and has its peculiar features of mark, among which may be mentioned the handsome "council chamber" wherein the managing editor daily meets his staff to confer upon the affairs of the day, determine the course to be taken, and assign to each his *rôle* in the next morning's editorial demonstration. Near to this is the manager's private office, and connected with it an inner sanctum where a Wheatstone's telegraph communicates with the senior proprietor's residence on Washington Heights, eight or ten miles distant, by a private line of wires erected expressly for the purpose. The library is a large apartment not yet fitted up, designed for shelves from floor to ceiling, accessible by stairs and balconies, and to contain thousands of books of reference on the innumerable subjects constantly arising in a daily paper. The numerous editors and editorial writers have their separate apartments on this floor, and the reporters' room has accommodations for more than a dozen at once. There is also a reception room furnished with files of the daily papers, and a doorkeeper always in attendance at the entrance, to admit or exclude. The proof-reading room is a good-sized apartment on the floor beneath the compositors', connected with the latter—like the editorial and publication offices—by small hand elevators and pipes. One of the excellent features of the system is the index office, where every event and subject noticed in the paper is indexed daily, and may be referred to in a moment, many years back. For system, completeness, and extent, the new *Herald* establishment, editorial, mechanical, and commercial, is probably without a rival.

For the Scientific American.

THE FIFTEEN-INCH BALL VS. ARMOR PLATES.

The fifteen-inch cast-iron navy smooth bore cast by Alger, of Boston and sent to England for the British ordnance officers and iron plate commissioners to experiment with, underwent its preliminary trials for "velocity, range, and accuracy," at Shoeyburyness, on the 27th June last. Fifteen rounds were fired with cast iron balls averaging a little more than 450 pounds each.

The first three rounds were fired with 35 pounds of the "mammoth grain" powder. Elevation 2 degrees; range, 711, 740, 737 yards respectively; velocity of ball averaged 920 feet per second; deviation of shot, $\frac{6}{10}$ of a yard to the right.

Next three rounds with 50 pounds "mammoth grain." Elevation as before; range averaged 987 yards. Velocity of ball, 1,110, 1,120, 1,133 feet per second respectively; deviation from 2 to 3·2 yards to the right.

Next round, 60 pounds of "mammoth grain" powder—elevation the same. Range, 1,138 yards; velocity of ball, 1,210 feet per second; deviation of shot, 1·4 yards.

Next three rounds with 35 pounds of English powder of the following character and composition: Number of grains to an ounce, 500; niter, 75·3 per cent; sulphur, 10·3; charcoal, 14·4; moisture, 1·07; density, 1·74. Elevation the same; average range, 873(?) yards; velocity, 1,044 feet per second; deviation of shot, ninth round "flew absolutely straight;" greatest deviation of the other two, 1 yard.

Next three rounds with 50 pounds of the same powder—elevation as before. Last round gave a range of 1,140 yards, with a velocity of 1,214 feet per second. Deviation—one round "flew straight to the mark;" last round deviated 2·4 yards.

Two rounds were then fired with 60 pounds of the "mammoth grain" powder, with about the same results as the other rounds with the same powder.

These preliminary trials seem to have astonished the British artillerists not a little, with respect to both velocity, range, and accuracy. *Engineering* remarks: "After Thursday's experiments we trust we shall hear little more of this parrot cry about *low velocity*;" and "As regards accuracy, we fancy the results must have surprised some of the judges not a little." Not only were the British artillerists astonished, but it was shown that one of the most distinguished of this fraternity, Captain Noble, of the Royal Engineers, who wrote the elaborate report to the Ordnance Select Committee, did not understand certain elements which should be regarded in computing the effect of large spherical shot. This officer, in the report alluded to, after extolling the power of the 9-inch wrought-iron Woolwich rifle, the favorite English gun, made a calculation which seemed to prove that the 15-inch American smooth bore was a mighty poor concern. These calculations, together with the termination of the gallant Captain's report, in which he pooh-poohed the American gun, seem to have been extremely gratifying to the British journalists. Ponderous leaders were written, and Lord Elcho was for the time pretty well put down for his Parliamentary attacks on the extravagance and inefficiency of the Ordnance Department of the government. He was for the time looked upon pretty much as our artillerists and engineers regard Mr. Wiard.

On page 30 of his report, Captain Noble sets forth as the result of his calculations on the American smooth bore, that with 50 pounds charge of English powder and a 484-pound spherical shot, a velocity of 1,070 feet per second will be the result. This is equivalent to a dynamic force represented by 8,658,760 foot-pounds, and 8,658,760÷50=173,175 foot-pounds to each pound of powder.

Now on the trials for range, velocity, etc., which are given above, it is seen that Captain Noble himself propelled the 450-pound 15-inch ball with 50 pounds of English powder with the velocity of no less than 1,214 feet per second. The dynamic force of this ball was therefore represented by 10,328,400 foot-pounds, or 10,328,400÷50=206,570 foot-pounds to each pound of powder, that is, 206,570—173,175=33,395 foot-pounds *more* energy per pound of powder than stated in his calculation on which he based his erroneous opinion of the power of the gun.

In no case which has fallen under the observation of the writer has a pound of powder in the English 9-inch rifle developed a greater energy than 175,000 foot-pounds; this with a 250-pound cylinder will give a velocity of about 1,490 feet per second.

Having thus shown that Captain Noble made a mistake of 1,569,634 foot-pounds in his calculations based on a charge of but 50 pounds, let us turn to the trials which took place at Shoeyburyness in July last with the 15-inch gun against armor. The target was constructed of John Brown's celebrated solid iron slabs, 8 inches thick, laid on a teak backing 18 inches thick, placed on the ½-inch iron skin of the ship, to which were secured "a double number of supporting ribs." It is almost unnecessary to remark that such a cuirass as this is not carried by any French or English iron-clad, and that the *Warrior*, with her 4½-inch plates and 18 inch teak backing, represents the average impregnability of the iron-clads of the powers alluded to; and bearing in mind that the shot-resisting power of solid slabs varies as the square of their thickness, the immense difference between such a protection and the target fired at will be seen.

Against this target three rounds were fired from the 15-inch gun, as follows:

First Round—Range, 70 yards; American cast-iron spherical shot, weight 453 pounds, diameter 14·895 inches; charge 60 pounds of "mammoth grain" powder; velocity, 1,174 feet per second. The effect, according to the London *Mechanics' Magazine*, was as follows:—"The shot struck the target near the horizontal junction of the armor plates, nipping about two inches only of the lower one, and smashing a deep indent of four inches into the plate, rebounded nearly entire—the striking face being flattened and a few largish fragments splintered off—twelve feet back from the front of the target. The armor plates were separated from each other vertically at the left edge about two inches, the space tapering along the whole plate to the right. The buckling from the indent extended over forty-one inches of area, and at the striking point (three feet from the left edge of the target) was inward to the extent of five inches," and the effect on the rear of the target was to bend the six supporting ribs "some inches," and to "slightly crack" them, and six butt-joints of the skin plates were opened along their entire length.

Second Round—Range the same. Pontypool No. 6 cast-iron spherical shot, weight 452·5 pounds, diameter 14·89 inches; charge same as before. According to the same authority, the effect was that the ball "struck about two feet six inches from the right end of the armor plate on the median line. Half the shot stuck in the indent (seven inches), the other half splintering off to a ragged, nearly flat face. Buckle on the vertical line, three inches at the middle of the width of the plate, and on the horizontal line, 1·6 inches, extending over a surface of five feet,"

Third Round—Firth's steel spherical shot, tempered in oil, weight 498 pounds; charge same as before; velocity 1,134 feet per second; it pierced the plate 8·2 inches. The *Mechanics' Magazine* says: "It struck about five feet from the left end and a foot from the top edge of the lower armor plate, and stood out from its front perfectly entire (except six or eight radiating narrow fissures) for about eight inches, the remainder being buried in the indent it had made in the plate."

Now in order that the reader may have a correct idea of the relation between the power of the 15-inch gun and the resisting capability of this tremendous target, it will be enough to state that about 40 per cent less than the real power of the gun was employed in these trials, and as an examination of the results show, a slight increase in the velocity of the big balls would have put them through the target. In short, as a cotemporary remarked, "what the effect of ten pounds more powder would have been, was drearily confessed by all the spectators of the trial." "The *Hercules*," says the *London Herald*, "ought to keep these missiles out; but she is not yet afloat. But it is something essential to know that henceforth no English man-of-war could be laid broadside against an American ship carrying guns of this caliber."

The English journals, both scientific and popular, have made a curious mistake with regard to the strength and quantity of the powder employed by us in the 15-inch gun. They call the "mammoth grain" powder used in these trials "American" powder, in contradistinction to their own, and state that sixty pounds of the "mammoth" is the maximum charge. The following extract from the instructions of the Naval Ordnance Bureau, issued during the war—April 1, 1864—while the experiments for endurance with the 15-inch gun were progressing, will show how very much less than the real power of the piece was used on the late trial: "Sixty pounds may be used for twenty rounds of solid shot. Cannon powder only should be used, as 35 pounds of this kind gives a greater range than 50 pounds mammoth powder."

Thus it is seen that the weight of the charge of "mammoth grain" used on the trial against the English target was equal to less than 42 pounds of such powder as is always used in the 15-inch navy gun, and 60 pounds of our powder gives a velocity of over 1,400 feet, against less than 1,200 obtained on the English trial ground against their target. Remembering that the power varies as the square of the speed, it cannot fail to be seen that the proper charge would have pierced and smashed this tremendous target. Seventy pounds of our cannon powder has been frequently employed on the trial ground, and a few months since a velocity of nearly 1,600 feet per second was achieved with the 15-inch gun with 100 pounds of "mammoth grain."

Perhaps the natural delicacy of John Bull has made him fearful of injuring the Yankee gun, but it is much more likely that his great care of the gun is due to his fear, not of bursting the piece, but of bursting his target and his reputation at the same time.

N.

GUNPOWDER—ITS MATERIAL AND MANUFACTURE.

The origin of this composition, which may be considered, next to steam, as the most influential agent in human progress, is involved in hopeless obscurity. It certainly was known to the Chinese and Hindoos at a very early period. The Chinese histories make repeated mention of it at a time when European nations were sunk in semi-barbarism, and Philostratus in his life of Apollonius Tyanæus speaks of the Oxydracæ, a people living between the Hyphasis and the Ganges, whom Alexander declined to attack because "they come not out to fight those who attack them, but those holy men, beloved of the gods, overthrow their enemies with tempests and thunderbolts shot from their walls." Hercules and Bacchus, who from Egypt overran India, were repulsed by these people "with storms of thunderbolts and lightnings hurled from above." The invention of gunpowder has been attributed to a German monk and alchemist of the 14th century, named Schwartz, and also to Roger Bacon, commonly known as Friar Bacon, who lived in the 13th century. But it is certain the latter referred to it as a composition already known as a scientific toy or means of amusement, and if so the claims of Schwartz who lived years afterward are of no value. It is somewhat remarkable that to ministers of the gospel of peace should be attributed the credit of inventing such an agent for the destruction of human life. It is singular, also, that the composition and the proportions of the constituents of gunpowder should remain radically unchanged from the earliest period to the present time.

Gunpowder is composed of niter, charcoal, and sulphur; according to Benton the proportions used by the United States government are niter, 76; charcoal, 14, and sulphur 10. According to the same authority the parts performed by these ingredients are shown by the following table:

COMPOSITION OF GUNPOWDER.

BEFORE COMBUSTION.		AFTER COMBUSTION.
3 parts of carbon,	3 carbon,	3 carbonic acid (gas).
1 part of nitrate of potassa,	6 oxygen, 1 nitrogen,	1 nitrogen (gas).
1 part of sulphur,	1 potassium, 1 sulphur,	1 sulphide of potassium (solid).

A gunpowder can be made of niter and charcoal alone; but it is not so strong as when sulphur is present; beside, the substance of the grain is friable, has considerable affinity for moisture, and rapidly fouls the arms in which it is used. Theoretically, sulphur does not contribute directly to the explosive force of gunpowder by furnishing materials for gas, but by uniting with the niter it affords a large amount of heat, and prevents the carbonic acid from uniting with the nitrate of potassa, or niter, and forming a solid compound, the carbonate of potassa. It is to the heat and carbonic acid thus formed that gunpowder mainly owes its explosive force.

Niter does not absorb moisture from the ordinary atmosphere, a very important quality in the principal ingredient of gunpowder; it is decomposed when strongly heated and oxygen is evolved at first; finally nitrogen is given off, and peroxide of potassium remains. When heated with combustible materials it is completely deprived of its oxygen; this is the part it plays in gunpowder. Charcoal is an absorbent of oxygen and very combustible. In burning, a large amount of carbonic acid is evolved. When first prepared by heating in a closed iron retort, it will, if pulverized, absorb so much of the oxygen of the atmosphere and so rapidly, as sometimes to ignite by spontaneous combustion. The properties of sulphur in gunpowder have been already described.

The explosion of gunpowder is a deflagration in which the combination of the ingredients is completed at once, the whole, or most, passing almost instantly into a gaseous condition by the influence of heat. The gases are combinations of the carbon of the charcoal with the oxygen of the niter; the sulphur serving to decompose the nitrate of potash by combining with its metallic base and thus setting free another atom of oxygen for producing more carbonic acid. The accession of heat thus engendered, also greatly adds to the effect. The sulphur and niter are refined to a point of almost absolute purity, and great care is exercised in the preparation of the charcoal and in the selection of the material from which it is produced. It is usually made from the twigs of the black dogwood, black alder, or the willow, the latter being exclusively used in this country. It is charred in closed retorts of cast iron at a low temperture, as it is found that the lower the heat by which the change is effected the greater the combustibility of the charcoal. Each of the ingredients is ground to impalpable powder and bolted. They are then weighed in proportions and sifted into a trough or cylinder in which are revolving fans which intimately mix the constituents.

They are then taken to a mill similar to that known as the Chilean mill for grinding gold-bearing quartz, which is simply a vertical shaft, having on two projecting horizontal arms immensely heavy rollers of cast iron which revolve on a circular cast iron bed having wooden sides. From forty to fifty pounds are put into the mill, moistened with water, and ground by revolving rollers. It is in this grinding process that those fearful accidents occur which occasionally horrify the public. The mill is isolated and at a distance from others, which are protected by trees or earth traverses. It requires from three to five hours to complete the grinding process. If a particle of grit gets into the mill during the process the result is almost unavoidably an explosion.

When taken out it is dried and presents the appearance of grayish black cakes called mill cake. It is then sprinkled with water and spread on brass plates in a press and subjected to immense pressure. This press is a hydraulic press, as the flying dust of the powder might become ignited by the friction of a screw. It comes out in thin, hard cakes, and is broken and granulated by being passed between fluted rollers, one series after another, being passed from one to the other over sieves which have a reciprocating or shaking motion.

The powder is then assorted by means of other sieves and the dust returned again to the press. The edges or corners of the grains must next be worn off to prevent loss from dust while in transportation. This is done by revolving a quantity in a tumbling box or barrel, in which it is also glazed by having the barrels lined with woolen. Drying on sheets in a heated and ventilated room completes the process.

Missouri Tin.

We believe that the discovery of these mines has not as yet seriously influenced the tin importations or affected the market to any considerable extent. "Prospects" are excellent, and speculators are confident, but results do not seem to justify the extravagant stories so prevalent in the interested regions. Lands in Madison and Iron counties, hitherto considered worthless, have suddenly acquired a fabulous value. Like the mining and oil manias, the tin fever has assumed a contagious form and is now ferociously raging in all the neighborhood around. As to the discoveries of these tin deposits we have seen no statement. A Dr. Farrell, and Dr. A. C. Hoch, are named as rival claimants. Each, our authorities state, some nine or ten years since was impressed with the belief that the ore existed in immense quantities in these regions. The former gentleman regards southeastern Missouri as a vast storehouse of mineral wealth; iron, lead, zinc, cobalt, copper, barytes, kaolin, and nickel being abundant. "The tin most abundant here" writes a correspondent of the Chicago *Republican*, "is the greenish brown, crystalized tinstone, very heavy and hard. However, since a few Cornwall miners have been employed in prospecting, beautiful block tin-crystals have been found in the beds of streams where lodes have been cut across by the washings of mountain streams, and some of these are so similar to the tin-crystals from European mines that they would be said by a casual observer to have come from the same lode or vein.

In the well-defined lodes, no shaft has been sunk more than 12 or 15 feet, and at this depth ore has been obtained from immense deposits, which will, in the opinion of Cornwall miners, yield from ten to 25 per cent. In Cornwall some ores are worked at a profit which yield only two per cent., and the general average of all ores, for which they go from 1,000 to 2,000 feet below the surface, contain from 4 to 15 per cent, and have heretofore been considered the richest of any worked in the world. Besides this, the mineral here crops out in hill-sides, thus greatly lessening the labor and cost of obtaining the mineral, compared with the Cornwall mines.

The "Champion lode," at "Tin Mountain," is between 500 and 600 feet wide, standing nearly perpendicular, with a slight dip toward the west. This deposit or lode runs north and south, 20° east. It is cut across by a small stream fed by three springs, and at the crossing of this stream a branch lode runs north, 5° west, and both the so-called main lode and the branch appear to run through a large porphyry covered hill. On the opposite side of the hill, at about the same elevation, lodes have been discovered of sufficient size and richness to satisfy the owners that it is their interest to erect furnaces, and develope the mine without unnecessary delay.

The deposits I have visited (some of which I discovered) are in townships 31 and 33, range 6 east, in Madison County; but from specimens furnished me from other localities, I believe other deposits will be found in Iron and Wayne counties, and that the tin region will embrace an area of 20 or 25 miles. The distance from the localities where tin has thus far been found, in Iron county on the west to Madison in the east, the extreme distance between the remote lodes thus far known (the minerals of which have been tested chemically and practically), is 24 miles.

Men are yet incredulous, and can hardly believe that tin really does exist in Missouri, or elsewhere in the United States. Capitalists go to the tin region, collect specimens, ask scores of questions, and still cannot believe what is told them by Cornishmen there employed. They ascertain the price of the land, and are afraid to buy even at the low price, and "for timber land;" come to the city to have an analysis made, see the tin brought out, and finally return to buy the land, and find it sold for fourfold more than it could have been purchased by them four days before. "Our doubts are traitorous, and make us lose the good we oft might win, by fearing to attempt."

Several thousand acres of land have been purchased in this region by parties who have evidently designed to secure all the tin land, and much of it has been entered at government price; but the probabilities are that still other good lodes will be found outside of the limits thus far explored. This region is generally heavily timbered with pine, oak, hickory, etc., furnishing an abundance for building, fuel, etc., and well watered by cold, spring-fed brooks.

Return of "Now Island" Expeditions.

The schooner *Leah* had returned to San Francisco from the search for the island reported discovered in longitude 150 50 W. and latitude 40 40 N. The search, though extending as far west as 160 degrees, and from 39 to 41 north, was unsuccessful, no land being seen. In the immediate vicinity of the reported location of the island a terrific sea was encountered, caused by a southeast gale. During the search a tract of discolored water was found, extending about 250 miles south-east and northwest and about 86 miles wide. Attempts were made to sound, but the sea was so rough that it was not satisfactorily done, and no bottom was found with 150 fathoms line. The water was, however, of a greenish color, similar to that found between the bar and the Farralones off San Francisco, and it was believed that comparatively shallow soundings could be found in searching in calmer weather. Vast numbers of small birds, like sand-pipers, were seen, some of which, as well as several large birds resembling boobies, alighted on the vessel. Immense quantities of "Portugese Men-of-war" were seen, the sea at times being literally covered with them, they resembling a sheet on the water and stilling the violence of the waves. From the discolored water and birds seen, (which latter are not found any great distance from land,) it is believed that an island exists not very remote from the locality visited. Capt. Matthew Turner, who has roturned from similar search made in the schooner *Caroline Mills*, says that a tract of discolored water which indicated soundings was found near the reported locality of the land. This tract extended some 200 miles one way by about 60 miles the other. Soundings were attempted, but no bottom was found with 120 fathoms line. Capt. Turner believes that soundings can be had if proper search is made for them, and that in such case good fishing ground will be had. Capt. Turner was three days exploring for the island, but, although he searched diligently from 149 to 151 west, and from 39 to 41 north, found no signs of land.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING AUGUST 13, 1867.

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	$30
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.

67,625.—SPICE BOX.—Wm. E. Andrews, Cambridge, Mass.

I claim, 1st, As a new article of manufacture, a portable set of spice drawers, made substantially as described and for the purposes set forth.

2d, The combination of the extension, F, of the front of the drawer with the holder, H, for the purpose set forth.

3d, The combination as well as the arrangement of the extension, E, of the piece forming the inner end of the draw with the case or box, A B, when the whole is made substantially as described and for the purpose set forth.

67,626.—JOINT SPLICE FOR RAILROAD RAILS.—Joseph Anthony, Greenbush, N. Y.

I claim, 1st. The combination of the rails, A A, the splice rail, C, and the open link bolts, E.

2d, The combination of the rails, A A, the splice rail, C, the open-link bolts, E, and the beveled washers, o.

3d, The combination of the rails, A A, the splice rail, C, the open-link bolts, E, and the beveled washers, o, and the fish plates, F.

67,627.—OINTMENT FOR HORSES.—G. P. Barnum, Marion, Iowa.

I claim the compound consisting of quicksilver, nitric acid, pulverized cantharides, corrosive sublimate, red precipitate, and oil of vitriol, as an ointment to remove blemishes from horses and other animals, substantially as herein set forth and described.

67,628.—WAGON BEDS.—Riley Bratton, Oskaloosa, Iowa.

I claim an improvement on ordinary wagon beds, as herein described, consisting of metallic standards with hooked ends fastening in staples, and the peculiar form of standards and location of staples, as my invention, by which a wagon bed may be easily and quickly taken apart and put together.

67,629.—FILLING FOR SAFES.—H. H. Bryant, Boston, Mass.

I claim the use of sponge as a filling for a safe, or other structure of a similar nature, or any other porous and absorbent substance that is its substantial equivalent, as and for the purpose herein set forth.

67,630.—ADJUSTABLE REST FOR LATHES.—J. E. Burdge, Cincinnati, Ohio.

I claim hinging one end of the tool block, F, to the transverse sliding head, C1, by a bolt, c, and raising and lower the other end of the tool block, F, by means of a wedge, D, or an equivalent device, whereby the cutting edge of the tool, H, may be raised or lowered as desired, while the lathe is in motion, or otherwise, and presenting it in a proper position to the material being turned, substantially as described.

67,631.—CARRIAGE COUPLING.—John H. Burrell, Jr., Charlestown, Mass.

I claim a coupling made of three parts, A B and C, substantially as described and for the purpose set forth.

67,632.—BRICK CARS.—John K. Caldwell, Pittsburgh, Pa.

1st, I claim hinging the shelves of a car for drying brick, fruit, grain, and other articles requiring such treatment, to an upright standard, or to upright standards, being attached to and supported by a truck or car frame, substantially as and for the purposes hereinbefore set forth.

2d, A spring, b, with a bevelled catch, i, attached to a standard, d, in combination with a shelf, or with shelves, f f, which it is designed and adapted to retain in an upright position, substantially in the manner and for the purposes above set forth.

67,633.—WINDOW FASTENING.—Benjamin F. Carleton, Nashua, N. H.

I claim the combination of the button, E, with the spring, R, when made and arranged substantially as described and for the purpose set forth.

67,634.—HARROW.—L. Coleman (assignor to Willis S. Coleman), New Orleans, La.

1st, I claim the combination of the two series of revolving disks, B B B and C C C, or their equivalents, when the same are constructed and arranged substantially as described for the purpose set forth.

2d, The two series of revolving disks, B B B and C C C, in combination with the sliding standards, K, lever, E, arm, P, rock shaft, n, handles, F, and frame, J, when the several parts are constructed and arranged with respect to each other and to the clearers, D D D, substantially as described for the purpose set forth.

67,635.—CLOTH PLATE FOR SEWING MACHINE.—E. H. Craige, Brooklyn, N. Y.

1st, I claim, in the Wheeler & Wilson and other sewing machines with raised and movable cloth plate, the combination with the cloth plate, A, of a throat piece, B, that extends on the feeder and furnishes an opening by which the feeder may be removed and the running parts cleaned and oiled without removing the cloth plate, as set forth.

2d, In the Wheeler & Wilson and other sewing machines with a raised and movable cloth plate, any throat piece which is held in place at one part by a lip, a, or its equivalent, and at the opposite part by one or more buttons or catches, b, substantially as and for the purpose shown and described.

3d, The arrangement on the under side of the throat piece, B, of one or more buttons or catches in combination with screws or rivets passing through to the upper surface, by means of which, with a screw driver or key, said buttons can be turned, substantially as and for the purpose set forth.

67,636.—LADDER.—Charles Croley, Dayton, Ohio, assignor to American Ladder Company, Hamilton, Ohio.

I claim the combination of the gudgeons, l, and notched bracket, K K, constructed and arranged as described, in connection with the troughed step, J, and separable or hinged ladders, A B, for the purpose set forth.

67,637.—STEAM GENERATOR.—James M. Dillon, Wheeling, West Va.

I claim, 1st, The pipe or pipes, F, in combination with the T-joint, H, hollow plug, J, pipes, E m, and mud drum, M, or their equivalents, substantially as described.

2d, The combination of the boiler, B, pipes, E F m, and mud drum, M, as and for the purpose set forth.

3d, The cock, C, arranged and operating in combination with the pipes, F m, and mud drum, M, in the manner and for the purpose specified.

67,638.—AXLE BOX AND HANGER.—D. H. Dotterer, Philadelphia, Pa.

I claim, 1st, An axle box provided with a detachable bearing, E, a curved projection, m, fitting a recess in an adjustable saddle, and with trunnions, d d, fitted for sliding blocks, b, which are adapted to guides formed in the hanger, all substantially as described.

2d, The combination of the rounded projection, m, on the top of the box, with a saddle, G, adapted to the hanger, and having a cavity for receiving the said projection, all substantially as and for the purpose herein set forth.

3d, The bearing, E, adapted to the journal of the axle and having lugs or projections, n, fitting into recesses in the box, as set forth.

4th, The sliding cover, f, fitted to the top of the box for withdrawal from the same, substantially in manner described.

67,639.—TRAVELER FOR THE JIB BOOM OF A VESSEL.—Sewall H. Downs, Bangor, Me.

I claim providing the interior of the cap or box of the traveler for the jib boom with two or more rollers above, and two or more rollers below the bar, and affixed, substantially as set forth, to enable the traveler to move surely and easily along the bar without danger of binding and to decrease the friction upon the several parts, for the purposes and in the manner substantially as set forth.

67,640.—MODE OF STRIKING GONGS OR BELLS.—Thomas G. Estes, Fall River, Mass.

I claim the combination of gong, A1, stand, B3, knob, C1, lever, E3, dog, F3, arm, G2, hammer, H2, and cam, K4, with clock-work, as herein set forth and described.

67,641.—LOCK FOR PRISON DOORS, ETC.—Chas. F. Felton, Buffalo, N. Y.

I claim, 1st, The shell, B, having a hinged cover or door, b1, in combination with a wall lock, substantially as set forth.

2d, Securing the hinged cover, b1, between the iron door frame, G, and shell, B, by means of the screws, g g, in such manner that the screw heads are covered by the door when closed, substantially as described.

67,642.—WASHING MACHINE.—John B. Francis, Barnesville, Ohio.

I claim the combination and arrangement of the adjustable and jointed or hinged concave wash board, x, and application thereof to the cylinder, H, by means of self-adjusting rockshaft, S, cords, weight, and pulley, F, in connection with the adjustable levers, O O and E E substantially as and for the purpose set forth.

67,643.—MOP HEAD.—O. S. Garretson, Cincinnati, Ohio.

I claim making the collar of the loose jaw in two parts so that the nut, d d, may be placed between them, and when connected together the collar surrounds the nut and retains it in position, for the purpose above set forth.

67,644.—IRONING MACHINE.—G. Gilbert and A. N. Allen, New Haven, Conn.

I claim the segmental bed, C, arranged upon elastic bearings, and in combination with a polishing surface, constructed and arranged so that the said polishing surface may be heated, substantially as and for the purpose specified.

67,645.—MANUFACTURE OF TRUNK ROLLERS.—Harvy Gray (assignor to Albert J. Sessions), Bristol, Conn.

I claim, as a new article of manufacture, a trunk roller with the frame, b, cast around the ends of the pivot or wire, c, substantially as described.

67,646.—REVERBERATORY AND CUPOLA FURNACE.—J. Durell Greene, Cambridge, Mass., and John A. Kay, Columbia, S. C.

1st, The combination of an ordinary cupola for melting iron, or other metal, with a reverberatory furnace, substantially as and for the purpose described.

2d, The utilization of waste heat from the cupola to heat the metal prior to its introduction into the cupola, substantially as described.

3d, In combination with the cupola and a reverberatory furnace, a supplemental heating or reverberatory chamber, substantially as described.

67,647.—BED BOTTOM.—Benjamin Griffen, Lawrence, Mass.

I claim the cross wire, D, when connected with the concaved bar, for the purpose set forth, and the swinging hooks, when combined with the slat, for the purpose specified.

67,648.—SELF-SUPPLYING MUCILAGE BRUSH.—Chas. Hamilton, New York city. Antedated Aug. 1, 1867.

I claim an attachment to the cap or brush cover, now in use, of a piece of wire running from the center of the cap, inside, to an inch or so beneath its base, the wire passing, when the cap is on the bottle, through the tube or passage in the brush, in the manner and for the purposes herein substantially set forth and described.

67,649.—BEEHIVE.—A. H. Hart, Stockbridge, Wis.

1st, I claim the lathed and plastered walls, H, in combination with the filled space, I, as and for the purpose substantially as set forth.

2d, The special arrangement of the ventilating holes, L L1, and passageway, a, in comolination with the honey chamber, B, and body of the hive, A, as and for the purpose described.

3d, The adjustable bee-gage block, O1, provided with the bee doors, f f1, as arranged in combination with the drone trap, P1, for the purpose and in the manner as substantially set forth.

67,650.—HEEL PRESS FOR BOOTS, ETC.—Chas. H. Helms, Poughkeepsie, N. Y. Antedated April 1, 1867.

1st, I claim the combination of the articulating joint, H, with the plunger, D, and lever, J, arranged and operating as hereinbefore set forth, for compressing the heels of boots and shoes.

2d, I also claim, in combination with the plunger, D, and articulating joint, H, a reacting spring, G, for the purposes hereinbefore set forth.

3d, I also claim the compensating rod, made and operating substantially as hereinbefore set forth, in combination with the lever, J, for the purposes described.

67,651.—TWEER FOR BLAST FURNACE.—Benj. H. Hibler, McKeesport, Pa., assignor to Pittsburgh and McKeesport Car Company.

I claim, 1st, A tweer consisting of a pipe, or the prolongation of the blast pipe of a smelting furnace, when such tweer extends into the cupola beyond the inner face of its wall or lining, and to or toward the center of the cupola, substantially in the manner and for the purposes above set forth.

2d, A tweer having an elbowed head with a cap, d, projecting outward so as to cover the apertures, e e, constructed and operating substantially as and for the purposes described.

3d, One or more apertures, c, in the lower side or face of the tweer or tweer pipe of the cupola of a smelting furnace, so as to discharge a portion of the air of the blast against the molten metal in the bottom of the cupola, substantially in the manner and for the purposes above set forth.

67,652.—FEEDING DEVICE FOR SEWING MACHINES.—James A. and Henry A. House, Bridgeport, Conn., assignors to Wheeler & Wilson Manufacturing Co.

We claim, 1st, The vibrating feed frame, I constructed, arranged, and operated substantially as and for the purpose described.

2d, The combination of the vibrating feed frame with the adjusting lever and cam for the purpose of varying the length of the feed.

3d, The combination of the vibrating feed block with the adjusting lever and set screw for the purpose of adjusting the feed vertically.

67,653.—TUCKING GAGE FOR SEWING MACHINES.—James A. and Henry A. House, Bridgeport, Conn., assignors to Wheeler & Wilson Manufacturing Co.

We claim, 1st, The attachment of the tucking gage to the presser foot of a sewing machine by the hooks and eccentric clamp, for the purpose of readily removing and replacing the gage without disturbing the gauge of the presser foot.

2d, The marking blade having a vertical, a longitudinal, and a lateral adjustment in the presser foot, substantially as described.

3d, The combination, substantially in the manner described, of the marking blade and its case spring and set screw.

4th, The combination, substantially in the manner described, of a marking blade having a vertical movement in its case with a buffer pad to deaden the shock of the head of the needle arm.

67,654.—DOVETAIL CUTTERS.—John C. Hursell, Boston, Mass.

I claim a cutting tool constructed and arranged for operation, substantially as and for the purposes herein described.

67,655.—SCREW-CUTTING MACHINE.—Clark Jillson, Worcester, Mass.

I claim, In a machine for cutting screws, the combination of the die holder with the mechanism for rotating the same, arranged substantially as and for the purposes herein described.

2d, The combination of the die-holder and gear wheel, O, or equivalent means for rotating the same, with the lever, L, substantially as and for the purposes set forth.

3d, The combination with the lever, L, of the die, P, and tubular shaft or spindle, N, and gear, O, or other suitable means for imparting a rotary motion to the same, substantially as and for the purposes set forth.

4th, The combination of the die holder and its swinging or vibrating lever, with the mechanism for revolving said die-holder in the manner and for the purposes herein described.

5th, The combination of the grooved frame, M, or equivalent means, for supporting and holding the screw under the action of the saw, with the lever, L, and saw, J, substantially as and for the purposes set forth.

6th, The combination of the frame, M, slotted or recessed at p, with the lever, L, and saw, J, as and for the purposes set forth.

67,656.—SEED PLANTER.—W. D. Johnson, Raleigh, N. C.

I claim the construction of the conical hopper, E, with its stirrers, K, and center wheel, H, when arranged and operated with a plow, D, in front and harrow, M, in the rear as herein described and for the purposes set forth.

67,657.—MEDICAL COMPOUND.—Carlos Judson, Omro, Wis.

I claim the use of a medical compound combining the medicinal properties of the ingredients specified mixed together in about the proportions and substantially as and for the purposes set forth.

67,658.—CHEESE HOOP.—O. A. King, Bedford, Ohio.

I claim the lever, C, links, E, and lugs, H, arranged in relation to the hoop substantially as and for the purpose set forth.

67,659.—AIR ENGINE.—Eugen Langen, and N. A. Otto, Cologne, Prussia.

1st, We claim the peculiar mode of communicating the downward and backward motion of the piston under atmospheric pressure only to the engine shaft by means of a clutch apparatus so arranged that the speed of the piston is rendered independent of the speed of the engine shaft.

2d, The cams or eccentrics S2, arranged for controlling the valves or slides for the admission of the combustible gas into and exit of the products of combustion from the cylinder when actuated in such a manner from the engine shaft through the mediation of the eccentric or cam, S1, pawl, H, ratchet wheel, Q, and disengaging catch, w, that such admission and exit of gases and consequently the number of strokes of the piston may be varied independently of the speed of the engine shaft substantially as and for the purpose hereinbefore set forth.

3d, We claim the combination of the several parts, k h P T U Q S1 S2 v' w and x, operating in manner and for the purposes substantially as set forth.

67,660.—GRAIN DRILL TUBE.—S. K. Lighter, Thos. Harding Joseph Curtis, Hamilton, Ohio.

1st, We claim the tube, Fig. 1, made with open coils in the manner for the purposes described.

2d, The mode of connecting the tube to the socket on the inside instead of the outside, in the manner substantially and for the purpose set forth.

67,661.—TAG OR LABEL.—E. A. Locke, Boston, Mass.

I claim a tag or lable composed of the metal embossing plate, a, and the inscription or marking plate, b, when these are connected together and to a confining band, d, by an eyelet, c, which at the same time secures the corners of the metal in bent over position, substantially as shown and described.

I also claim the construction of the band, d, with an eyelet, e, integral therewith and formed therefrom, substantially as and for the purpose described.

I also claim protecting the end of the band when the tag is applied, by carrying it between the pieces, a b, substantially as shown and described.

I also claim the lead or soft metal safety eyelet, i, to be used substantially as and for the purpose set forth.

67,662.—MODE OF RAISING THE GRADE OF RAW SUGAR.—Alex. Mackey, N. Y. City, and Eberhardt Müller, Brooklyn, N. Y.

We claim raising the grade of raw sugar by placing it in a dry or comparatively dry state in a centrifugal machine, and therein subjecting it to a washing operation substantially as herein described.