that when the recoil block is raised up against the rear end of the barrel and the trigger pulled for the purpose of firing, the recoil block is supported by the trigger, acting as a brace and kept in place by the hammer, and when the recoil block is down and the trigger in the notch of the hammer, it (the trigger) is kept from being pulled out from under the hammer by the recoil block, substantially as herein set forth.

Third, The projection, M, when constructed and arranged in the manner and for the purpose set forth.

60,999.—STAVE MACHINE.—W. S. Colwell and F. Veazie, Pittsburg, Pa.

First, We claim the arrangement of the saws, A and B, arms, 1 and 2, shaft, 3, connecting rod, 5 and 6, and crank, 4, when said arrangement is used for sawing out the concave and convex sides of a stave at one operation as herein described.

Second, The arrangement of the guides, D and D', clamps, e f g and h, provided with arms, J K, rack, m, lever, l, endless screw, i, and wheels 12 and 13, when said parts are arranged and operating as herein described and for the purpose set forth.

Third, The arrangement of the rack, w, wheels, 30, shaft, P, lever, u, provided with pawl, t, when said parts are used in connection with the clamps, e f g and h, as herein described and for the purpose set forth.

61,000.—FEATHERED CLOTH.—Alice A. Condit, Muncie, Ind.

I claim an article of manufacture formed by trimming, folding back, and sewing upon cloth or other material, the feathers of geese, birds, or fowls, as herein shown and described.

61,001.—BED BOTTOM AND SEAT.—Edward S. Cross, Lime Rock, Conn.

First, I claim the spiral spring, E, attached to the end of the slat, B, or of the bedstead, A, by means of an attachment inserted into the end of the spring and having one or more spurs standing in the helical spaces in the spring, so as to allow of being turned, substantially as and for the purpose herein specified.

Second, I claim, in combination with the above, the within-described arrangement of the castings, C and D, and axis, c and d, adapted to turn in the vertical plane, substantially as and for the purpose herein specified.

61,002.—DEVICE FOR HANGING PAINT POTS TO SIDES OF BUILDINGS.—James H. Flagg, Perkinsville, Vt. Antedated Dec. 23, 1866.

I claim the lever, A, and forked brace, B, in combination with each other, in such manner as to provide a device substantially such as and for the purpose herein shown and described.

61,003.—CAR COUPLING.—A. M. Freeman and A. M. Stoner, Springfield, Ohio.

We claim the combination of the shaft, C, bolt, O, and latch, m, when said parts are arranged to operate in connection with each other, substantially as and for the purpose herein set forth.

61,004.—APPARATUS FOR CARBURETTING AIR.—Charles N. Gilbert, John F. Barker, and E. N. Ives (assignors to New England Portable Gas Works Company), Springfield Mass.

First, We claim in a gas apparatus, constructed on the principle beforementioned, arranging the generator in a fire-proof and gas-tight chamber, substantially as set forth.

Second, Arranging a tank for holding the fluid in a separate and detached building, and connecting the same with the generator by means of a force pump and pipes, substantially as set forth.

Third, Arranging the pipes connecting the generator with the tank and pump, in such a manner that the syphons can be filled and the generator emptied from the tank house.

Fourth, The arrangement of the gas-pipe in such a manner that the condensed vapor together with the gas in the generator and pipes can be withdrawn from without the building substantially as described.

Fifth, Heating the generator by means of the radiating box or pipe passing through the chamber outside of the generator, substantially as described.

Sixth, The use of gages for the purpose of indicating the presence of fluid in the generator or pipes, instead of petit cocks.

Seventh, The use of metalic flanges for the purpose of securing the pipes to the generator and tank, constructed substantially as described.

Eighth, The improved form of generator, in which the reservoir, h, is added to the evaporating pans, o, o, o, both enclosed in one case, substantially as described.

Ninth, The attachment of the metallic box B, arranged substantially as and for the purpose shown.

Tenth, The improved can for filling with the union and hose attachment arranged substantially as shown.

Eleventh, The arrangement of the pipes g and v, with the cock p, and the cocks s, communicating with the syphon tubes and the gage P, in such a manner that the syphons may be operated and fluid withdrawn from the pans by the naphtha let down from the reservoir, h, in the manner substantially as described and shown.

Twelfth, The syphon cups, E, E, E, arranged substantially in the manner and for the purpose specified.

Thirteenth, We claim the general arrangement of the gas-tight chamber, with the enclosed closet, having the glass front and metallic door, into which closet the various pipes enter together with the damper-rod, arranged in such a manner that the generator can be inspected and operated without necessitating an entrance to its chamber, substantially as described.

Fourteenth, The general arrangement of the air-tight chamber, with pipes for venting the generator and chamber having the damper, u, and man-hole, w, substantially as described.

61,005.—BEARING FOR SHAFTS FOR STEAMSHIPS.—George K. Gluyas, San Francisco, Cal.

I claim the arrangement of the frame, A, enclosing the adjustable blocks, B, guided by the slides, C, and the blocks, D, and combined with the rubber springs, E, and adjustable screws, F, substantially as set forth for the purpose specified.

61,006.—ARTIFICIAL FUEL.—George Gray, Temperanceville, Pa.

I claim the artificial fuel composed of the ingredients, prepared in the manner and proportions, substantially as set forth.

61,007.—BACK SIGHTS FOR FIRE-ARMS.—Henry Hammond, Hartford, Conn.

First, I claim the combined action of the oscillating disk, i, with the clasp, f, relative to the standard, d, substantially as and for the purpose described.

Second, I claim the oscillating disk, i, with its fastening screw, k, and sight, n, with the standard, d, substantially as described.

Third, I claim the employment of the screw, h, with the oscillating disk, i, and standard, d, substantially as and for the purpose described.

61,008.—INHALERS.—Ira Holmes, Moscow, N. Y.

I claim the cap, C, with its chamber, E, valves, c, i, and tubes, D, F, when arranged in the manner and for the purpose set forth.

61,009.—STONE DRESSER.—B. S. Hunt, Philadelphia, Pa.

I claim the hammer, H, R, and its cutter, c, c, constructed and combined with lever, M, O, lifter, L, F, and springs, S, P, and S' P', regulating nut, M, A, so as to obtain the intended and herein described effect.

Second, The lever, L, pinions, P and P', with gearing and ungearing movement plate, N, S, with notches and lug, N, S—N, S, when combined and constructed in the manner and for the purpose above described and set forth.

Third, Wheels, R, A, and R', A', provided with a rim made of india rubber, gutta percha, leather or any equivalent substance, when combined and constructed in the manner and for the purpose above described and set forth.

61,010.—SELF-LUBRICATING BOLSTER AND STEP FOR SPINNING FRAMES.—Barton H. Jenks, Bridesburg, Pa.

I claim the hard-metal bolster, a, with oil chamber, e, and separated removable bearings, c, c', substantially in the manner and for the purpose described.

Second, The spindle step, g, h, m, constructed in the manner and for the purpose described.

Third, The combination of the bolster, a, c, c', e, step, g, h, m, and spindle, B, substantially in the manner and for the purpose described.

61,011.—SKIRT-SUPPORTER.—John L. Kendall, New York City, assignor to Ellen A. Vail, Southold. Antedated Sept. 23, 1866.

I claim a skirt-supporter composed of a tape or strip of fabric furnished with a hook and eyelets and adapted for attachment to the skirt as and for the purpose described.

61,012.—WRINGING MACHINE.—J. W. Latcher, Albany, N. Y., and John Young, Amsterdam, N. Y., assignors to John Young, Amsterdam.

First, We claim the employment or use of conically-bored wheels, F, F, applied to shafts of clothes wringers, for the purpose shown and described.

Second, We claim in combination with the gears, F', F, the variable bearing-plate, E, all constructed and arranged to operate substantially as set forth.

Third, We claim in combination with the wheels, F, F, and bearing-plate E, the elastic cushion, k, for the purposes set forth.

Fourth, We claim in combination with the conically-bored gear wheels, F, F, and cushion, k, the relay spring, l, for the purpose described.

61,013.—TORCH AND MATCH-SAFE.—William J. Ludlow, Chardon, Ohio.

The described invention is a new article of manufacture.

61,014.—SAWS.—A. C. Martin and J. Woodrough, Hamilton, Ohio.

Inserting the saw tooth in its seat by moving it toward the periphery or edge of the saw and securing it in place by the means, substantially as specified.

61,015.—BARRELING COCKS.—Alexander, John and Thomas McKenna, Pittsburg, Pa.

We claim combining with a barreling cock, a whistle or other contrivance, that will indicate by sound the flow of liquid while filling, and so constructed as that when the liquid reaches the nozzle, the sound will cease, whereby the person in charge may know that the barrel is full.

61,016.—DEVICE FOR PROTECTING HORSES' NECKS.—Jacob P. Meyer, Waukesha, Wis.

I claim the pad composed of the slats, A, flexibly united and having a middle space which spans the sore and ends which rest upon the neck or withers, with or without the cushions, substantially as described and represented.

61,017.—METHOD OF SEPARATING HARD RUBBER FROM PORCELAIN TEETH.—Alexander G. Nye, Weymouth, Mass.

I claim the employment of a bath of heated or boiling fat or oil, in connection with one or more teeth and a mass of vulcanite, in manner and for the purpose as specified.

61,018.—MANGLE.—S. U. J. Foreman and N. Palmer, Auburn, N. Y., assignors to selves and David Lyman, Middlefield, Conn.

First, We claim the application to the rollers of mangles of hard rubber or vulcanite, substantially in the manner and for the purposes described.

Second, Combining and connecting the lever frames in which the stationary and movable rollers are hung by a system of links and levers, arranged substantially as described so that the same may be actuated by hand weight or otherwise, substantially as and for the purposes herein shown and described.

Third, In combination with the movable roller, when hung in the short arms of angular levers for the purpose of adjustment with reference to the stationary roller, we claim the internal and external gear wheels and intermediate pinion under the arrangement shown and described so that the said gear wheels, while at variable distances from each other, shall bear fixed and invariable relations to the said pinion, substantially as and for the purpose set forth.

Fourth, We claim the method of gearing the rolls of mangles, or other like machines, when arranged so as to move with equal or different velocities, but at variable distances from each other by mounting upon the said rolls, respectively, internal and external gear wheels which mesh with an intermediate pinion, stationary with relation to said rolls, substantially as shown and set forth.

Fifth, In a mangling machine, we claim marking and ornamenting the material passing between the mangle rolls, by means of letters or other devices or designs cut or formed in intaglio in one or both of said rolls, substantially as herein shown and described.

61,019.—ORE CRUSHERS.—William P. Parrott and John J. Bordman, Boston, Mass.

We claim the mode hereinbefore described of making either or each of such crushing rollers of a series of peripheral segments or sections, e', a