

THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported for the Scientific American.]

The usual weekly meeting of the Polytechnic Association was held, at its room in the Cooper Institute, this city, on Thursday evening, Jan. 26, 1861. The President, Professor Mason, in the chair.

NEW SUBJECTS.

Mr. JOHNSON, in behalf of Mr. John Brown, proposed "Fuel" for a subject for future consideration.

Mr. GARVEY offered to read a paper at some future time upon the subject of "Language."

NEW PYROMETER.

Dr. VANDERWEYDE exhibited and explained a new pyrometer invented by him. The ordinary pyrometer, moving an index by multiplying levers, which he also exhibited, in operation, was suitable only for ascertaining the expansion of metals by heat. In order to ascertain more accurately the heat of a fire, or of metals in fusion, he had contrived a pyrometer capable of measuring temperature up to 1800° Fahrenheit. The principle is that of the compensation pendulum with a reversed application, *i. e.*, the difference in the expansion of different metals under the same change of temperature. A tube of copper (or iron), 4 inches long, incloses a rod of platinum of precisely the same length at a certain temperature, and fastened immovably to each other at one end. The handle consists of a continuation of the tube, and of the rod, but both of iron, so as to expand equally. At the other end of the handle is the circular index, moved by the difference of expansion of the platinum and the copper, the motion being so multiplied as to be easily visible. Dr. Vanderweyde placed the end of his pyrometer, constructed by Becker, of Brooklyn, in the flame of an alcohol lamp, to show its operation. He proposed also to use this apparatus as a pressure-gage for steam boilers, since the pressure and temperature depend upon one another. In order to prove this law, he exhibited an apparatus combining a thermometer with a mercurial pressure-gage, attached to a confined vessel for the generation of steam. When the steam was formed and allowed to escape freely, the thermometer stood at 212°. Stopping the escape of the steam, the thermometer rose to 248°, when the mercury had risen so as to indicate the pressure of two atmospheres, *i. e.*, about 15 lbs. above atmospheric pressure. Upon again allowing the steam to escape, the mercury in the thermometer fell simultaneously with that in the other tube, to 212°; showing that the heat immediately becomes latent when the pressure is removed. The principle could be tested for higher temperatures by closing the top of the tubes of the pressure-gage, when filled with atmospheric air, converting it into a manometer, and increasing the pressure by the condensation of the air in the tube. Dr. Vanderweyde exhibited a table of temperatures ranging from the highest to the lowest theoretic temperatures—from 463° below zero to 21,632° above.

Mr. GARVEY stated that he had examined this table and been delighted with its accuracy.

REFRIGERATOR WITHOUT ICE.

Mr. GARVEY exhibited and explained a model of a refrigerator invented by William Simms, of Dayton, Ohio. The principle is that the gaseous vapors from the food are lighter than the atmosphere and septic in their nature. A current of air is passed through the top of the refrigerator to remove these gases. This current may be generated by a lamp, or by a fanwheel running by clockwork for 30 hours, as in the model. If the tube which supplies the fresh air, draws it from near the surface of a well, it will be so cool that it will be unnecessary to use ice.

ASPHYXIATION IN WELLS.

Mr. STETSON, in this connection, stated that the trouble from carbonic acid gas in wells could be easily remedied. It was only necessary to draw a pail or two of water and pour it down the well, the agitation of the air produced mixing the common air with the carbonic acid gas sufficiently to enable a person to go down with safety.

Mr. GARVEY, admitting that this might often be sufficient, said that it was not safe to rely upon it, especially if the well is deep, or situated in a valley. The only safe rule is to light a lamp and lower it to the bottom, and unless it will continue lighted for a considerable time, it is unsafe to go down.

Mr. SEELY said that there was one fact in relation to this subject which he had not seen stated in the

books; that the carbonic acid gas is generated in the wells. Although once and a half as heavy as atmospheric air, it will not for that reason sink, in consequence of the law of the diffusion of gases. In wells in Saratoga county, or where there are many mineral springs, the gas may collect in half an hour, so that it will be dangerous to go down.

PROJECTILES—RIFLING CANNON.

The Association proceeded to consider the question for the evening, "Projectiles for Rifles and Rifled Cannon."

Mr. STETSON said that the subject of rifling cannon was still in its infancy. One reason for this is the increased expense. It had been computed that every discharge of the Lancaster guns at the Crimea, of which so much talk was made, cost \$500; but this probably included the expense of getting the cannon there, and all other attendant expenses. Rough balls are expensive from their destroying the cannon; and replacing the cannon is a more serious expense than finishing up the shot. The Whitworth plan seemed to be the type of perfection in this direction. But the great expense had turned attention in this country to the banding of the ball, covering it with soft metal, and similar methods. Mr. Stetson proceeded to illustrate upon the blackboard the various forms for rifle balls. At first they were spherical; then they were prolonged. Then the back of the ball was flattened somewhat. It was soon found that the effect was still better if completely flattened, with square edges. A later plan was to make the back of the ball concave, not only to utilize the expanding gas more completely, but in order that this expansion should spread the thin edges of the back of the ball, so as to completely fill the bore of the gun, and in rifled pieces, so as to fill also the grooves of the twist. There is a plan, upon somewhat the same principle, for rifled cannon. The ball is of iron, with the front so sharpened as to reduce the resistance of the air, and with the back accurately turned to fit the bore. There is a groove around the ball, filled with a lead ring; and beneath this ring are channels communicating with the back of the ball. Upon the discharge of the piece, the expanding gases rush through these channels and force the lead outward, so as to fill accurately, not only the bore of the piece, but the grooves. The objection is, that as soon as the ball leaves the mouth of the cannon, this expansive force causes the ring of lead to fly off at a considerable angle; so that, in many cases, balls cannot be used. Another plan, patented by B. B. Hotchkiss, of Sharon, Conn., is intended to obviate this defect. Mr. Stetson exhibited a drawing of this ball, partly in section, and a small specimen ball. A great friction is required to give the rotary motion to the ball, and this may endanger the piece, if the pressure of the lead is unlimited. The Hotchkiss ball limits the expansion of the lead, and hence the amount of pressure. The back of the ball is a separate piece, with a rim around the edge, which is wedge-shaped. The discharge of the cannon causes this separate piece first to be driven up firmly against the remainder of the ball, the wedge forcing out a certain portion of the lead, and also a little grease so as to smooth the passage of the ball. At the same time this rim, and another on the front part of the ball, so inclose the inner portion of the lead ring, as to prevent it from separating from the ball. And as the expansion of the lead is wholly produced by the wedge, before the ball leaves the gun, there is no residuum of the force for this purpose to cause the ring to separate afterward, as in the former case.

The President made some remarks upon the history of projectiles, referring to the sling and to the ballista of the ancient Greeks and Romans as having probably suggested the use of cannon in modern warfare.

Mr. GARVEY explained the theory of rifling firearms. The projectile force is applied to the ball at the center of measurement; but if the center of inertia should be at one side of this, the ball would have a tendency to move in that direction. But if a motion of rotation is given to the ball, whatever tendency to deflection there may be to one side at one instant, it will be compensated for by a corresponding tendency to deflection to the other side at the next instant. It is only by one error correcting another that we arrive at accuracy in anything human. The power required to produce the rotary motion was an element of which he had seen no notice taken in any calculation. If the velocity of rotation were equal to the forward motion, it

would take as much force to produce the former as the latter. Another element that had been omitted was the action of centrifugal force in its tendency to separate these lead rings from the balls, especially when the lead is loosened by the tearing of the grooves. When a mass of matter is suspended in space, an infinitely small force will give it motion. If we can add a Barker mill attachment to the ball, so that it shall be made to spin, when free from the gun, by the action of the atmosphere, there will be no need of rifling. Some one has invented an oblong ball, rifled by a hole in the center, so that the passage of the air through the ball causes it to rotate. A cannon once fired becomes dangerous, and every shot fired makes it more dangerous; for we can never ascertain how much effect the concussion has had upon the structure of the iron. He would propose, therefore, to fire away the gun and keep the ramrod—or, in other words, to make the ball a tube closed at the end. A rotary motion could be easily given by any sort of light force attached to it.

M. HASSELL described and illustrated a ball invented by Mr. Frederic Newbury, of Albany, consisting of two cup-shaped balls, with an oil patch between them projecting over the inner one. The expansion forces the lead against the oil patch, so as to fit the piece, and the lead does not come in contact with the iron. There is therefore no abrasion.

Mr. STETSON said that one of the effects of rifling which had not been alluded to was that illustrated in the gyroscope, resulting from the tendency of a revolving body to maintain its plane of rotation. The ball being caused to rotate, will not so readily change its course. Mr. S. thought a grave objection to the method of causing the ball to revolve by the action of the atmosphere was that it did not operate at the point where the necessity for it is the greatest, since when the ball first leaves the mouth of the cannon, any deflection produces a greater error than a deflection produced afterward. To avoid the great friction in producing this rotation, he should judge that one turn in 200 or 300 feet would answer, instead of one turn every 20 or 30 feet.

Dr. VANDERWEYDE said that the law that the tendency of a body to rotate upon its axis is equal to its tendency to move in a right line, and that the law of the plane of rotation had been laid down by an Italian mathematician. If a body revolving around an axis is acted upon by a force which, acting alone, would cause it to rotate around a different axis, the result will be a rotation around an axis between the two; and that is the principle of the gyroscope.

The President inquired what was the practical effect of the "Accelerating gun," which has three successive discharges for one ball.

Mr. GARVEY stated that it had a tendency to diminish the concussion, and therefore to avoid the deterioration of the gun; but in the propulsive power, there would be a loss.

Mr. SEELY attributed the results attained to the great length of the gun. An ordinary gun is so short that the combustion is seen to continue after the ball has left the gun.

Dr. VANDERWEYDE said that the reason why chloride of potash and similar substances could not be used was because they burned too rapidly. Gunpowder is the best propelling agent, because it burns so slowly. There is less danger of explosion.

The President inquired how many discharges a cannon would bear.

Mr. JOHNSON—It varies from 250 to 1,500 for cannons of the same kind of iron and under conditions very much alike. Those that lasted the longest were cooled from the inside.

The President suggested that there might be a resemblance between cast iron and ice. He had found that the strength of ice was chiefly in the upper half inch, where the crystals are horizontal, while the lower ice is formed from vertical crystals. The outer coating of cast iron is extremely tenacious. By cooling the cannon from the inside, there were practically two outer surfaces.

Mr. BRUCE desired to say something further upon this subject, and its further consideration was postponed until the commencement of the next meeting.

On motion, it was voted that the hour of meeting should be 7 P. M.

The subject selected for discussion for the next meeting is "Fuel," upon which Professor Hedrick will read a paper.

Recent American Inventions.

The following inventions are among the most useful improvements lately patented:—

POWER LOOM.

This invention consists in a novel system of cones of pulleys for supporting and operating the harness, whereby several important advantages are obtained. It also consists in certain means of producing a slower movement of the harness at the time of crossing the sheds as compared with the greater portion of its movement, whereby the loom is enabled to be driven at a higher velocity; that is to say, to make a greater number of picks per minute, without liability to injury to the warp at the time of crossing the shed. The patentee of this invention is Benjamin F. Knowles, of Providence, R. I.

FIRE BRICK OVEN.

This invention consists in a novel arrangement of a furnace, heating flues and escape flues, in combination with a chamber of arched form, whereby a great saving of time and fuel is effected in the baking process, and, by a quick baking at a regular but not too intense heat, fire bricks or other articles of better than usual quality are produced. Louis Auguste Boisson, of Lyons, France, is the patentee of this invention.

TIRE HEATER.

This invention consists in the employment of a cylindrical furnace with a movable top, having two or more concentric chambers in it for receiving tires of different diameters, and furnished with dampers or valves, whereby the draught of the furnace may be conducted through either one of the concentric chambers from a door in the outer box to an escape pipe diametrically opposite to this door. The credit of this contrivance is due to Alfred Ingalls, of Independence, Iowa.

HOISTING APPARATUS.

The object of this invention is to obtain a simple apparatus which is easy of manipulation, by which barrels or any unwieldy cylindrical vessel may be tiered with very little labor. The invention consists in the employment of a derrick with a movable jointed leg, in combination with a prop, whereby the barrels, &c., will be raised perpendicularly to the desired height and then rolled over on the first tier with a comparatively short derrick. This invention is patented by G. B. Vroom, of Jersey City, N. J., and Solomon Kenzie, of Brooklyn, N. Y.

MACHINE FOR SEWING BOOTS AND SHOES.

The object of these improvements for making stitched boots or shoes by mechanism is to hold the work done on the table or bed plate of the machine as near the awl and needle as possible, and to keep the channel formed on the outside of the outer sole, open, so that the seam will follow closely in this channel, that the raised lip of the channel may be pressed down after the shoe is finished, and present a neat appearance, as if the stitching had been done by hand. The invention also provides for stitching the shanks of the boot or shoe, in which operation the work can be presented to the awl and needle with great facility; and it further provides for keeping the upper from the needle, and for guiding the channel to receive the seam, through the machine; and for sewing light or heavy, large or small work. The patentee of this invention is Francis D. Ballou, of Abington, Mass.

Tempering Steel.

From the large number of inquiries that we have recently received in regard to tempering steel, we think many of our readers will be interested in the following table, which was prepared several years ago by Mr. Stoddart, of England. The steel is to be hardened in the usual way, by heating it to a cherry red, and plunging it in cold water. The temper is then to be drawn by moderately heating the steel again. Different tempers are required for different purposes, and the degree of heat for each of these, with the corresponding color, is given in the table.

Table with 2 columns: Color and Description. Includes items like 'Very pale straw yellow', 'The temper required for lancets', 'Swords and watch springs', etc.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JANUARY 22, 1861.

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* * Pamphlets giving full particulars of the mode of applying for patents, 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.

140.—P. J. Ackerman, of Paterson, N. J., for an Improved Combination of Cooking Stove and Air-heating Furnace: I claim the combination and arrangement of the ovens, C C, fire-pot, B, and chambers, E H, as and for the purpose set forth.

[The object of this invention is to obtain a combined cooking stove and air-heating furnace by a very simple and economical arrangement of parts which renders the stove more desirable than the ordinary ones, while all the advantages of an air-heater is obtained. The invention consists in placing the fire-pot of the stove within the ovens, or having the former in direct communication with the latter, and having the ovens communicate with hot-air pipes.]

141.—Wm. R. Axé, of Beloit, Wis., for an Improved Clamping Machine for Carpenters: I claim the employment of the ratchet bars, E E, in combination with the rock shaft, B, actuated by a suitable lever, and the clamping jaws, I, and G, the former being provided with suitable pawls for engagement with the bars, E, and the whole arranged and operating as described for the purposes set forth.

142.—Louis Bauhoefer, of Philadelphia, Pa., for an Improvement in Gum Shoes and Boots: I claim the combining of pieces of cork with the heel or sole both of a gum shoe or boot, substantially in the manner set forth for the purpose specified.

143.—A. John Bell, of Ashland, Ky., for an Improvement in Steamboat Staging: I claim the arrangement of the staging, C, power winch, E F G H I, and supporting apparatus, J K L, the whole being constructed and operating together, substantially as and for the objects set forth.

144.—G. Bennett and R. Dalzell, of Waddington, N. Y., for an Improved Machine for Tapping Nuts and Cutting Screws: We claim the combination of the expanding die-box, the revolving plate or blank holder and expanding bolt holder, when the same are arranged and constructed, as shown, for the purpose of cutting screws and tapping nuts by the same machine, as specified.

145.—A. E. Blood and J. B. Blood, of Lynn, Mass., for an Improvement in Sieves: We claim the arrangement of the shaft, N, and the supports or bearings, c, c, of the sieve with respect to such sieve and its case, when the shaft, N, is constructed substantially as described and represented.

146.—L. A. Boisson, of Lyons, France, for an Improvement in Ovens for Baking Fire Bricks: I claim the arrangement of the furnace or furnaces, B B, heating flues C C, and escape flues, D D, with respect to each other, and the arched chamber, A, whereby the heat is first conducted beneath the hearth of the oven, and thence through the oven, all substantially as described.

147.—Wm. Chesterman, of Peosta, Iowa, for an Improvement in Apparatuses for Evaporating Saccharine Juices: I claim, first, The arrangement of the train of pans, A B C, the continuous flue, E, running under the whole in succession, and a chimney at the end of each furthest from the fire, substantially as described.

Second, The arrangement of a water vessel, I, float, J, and lever, K, with the pans, flues, and chimney dampers of a sugar evaporator, in the manner substantially as shown and described.

[This invention consists in a certain arrangement of a train of pans in combination with a single continuous flue running under the whole of them, and a separate chimney for each pan, and in a certain system of dampers operated by an automatic regulator applied in connection with the said arrangement of pans, flue and chimneys, whereby a very effective and economical apparatus for evaporating and concentrating cane juice or other saccharine liquids is obtained.]

148.—G. F. J. Colburn, of Newark, N. J., for an Improved Evaporator for Hot Air Pipes: I claim, first, The arrangement of the reflector, C, in combination with the evaporating vessel, A, and hot air pipe, B, as described, for the purpose of facilitating the evaporation, and to prevent the dust rising into the apartment.

Second, Constructing the vessel, A, of two parts, a and b, the part, a, to be made of porous material, and the part, b, to contain a lamp wick or its equivalent, substantially as and for the purpose set forth.

149.—George Cooper, of Thompsonville, Conn., for an Improvement in Needles: I claim, as a new article of manufacture, the sewing needle described in the specification, and represented in the drawing.

150.—Reuben Daniels, of Woodstock, Vt., for an Improvement in Machines for Reducing Fibrous Material: I claim providing the working face of each with pointed teeth, a and c, or their equivalents, secured thereto, and set substantially in the manner described, when operated with a current of fluid passing freely through and towards the periphery, to separate worn out cloths and fibrous material, to reproduce (and not destroy) the longest possible staple in a suitable state for carding, these wheels being made adjustable to, and with each other, substantially as described and for the purposes set forth.

151.—N. E. Doane, of Hannibal, Mo., for an Improvement in Weighing Carts or Wagons: I claim the lever frames, G G, rod, H, parallel bars, D D, levers, I J, graduated beam, K, and frame, L, combined, arranged and applied to a cart or wagon, as and for the purpose set forth.

[The object of this invention is to obtain a simple weighing attachment for carts and wagons, one that may be applied at a very moderate cost, and enable loads to be weighed very accurately and with great facility.]

152.—Thomas Earle, of Worcester, Mass., for an Improvement in Sewing Machines: I claim, first, The combination of the feeding hand and nippers with a connecting adjustable link, constructed and arranged as described, whereby a positive lateral vibratory motion is communicated directly from the nippers to the feeding hand.

Second, The combination of the feeding hand, constructed and arranged substantially as described, with an in-let spring so arranged as to act on the hand to draw it down in line with its center of motion.

Third, The combination of the pressure pad with the interior spring and sliding rod and cams, the whole arranged substantially as described for the purpose set forth.

153.—Lewis Eikenberry, of Easton, Pa., for an Improvement in Iron Bridges: I claim, first, A side frame for a bridge having its diagonal braces or diagonals and uprights constructed of angle iron, substantially as and for the purposes set forth.

Second, The combination of double angle iron or U-shaped braces with single angle iron uprights or diagonals, substantially as and for the purposes set forth.

Third, A side frame for a bridge which has its uprights or diagonals constructed of U-shaped or double angle iron, substantially as described.

154.—George Esterly, of White Water, Wis., for an Improvement in Harvesters: I claim, first, The combination with the joint, e d, which allows the flange, beam, E, to be adjusted in the path of a vertical circle of a curved slotted wheel, G, the dividing apparatus and a set screw, k, substantially as and for the purposes set forth.

Second, The combination of the angular adjustable bar, M, curved slots, x, x, and axial pivots, S3 and y and a, hinged platform, K, substantially in the manner and for the purpose described.

Third, The combination with the slotted curved brackets of the angular supporting bar, M, of a bracket, P, a thrust screw, Q, a pivoted lever, H, and the divider, F, substantially as and for the purposes set forth.

Fourth, The employment of the said pivoted lever, H, in combination with the divider, F, and the axle, S3, of the grain wheel, I, arranged substantially as and for the purposes set forth.

Fifth, The employment of the vertical pendant tension rod, S2, in combination with the reel bearer, S, divider, F, and the grain wheel, I, S3, substantially as and for the purposes set forth.

Sixth, The combination with the divider, F G, and inner adjustable wing, J, of an outer adjustable wing, J', arranged substantially as and for the purposes set forth.

Seventh, The combination of the short angular platform, K, with the continuation, L, and raker support, L', facing the platform laterally; the continuation, L, forming the outer end and being located between the frame, A, of the driving apparatus, the driving wheel and the axle thereof, and otherwise constructed so that the raker shall be located between the front sill, A', and the axle of the driving wheel, and be supported by the connections which support the platform, substantially as and for the purposes set forth.

Eighth, The combination with the finger beam, E, and a platform, K, hinged on hinges, V V, of an adjusting screw rod, M, which forms a hinge connection, one or more knife edge bearings or pivots, Z, one or more screws or bolts, x' x', and a thrust plate or bar, N', substantially as and for the purposes set forth.

155.—George Esterly, of White Water, Wis., for an Improvement in Harvesters: I claim, first, The arrangement of the reel and cutting apparatus obliquely to the side of the driving wheel frame and platform, M P n, when the rear line of the platform is oblique to the driving wheel frame, and its inner corner terminates near the axle of the driving wheel, substantially as and for the purposes set forth.

Second, The arrangement of the thrust or screw rod, I, and curved brace, J, with the dividing apparatus, grain wheel axle, e, and reel support, a, substantially as and for the purposes set forth.

156.—O. C. Evans, of New York City, for an Improvement in Lamps: I claim, first, The combination and arrangement of the gas chamber, A, constructed with horns, t, and slitted openings, as described, with the openings of the wick tube, at a2 a3, &c.

Second, In combination with the gas chamber and openings in the wick tube of the guards, c, c, and petticoat cone, D, the same being arranged in the manner and for the purposes set forth.

157.—I. N. Felch, of Hollis, Maine, for an Improvement in Hub Machines: I claim the combination of the attachment, the arrangement of the reciprocating knife frame, and the vibrating feed frame, in the manner and for the purposes set forth, and boring the hub while it is being turned by pressing up the auger through the hollow spindle.

158.—F. F. Fowler, of Crane Township, Ohio, for an Improvement in Machines for Gathering Hay: I claim the arrangement of runners, F, braced, as described, with the revolving roller, R, tongue, P, shaft, r, and braces, f, when the several parts have the loose connection described, whereby the machine may conform to the inequalities of the surface passed over, the construction and operation being as set forth.

159.—E. W. Fuller, of Martinsville, La., for an Improvement in Cultivators: I claim the arrangement of the adjustable bars, E E, plows, G, rotary harrow, B, and roller, C, with the adjustable bars, D D, transverse bars, a, and frame, A, all in the manner and for the purpose shown and described.

[The object of this invention is to obtain an implement of simple construction that will admit of the plows being adjusted both vertically and laterally, and, at the same time, admit of the use of either ordinary wheels or of a roller and revolving harrow, and a seed-distributing attachment, when required; the whole forming a very compact, efficient and economical implement.]

160.—G. G. Gabriel and N. B. Whitney, of Copenhagen, N. Y., for an Improved Stave Jointer: We claim the combination of the planes, 1 and 2, secured in the frame, 4, and made adjustable, in the manner described, with the carriage, 7, sliding on the rod or shaft, 6, all being constructed, arranged and operated substantially as set forth.

161.—John Griffin, of Louisville, Ky., for an Improvement in Cotton Pickers: I claim the arrangement for joint operation of the tubes, A F I, valves, C 4, and pipes, 1 m, essentially as and for the purpose set forth.

[This invention relates to certain improvements in cotton picking crops, for which Letters Patent were granted to this inventor, bearing date March 8 and Nov. 22, 1859.]

163.—Robert Henage, of Buffalo, N. Y., for an Improvement in Hemp Breaks: I claim the arrangement of the secondary brake, F, with the brakes, C C', in combination with the dressers, G G', and the gearing for reversing the motion of the machine, so that the parcel of hemp, as it passes through the brakes, will be bent at right angles (or nearly so) and directed downward to the dressers, the brakes operating and holding on to the parcel of hemp while the dressers are performing their work, substantially as set forth.

164.—C. L. Herring, of St. Louis, Mo., for an Improvement in Gas Regulators: I claim the application of the curved plates, a, to the flexible diaphragm, C, substantially as described, for the purpose specified.

165.—Edward Holmes and Britain Holmes, of Buffalo, N. Y., for an Improvement in Stave Machines: We claim, first, The endless revolving iron bed, A, constructed of jointed links, and having stops, a', in combination with cams, whose velocity must be increased or diminished according to the length of the stave to be dressed.

Second, The arrangement of the jointers in frame, L, said frame being operated by levers which have a connection to a cam, which cam has a horizontal adjustable movement upon its shaft, so that the revolution of the cam (through the arrangement of the levers) will communicate a reciprocating movement to the jointers, for the purposes set forth.

Third, The combination of the adjustable lever, n, with the frame, L, and hook or rest, v, for the purpose of giving different widths to staves, substantially as described.

Fourth, The arrangement of the frame, R, including the cutter, T, with the other parts of the machine, substantially as described, so that the said frame will have a periodical movement which will cause the stave to be chesed thinner in the middle portions thereof than it is at the ends.

Fifth, The arrangement of the gages, 1 2 3 4, &c., in combination with the lever, u, and rest, v, for the purpose of locating the rest, v, in the proper place to bring the lever, h, to its proper angle, to give the required width of stave.

166.—Alfred Ingalls, of Independence, Iowa, for an Improved Tire Heater: I claim combining with the horizontal circular furnace described, the inside concentric partitions, D D, movable covers, C C C, the dampers, e e and g, and supporting rods, p p p p, all arranged substantially as and for the purposes described.

167.—Charles Irwin, of Buffalo, N. Y., for an Improvement in Sewing Machines: I claim the adjustable arm, b, on the front end of the shuttle carrier, in combination with the spring, f, for guiding and protecting the needle and its thread, as set forth.

168.—William Jarrell, of Trenton, Tenn., for an Improvement in Plows: I claim the combination of the landside, B, sockets, d and f, belt, e, and nut, g, constructed, arranged and operating in the manner and for the purposes set forth.

[This invention consists in a peculiar manner of securing the landside of a plow, the advantages being facility in casting, perfect security when in position, and ease of removal for repair or substitution.]