(No Model.) 3 Sheets—Sheet 1.

E. TWEEDY & G. YULE.

HAT IRONING MACHINE.

No. 315,452. Patented Apr. 7, 1885.

Fig. 1.

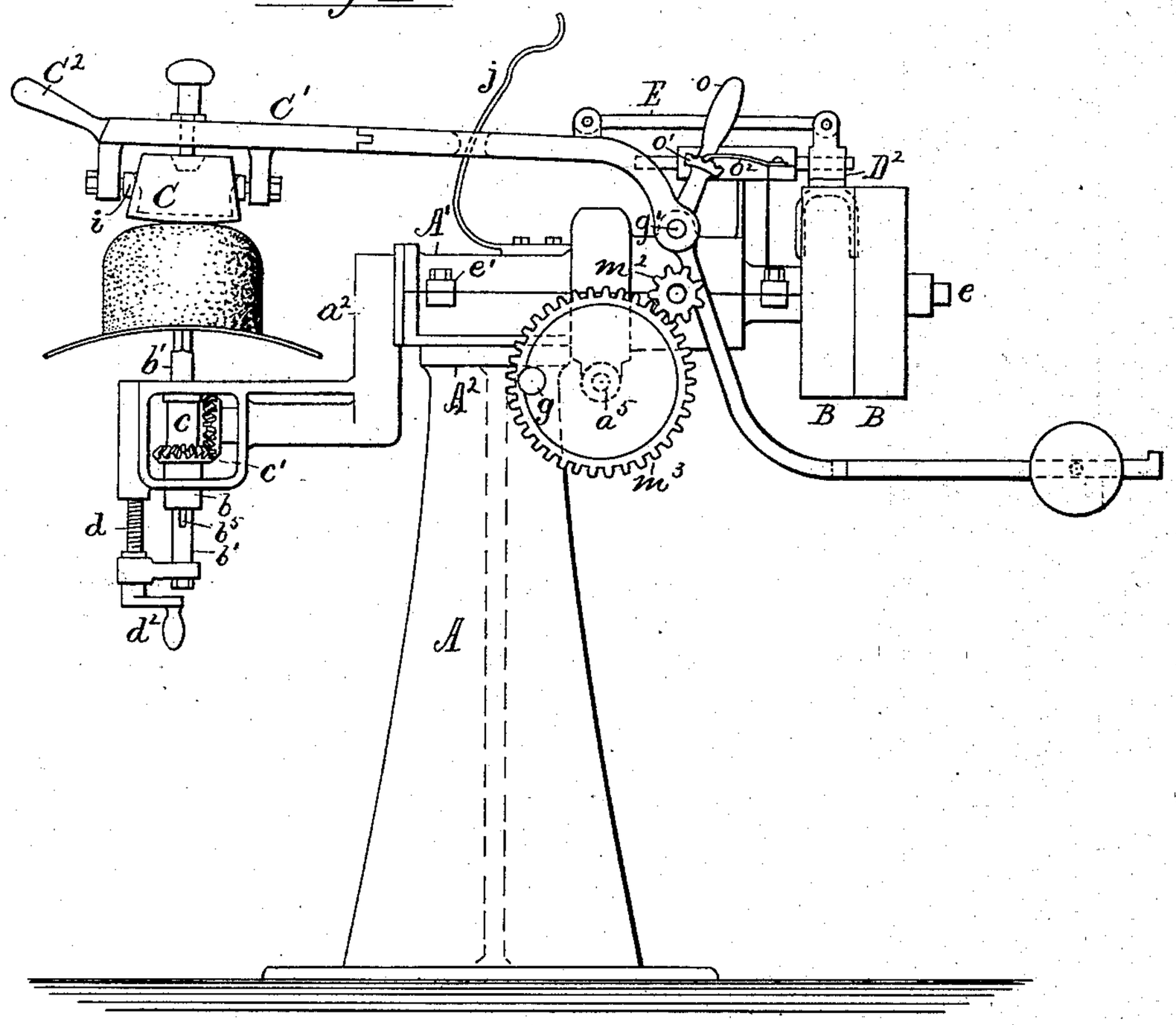
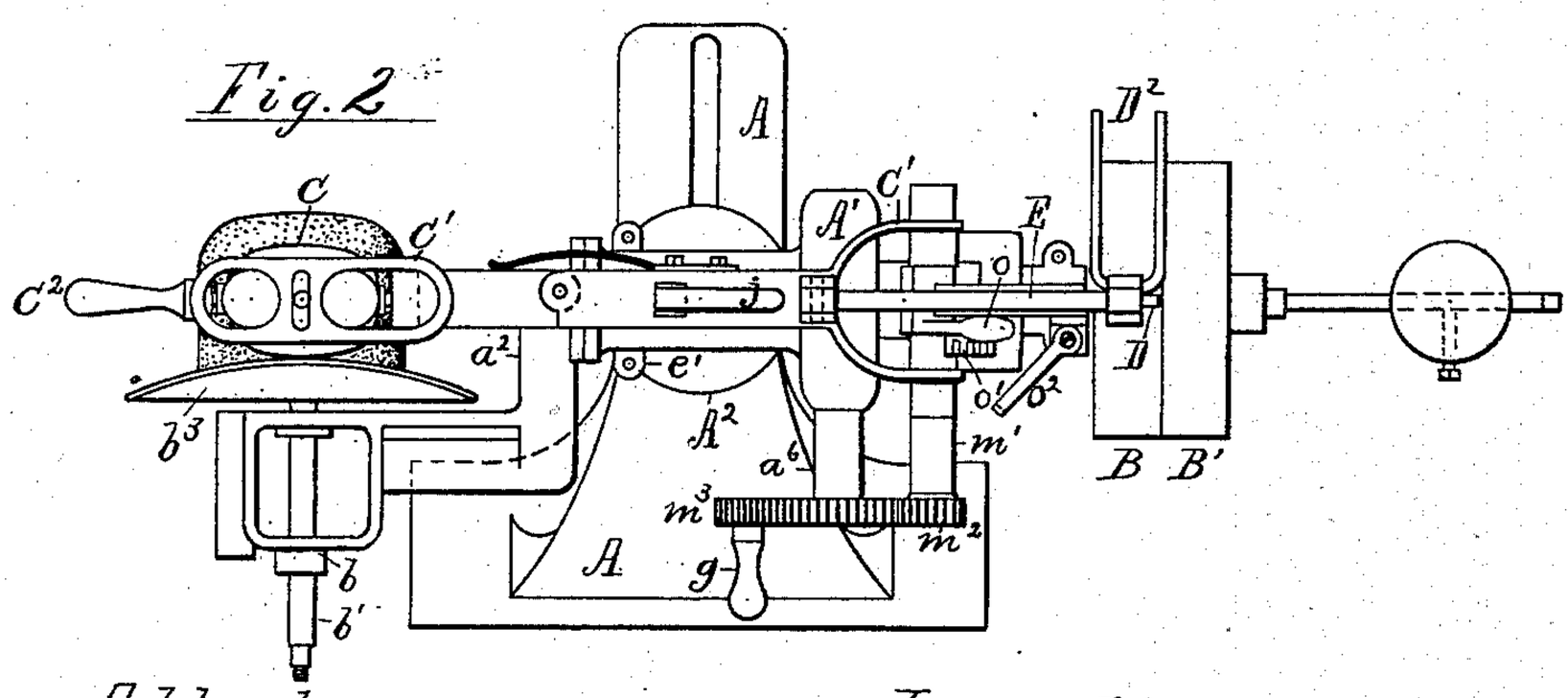


Fig. 2



Attest:

L. Lolly.

Henry J. Theberath.

Inventors.

Edmund Tweedy & Geo. Yule

per Thos. S. Crane, Atty.

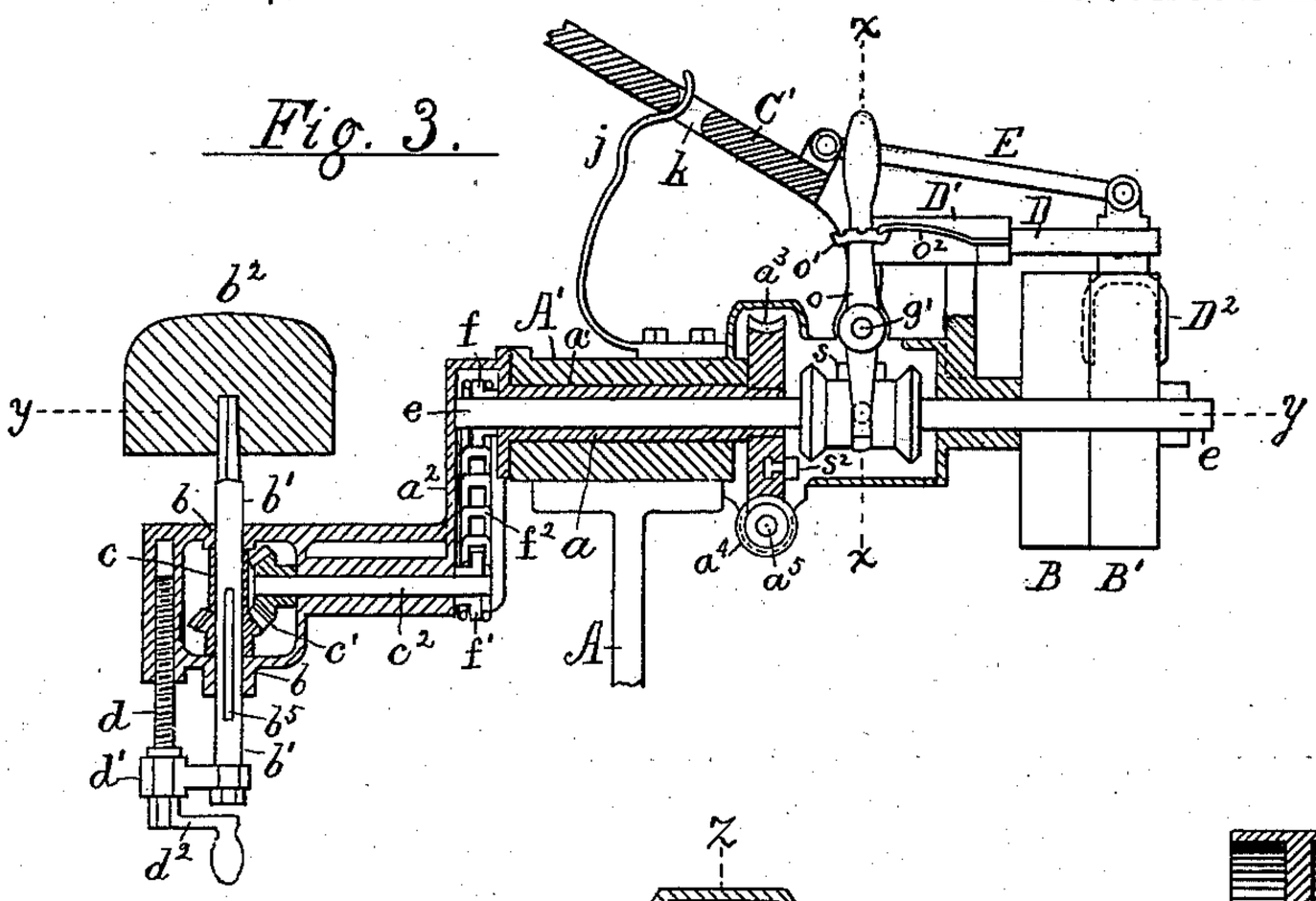
(No Model.) 3 Sheets—Sheet 2.

E. TWEEDY & G. YULE.

HAT IRONING MACHINE.

No. 315,452. Patented Apr. 7, 1885.

Fig. 3.



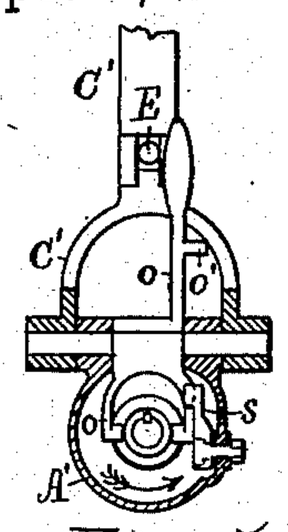


Fig. 5.

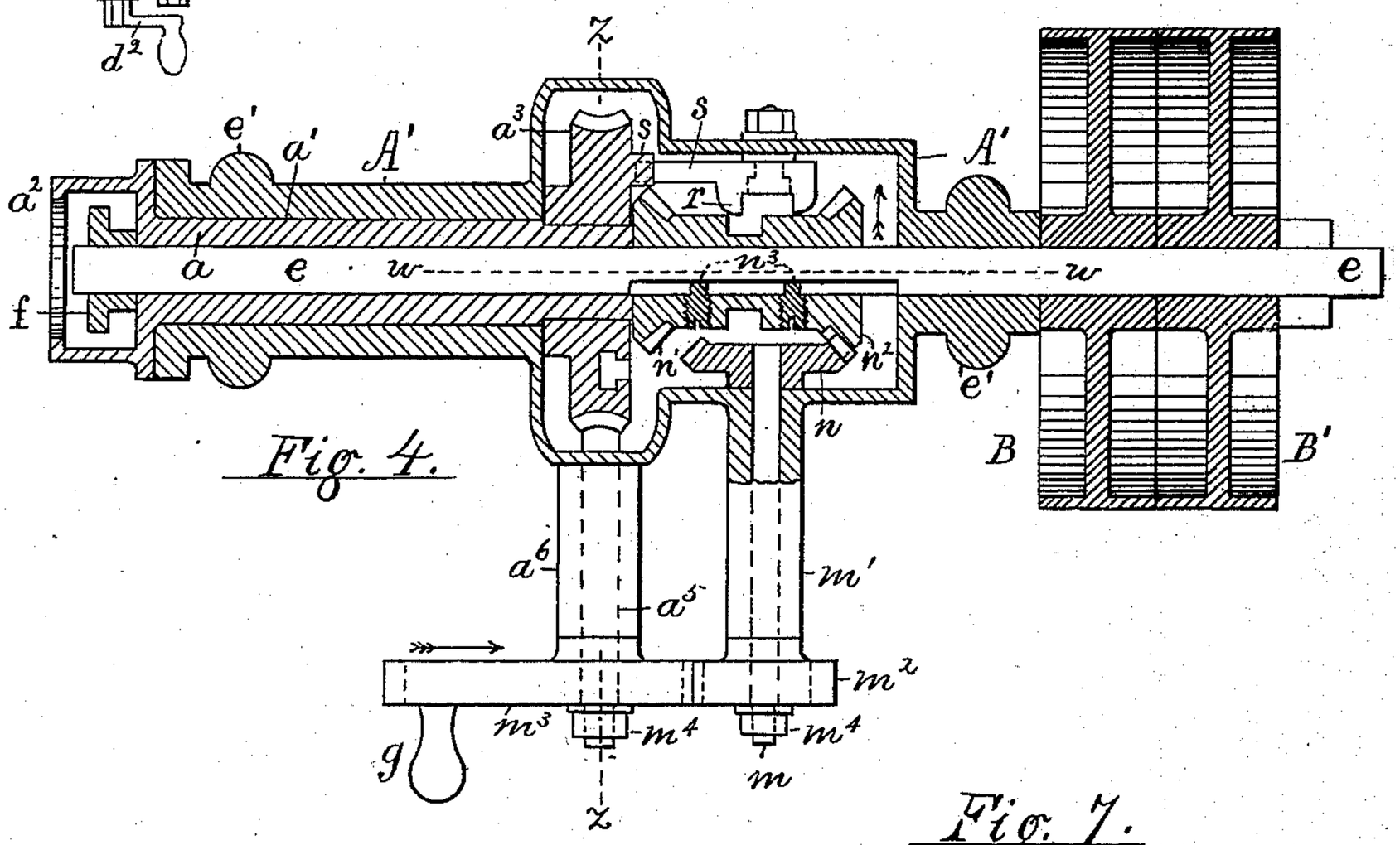


Fig. 4.

Fig. 6.

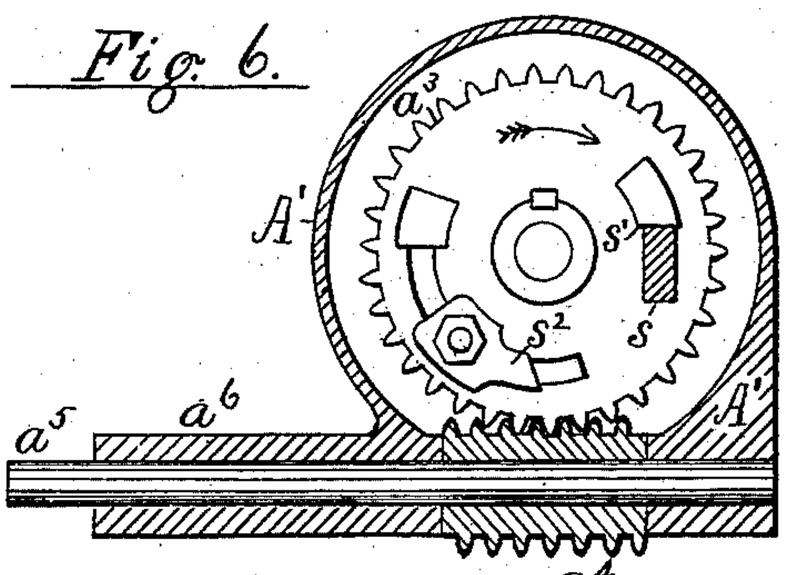
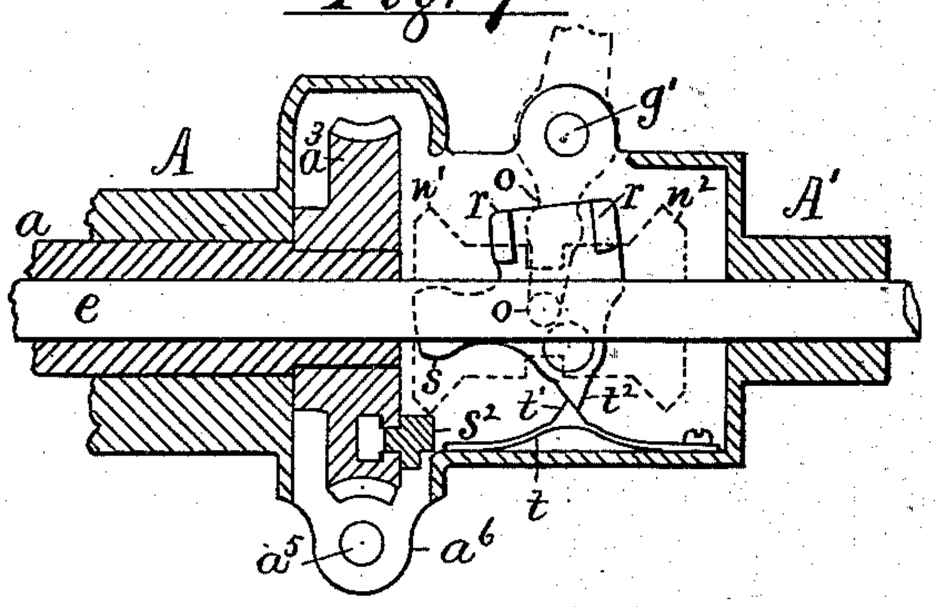


Fig. 7.



Attest.

L. Lee

Henry J. Theberath.

Inventors.

Edmund Tweedy & Geo. Yule

per Thos. S. Crane, Atty.

(No Model.)

3 Sheets—Sheet 3.

E. TWEEDY & G. YULE.

HAT IRONING MACHINE.

No. 315,452. Patented Apr. 7, 1885.

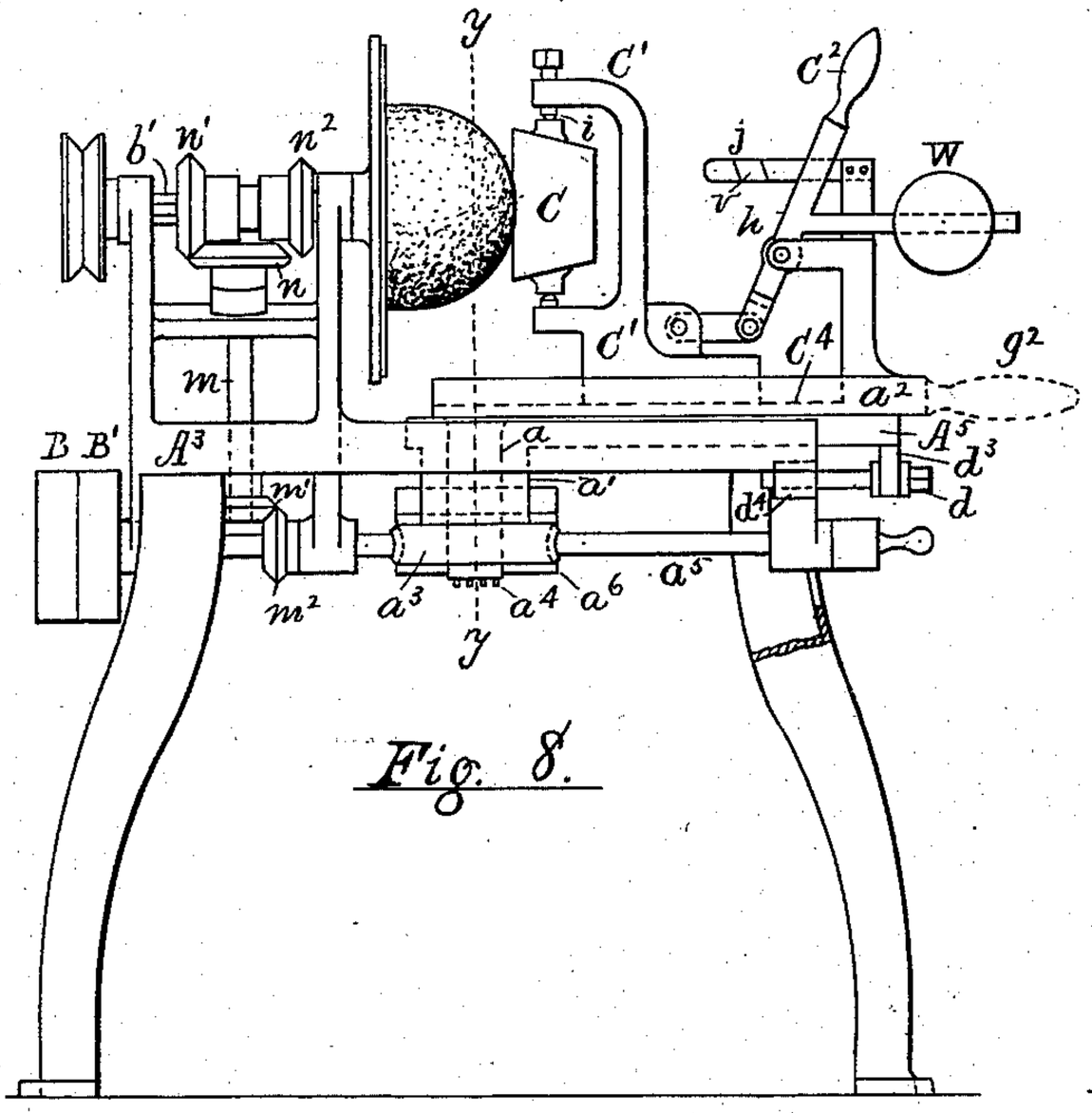


Fig. 8.

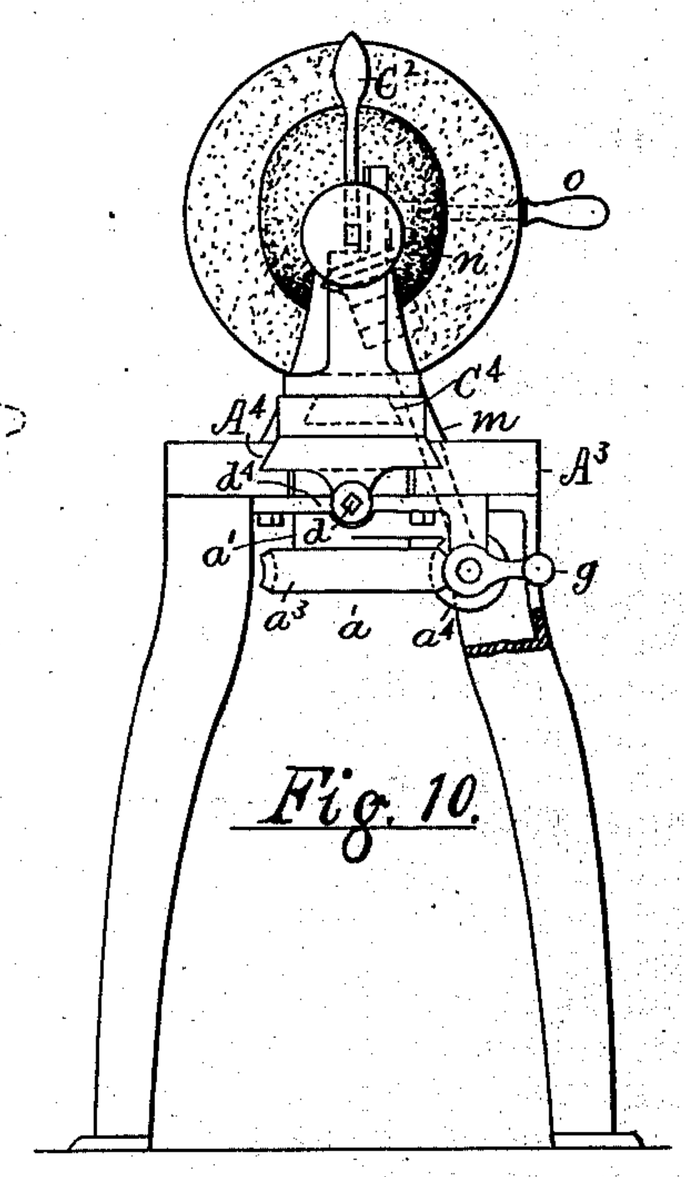


Fig. 10.

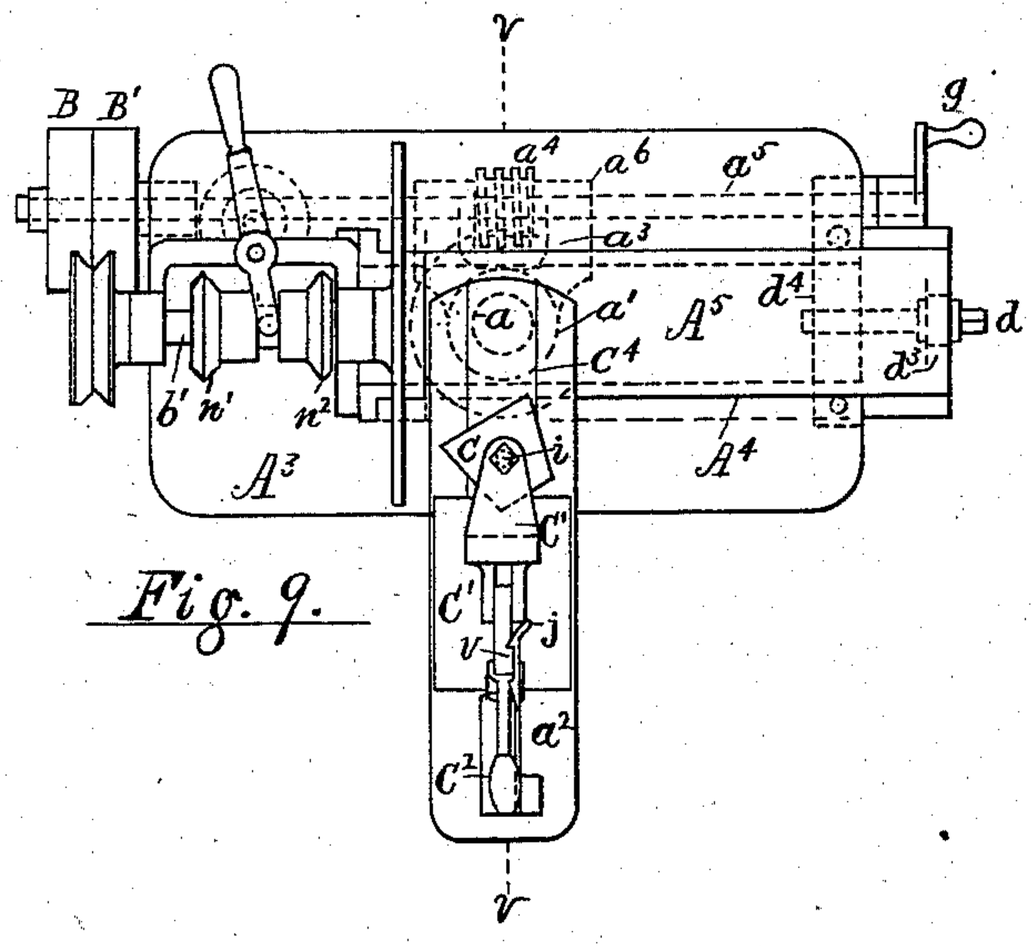


Fig. 9.

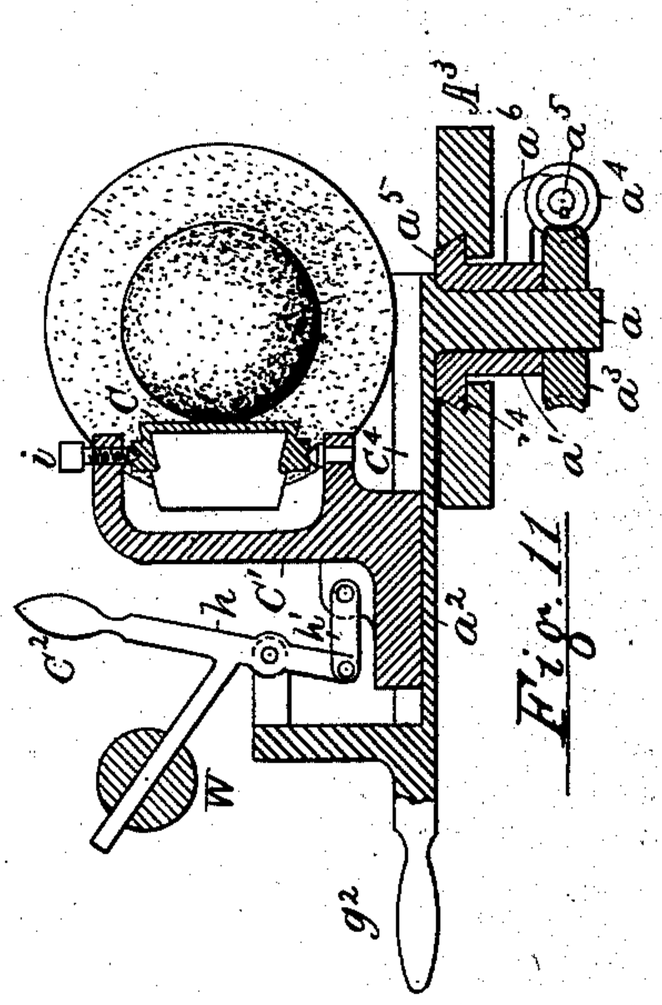


Fig. 11.

Attest.

L. Lee.

Henry J. Theberath.

Inventors.

Edmund Tweedy & Geo. Yule

per Thos. S. Crane, Atty.

UNITED STATES PATENT OFFICE.

EDMUND TWEEDY, OF DANBURY, CONNECTICUT, AND GEORGE YULE, OF NEWARK, NEW JERSEY, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE HAT CURLING MACHINE COMPANY, OF DANBURY, CONN.

HAT-IRONING MACHINE.

SPECIFICATION forming part of Letters Patent No. 315,452, dated April 7, 1885.

Application filed September 4, 1884. (No model.)

To all whom it may concern:

Be it known that we, EDMUND TWEEDY and GEORGE YULE, citizens of the United States, respectively residing at Danbury, Connecticut, and Newark, New Jersey, have invented certain new and useful Improvements in Hat-Ironing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of hat-ironing machines in which the hat-block is rotated and a yielding iron is applied to the hat and caused to press consecutively upon all parts of the crown. Heretofore in such machines the hat-block spindle has been rotated in bearings fixed in a given position during the operation of the iron, and the latter has been mounted upon a movable support in such manner that the support could be turned about the crown of the hat upon a fixed axis, and the iron gradually moved from the tip to the side of the crown in contact with the hat, or vice versa. In such machines the axis about which the iron is moved is commonly fixed in relation to the hat block or crown, so that if the iron were automatically moved about such axis at a uniform rate of speed its effect upon the tip, the side crown, and the intermediate portions of the hat would be far from equal, owing to the different heights of the various styles of hat-blocks used in the same machine, and the different distances and consequent speeds of various parts of the hat from the center of the hat-block and from the axis of the iron's movement. To obviate such unequal effects, and to secure a sufficient ironing of the tip, the iron has heretofore been manipulated by hand, and considerable skill has been required upon the part of the operator to retain the iron in contact with the different parts of the hat during a suitable length of time to iron them all uniformly.

This invention is designed to iron the hat automatically when desired, the iron being applied to it when it is placed in the machine, and moved without the operator's assistance to all parts of the crown, and stopped when the desired movement is completed. By such construction the time of the operator is only partially occupied, and he may therefore have leisure to prepare the hats for finishing during the operation of the machine, or he may keep several machines running by merely replacing the hats therein when finished. To employ a uniform movement of the iron about the hat-crown with the desired effect upon hat-blocks of different heights and shapes, it becomes essential to adjust the tip of the hat-block in relation to the axis of motion upon which the iron is moved, so that such axis may intersect the hat-block at a suitable distance from the tip, about equal to the semi-diameter of the block, and thus adjust the entire surface of the hat to nearly the same distance from the said axis. The radius of the iron's movement about the hat is obviously equal to the distance of the said axis below the surface, and, with a uniform movement of the iron about such axis, determines the time during which the iron operates upon different parts of the crown. By proper adjustment of the tip to such axis the duration of the iron's pressure upon different parts of the hat may be regulated in any degree, and a shorter pressure can be secured upon the tip of it, if desired, to compensate for the small rotary speed of such part as the hat-block revolves and the relatively large amount of heat transmitted to it.

We have shown herein machines of two opposite constructions, that shown in Figures 1 to 7 having a yielding iron held in a fixed position, and the hat-block moved or oscillated about it upon an axis of motion intermediate to the iron and hat-block spindle, and the latter being rotated in a bearing at right angles to such axis, while Figs. 8 to 11 show the hat-block fixed and the iron moved about it upon an axis intersecting the hat-block between its tip and base. To adjust the tip of the hat to the axis, the hat-block spindle is adjustable endwise in the first machine; but in the latter the iron is mounted or carried upon an adjustable oscillating shaft the fulcrum of which is movable lengthwise of the block-spindle. The mechanism shown may also be adapted for

holding other tools than a finishing-iron in contact with the hat in cases where the pressure of a yielding object is required, as in the pouncing of hats; and the invention therefore consists, primarily, in the combination, with a yielding tool-carrier for holding an iron or other object, of a hat-block spindle and means for revolving the same, an axis of motion intermediate to the carrier and hat-block spindle and preferably at right angles to the latter, and means for moving the spindle and tool-carrier in relation to one another automatically in lieu of the hand movements hitherto required with previous constructions.

It also consists in means for adjusting the tip of the hat-block to the axis of movement, and in means for automatically performing and regulating various movements of the machine, as means for varying the extent to which the hat-block or carrier is moved about the axis, means for oscillating the said parts back and forth so as to operate repeatedly upon the same part of the hat, means for arresting such movement, means for moving the said parts by hand for setting them in their initial position, means for disengaging the automatic moving devices when moving the said parts by hand, and means for operating the said parts by reversible connections to the arbor provided for driving the hat-block spindle. It also includes a connection from the hinged tool-carrier to the mechanism for rotating the hat-block spindle, whereby the rotations of the spindle are stopped when the tool is removed from the hat.

The nature of these improvements will be understood by reference to the annexed drawings, in which Fig. 1 is a side elevation, and Fig. 2 a plan, of a machine in which the hat-block spindle is mounted to move about the axis of motion upon a swinging arm affixed to an axial shaft, the swinging arm being shown below the axial shaft in Fig. 1 and at the nearer side thereof in Fig. 2. Fig. 3 is a vertical longitudinal section of the operative parts of such machine at the center of the said shaft, the arbor, clutch, and clutch-lever not being in section, and the carrier-lever being only shown in part and elevated, to show the automatic action of the shipper. Fig. 4 is a horizontal section of the same parts on line *y y* in Fig. 3. Fig. 5 is a transverse section on line *x x* in Fig. 3, enlarged to double the scale. Fig. 6 is a transverse section on line *z z* in Fig. 5, and Fig. 7 is a vertical section on line *w w* in Fig. 4. Fig. 8 shows a side elevation, and Fig. 9 a plan, of a machine in which the tool-carrier is mounted so as to move about the hat-block, the latter being rotated upon a spindle set in bearings fixed to the frame of the machine, and the iron and tool carrier being set in Fig. 8 at the tip of the hat, while in Fig. 9 they are shown turned around so as to act upon the side crown, the hat-block being merely indicated by dotted lines in the latter figure. Fig. 10 is an end view of the machine, viewed at the right-hand end of Fig. 8; and Fig. 11 is a vertical section of the machine on line *v v* in Fig. 9, and projected at the right-hand side of said figure.

Referring, first, to Figs. 1 to 7, inclusive, A is a flanged column which serves as the frame of the machine, in connection with a shell, A′, in which the driving and oscillating mechanism is partly confined, and to which the bearings of the several shafts and the driving-arbor are attached.

a is the axial shaft, arranged horizontally in a bearing, *a′*.

a^2 is an arm affixed to its external end; *b*, a radial bearing affixed to the arm; *b′*, the hat-block spindle mounted therein; b^2, the hat-block; b^3, the hat-flange, and b^4 the brim of a hat thereon.

c is a feathered bush mounted within the bearing *b*, and b^5 a keyway in spindle *b′*.

d is a screw fitted to a nut parallel with the spindle, and operated to move the latter endwise by means of a swivel-connection, *d′*, and crank d^2. The center line, *y y*, in Fig. 3 represents the axis of motion, and will be seen to intersect the block b^2 about as far from the tip as the radius of the block itself. The axial shaft *a* is made hollow to admit an arbor, *e*, which is provided at its outer end with fast and loose pulleys B B′, and at the end next the arm a^2 with a chain-wheel, *f*. Bevel-wheels *c′* connect the bush *c* with a bevel gear-shaft, c^2, mounted upon the bearings *b* parallel with the axis *y y*, and motion is communicated to the shaft c^2 by a chain-wheel, *f*, and chain f^2 applied to the wheel *f*. The pulleys B B′ and arbor *e* are rotated continuously when the machine is in operation, and the hat-block may thus be rotated by the arbor at the same time that the arm a^2 is turned about the axis *y y* by means of rotating or oscillating mechanism applied to the shaft *a*. The mechanism shown for such purpose is constructed as follows:

a^3 is a worm-wheel affixed to the axial shaft *a*; a^4, a worm fitted thereto; a^5, the worm-shaft; a^6, bearings for the same, and *g* a crank affixed to the worm-shaft to rotate the axial shaft, and thus move or turn the hat-block and hat to bring different parts of the surface under the iron.

C is the iron; C′, the tool-carrier, formed as a lever or arm, pivoted at one side of the axis *y y* about as far from the axis as the surface of the hat-block, the fulcrum *g′* being above the axis, so that the iron bears upon the upper side of the hat-block and exerts a uniform pressure, due to gravity, upon all parts of the hat as they are presented to it. The iron is hinged upon pivots *i*, parallel with the axis *y y*, so as to rock sidewise as the block is shifted beneath it, and a spring, *j*, is fixed upon the top of the shell A′, and fitted to bear in a slot, *k*, in the carrier-lever C′, so as to sustain the lever when the iron is raised from the hat.

D is a shipper-slide mounted in a bracket, D′, upon the shell A′, and provided with a belt guide or shifter, D^2, adjusted to the pulleys B B′; and a link, E, jointed to the ship-

per and to the carrier-lever C′, serves to move the belt automatically when the lever is raised to displace the iron and remove the hat from the block.

It is obvious that with the construction described the operator may arrange the hat-spindle vertically, as in Fig. 1, and after placing a hat upon the block grasp the lever C′ by the handle C^2 at its end, and rest the iron upon the hat by detaching the lever C′ from the spring *j*, thus shifting the belt to the pulley B and setting the hat-block in motion. The tip of the hat would then be first acted upon, and the operator, by turning the crank *g*, could continuously shift the hat-block in relation to the iron, and transfer the side of the hat gradually into contact with the same. The continued shifting of the spindle would then operate to press the hat-brim between the revolving flange b^3 and the side of the iron, which would be properly shaped, as shown in Fig. 2, to fit against the flange and to press the whole width of the brim. To actuate the shaft *a* automatically, an intermediate shaft, *m*, is fitted to a bearing, *m′*, adjacent to the worm-shaft a^5, and gears m^2 and m^3 connect the two shafts, while the shaft *m* is itself rotated by means of reversible clutch-gearing applied to the arbor *e*. This clutch-gearing consists in a central bevel-gear, *n*, affixed to the inner end of the shaft *m*, and in two connected bevel gear-wheels, n' n^2, movably fitted to the arbor *e*, so that either may be shifted into contact with the central gear. The gears n' n^2 are feathered to the arbor by screw-pins n^3, and a clutch-lever, *o*, is pivoted upon the fulcrum *g′*, and provided with a notched segment, *o′*, and holding-spring o^2, which serves to fit a notch in the segment and to hold the clutch movably in its central or neutral position, as shown in Fig. 3. When in the neutral position, the clutch-gears have no effect upon the arm a^2, although the arbor and hat may continue their rotations, and the arm and hat can then be moved by the crank *g* into any desired position.

In Fig. 1 the lever *o* is shown in its "forward" position, in which the gearing operates as shown by the arrows in Figs. 4, 5, and 7, and the gearing operates to move the hat-block from the position shown in Fig. 1 to that shown in Fig. 2.

The reversing device consists in a frog, *s*, actuated automatically by dogs s' s^2, secured to the worm-wheel a^3, the frog being pivoted to the inside of the shell A′, adjacent to the wheel a^3, and being formed with lugs *r r*, which operate to shift the clutch lever and gears n' n^2 when the shaft *a* and hat-block have been shifted just the desired amount. A tipping-spring, *t*, is provided, which presses a wedge, *t′*, against a pointed projection, t^2, upon the frog, and operates to push the frog over its central position when brought thereto by either dog. The lugs *r r* are set farther apart than that part of the clutch-lever embraced by the lugs, and the lost motion thus afforded permits either dog to shift the point t^2 past the wedge *t′* before the motion of the wheel a^3 is arrested. When thus operating the spring o^2 may be turned away from the segment *o′*, as shown in Fig. 2, to avoid contact with the notch therein.

For certain classes of work the machine may be constructed without the spring-wedge, and the segment *o′* be provided with three notches, as shown in Fig. 1. By this construction the shaft may be set in motion with the iron in contact with either the tip or brim of the hat, and automatically arrested when the hat-block has been shifted to the opposite extremes of its movement. The extent of this movement is about ninety degrees, and may be varied by adjusting one of the dogs in a slot, s^3, formed in the side of the wheel a^3, and in which such dog is secured by a bolt and nut. The normal action of the dogs is to withdraw either of the clutch-gears n' n^2 from contact with the central gear, *n*, and thereby completely stop the movement of the arm a^2; but when the spring-wedge is added to the combination, the frog operates to reverse the action of the clutch and bring the opposite gear into action, as just described above. When provided with such spring, the clutch mechanism operates to oscillate the axial shaft and its arm a^2 back and forth continuously within the prescribed limits, and the ironing of the hat would be continued until the machine was stopped by the operator to replace the hat by another. A ball arranged to oscillate at the end of an arm, above its fulcrum, may be used in lieu of the spring *t* to push the frog from its central position, and either may be made detachable from the frog at pleasure to leave the same to act normally; but as such specific devices are common in clutch-shifting mechanisms they are neither illustrated nor claimed herein. In the machine shown in Figs. 1 to 7 the movement of the iron and hat-block in relation to one another about an intermediate axis is effected by fixing the iron and by shifting or swinging the hat-block around such axis; but the opposite construction may be operated to produce the same results, and in Figs. 8 to 11 we have therefore shown a machine in which the said movement is effected by fixing the hat-block and shifting or swinging the iron about it. An iron thus arranged and operated has been commonly used heretofore, but, as stated above, could not be moved about the block automatically with a uniform movement, because the axis of motion was not adjustable, and the action of such a uniformly-moved iron was far from equal upon different parts of the same or of other styles of hats.

In Figs. 8 to 11 the equivalent or corresponding parts are lettered the same as in the previous figures; but the frame of the machine is a flat bed, A^3, having the revolving spindle *b′* fixed thereon in stationary bearings and the functions of the arbor *e* and spindle combined together.

Instead of moving the spindle endwise to adjust the tip of the block to the axis of motion, the latter is made adjustable to and from the tip of the hat-block by mounting the bearing a' in a slide, A^5, fitted to ways A^4, formed in the bed, the adjusting-screw being then applied to a lug, d^3, at the end of the slide and tapped into a nut, d^4, fixed across the ways upon the bed. The swinging arm a^2 projects horizontally above the slide, and is turned with the shaft a by a worm-wheel affixed to the lower end of the shaft. The carrier is mounted upon the arm so as to move with it in a horizontal plane to and from the tip and side of the hat-block.

To press the iron toward the hat uniformly, the carrier C′ is provided with a rectilineal guide, C^4, and is moved therein by a lever, h, connected with the carrier by a link, h', and having a weight, W, affixed to it by a horizontal arm, so that its pressure upon the carrier is practically uniform. The lever h has the handle C^2 affixed thereto, and the spring j is mounted upon the slide and formed with a notch, v, to fit the lever h, so as to hold the lever and carrier C′ in an inoperative position. The shaft m is fixed vertically below the spindle b', upon which the clutch-gears n' n^2 are arranged, and the shaft m is connected by bevel-gears m' m^2 with the worm-shaft a^5, the bearings for which are affixed to the slide A^5, adjacent to the wheel a^3, so as to follow the latter when the slide is moved by the screw d to adjust the axis y y, Fig. 8, to or from the tip of the hat. In Fig. 8 this axis is shown quite near the tip of the hat-block, so that the uniform angular movement of the iron about the hat would produce but a slow actual motion of the iron when adjacent to the tip, and thus afford such part of the hat a longer contact with the iron than the side crown, whose radial distance from the axis y y would be much greater. By turning the screw d the slide and axial shaft are moved to and fro in the ways A^4, and the axis y y may thus be adjusted to produce any other desired effect upon the tip or side of the hat, the same as if the spindle itself were adjustable endwise. It is obvious, however, that this adjustment could be secured in the machine shown in Fig. 8, and which embodies a very old method of hat-ironing by a hand movement, by making the hat-block spindle adjustable endwise in its bearings, which would be a much simpler construction than the moving slide A^5 for varying the relation of the axis y y to the block. Such construction would overcome the very defect of the previous machines of such class and make the hat-block adjustable toward the axis y y. The object of the construction shown in Figs. 8 to 11 is, however, to show that the axis of motion may be adjusted in reference to the block, and to illustrate that our invention includes fully any means for adjusting either the axis of motion or the hat-block in relation to the other of such elements. Thus the hat-block flange may be movably fixed to the end of the spindle and adjustable to and fro upon the same; but this would be a precise equivalent of the sliding spindle, as would any other means of varying the relation of the axis and hat-block, so that a uniform motion of the oscillating mechanism may be made to produce varied effects upon the tip and side of the hat. The manner in which such adjustment is adapted to retain the iron in contact with the tip for a greater or lesser degree of time is shown by the difference in the shape of the hats exhibited in Figs. 1 and 8 and in the different distances of the axis y y from the tips in both cases.

The axis is shown in Fig. 1 about equidistant from the tip and side crown, and the uniform angular motion would therefore operate to press the iron for an equal length of time upon all parts of the hat, making a marked difference in the finishing of such a hat in comparison with that ironed with the adjustment shown in Fig. 8.

To provide for the movement of the worm and its bearings a^6 with the slide A^5 the worm-shaft would be grooved and a feather fitted to the worm, as usual in such cases.

The bevel-gears m' m^2 in Fig. 8 are not readily removable like the spur-gears shown for the same purpose in Figs. 1 and 4, and the latter are therefore made removable and secured by nuts m^4, so as to afford the means for changing the relative speed of the arbor and axial shaft by substituting other wheels of different proportions. Such gear-wheels may also be replaced by cone-pulleys and a belt, if preferred, to effect such changes of speed more conveniently. A crank, g, is shown on the worm-shaft to actuate the axial shaft a by hand, and a handle, g^2, is shown in dotted lines at the outer end of the arm a^2 in Figs. 8 and 9 to illustrate the means heretofore used to oscillate such an arm or tool-carrier in lieu of the automatic mechanism devised by us. The clutch-lever o is shown only in Figs. 9 and 10, as the action of the clutch has been fully set forth in connection with Figs. 3 to 7, and the means for shifting the same automatically is also omitted to avoid complicating the drawings, and because a construction similar to that shown in Figs. 3 to 7 could be employed by conveying the necessary motion from the oscillating shaft or arm to the vicinity of the clutch by suitable connections. In Fig. 9 the iron C is shown tipped in the manner produced by the convex form of the crown exhibited in Fig. 8, the pivot being set parallel with the axis y y to provide for such necessary movement.

As the movements of the tool-carrier employed in holding a finishing-iron are analogous to those employed in pouncing hats by abrading agents, we have not limited ourselves herein to the use of the carrier for an iron merely, but have claimed our invention for any purposes to which it may be adapted.

Having thus set forth the nature of our invention, it will be seen that it differs from

other devices for applying the iron to the hat in its shifting the hat or iron automatically, when once adjusted by the operator, and that, although it enables us to utilize a uniform movement for the tool or hat when in contact, it is not dependent upon such movement, but would be equally appropriate for any irregular movement adapted to produce special effects in the application of an iron or a pouncing-tool to different parts of the hat. Such irregular movements would be especially useful in pouncing, to avoid cutting the hat through [at any especially projecting points, and may be produced by cam-motions or gearing of any suitable character arranged to operate upon the shaft *a* or arm a^2.

In any modification of such machine for the pouncing of hats the spindle *b* could be rotated after the removal of the automatically-operating tool, so that the operator could supplement the working of such tool by one held in his hand at any desired point.

We have shown and claimed a modification of our present invention in another pending application, No. 142,211, of even date herewith, and therefore disclaim herein any subject-matter that may be allowed in said copending application.

What we claim herein is—

1. The combination, with a yielding iron or tool carrier, a hat-block spindle, and means for revolving such spindle, of an intermediate axis of motion intersecting the hat block or spindle, and means for automatically moving the spindle and tool-carrier in relation to one another about said axis.

2. The combination, with a yielding iron or tool carrier, a hat-block spindle, and means for revolving such spindle, of an intermediate axis of motion intersecting the hat block or spindle, and means for automatically oscillating or reversing the movement of the spindle and tool-carrier in relation to one another about said axis.

3. The combination, with a yielding iron or tool carrier, a hat-block spindle, and [means for revolving such spindle, of an intermediate axis of motion intersecting the hat block or spindle, means for automatically moving the spindle and tool-carrier in relation to one another about said axis, and means for adjusting or varying the extent of such movement.

4. The combination, with a yielding iron or tool carrier, a hat-block spindle, and means for revolving such spindle, of an intermediate axis of motion intersecting the hat-block, means for automatically moving the spindle and tool-carrier in relation to one another about said axis, and means for automatically arresting such movement at a fixed point.

5. The combination, with a yielding iron or tool carrier, a hat-block spindle, and means for revolving such spindle, of an intermediate axis of motion intersecting the hat-block, mechanism for moving the spindle and tool-carrier in relation to one another about said axis by the hand of the operator, mechanism for producing the same movement automatically, and means for bringing either mechanism into operation separately.

6. The combination, with a yielding iron or tool-carrier, a hat-block spindle, and a driving-arbor for revolving the same, of an intermediate axis of motion intersecting the hat-block, and mechanism connected with said driving-arbor for moving the spindle and tool-carrier in relation to one another about said axis.

7. The combination, with a yielding iron or tool-carrier, a hat-block spindle, and a driving-arbor for revolving the same, of an intermediate axis of motion intersecting the hat-block, mechanism for moving the spindle and tool-carrier in relation to one another about said axis by the hand of the operator, and a clutch for connecting the said hand-moving mechanism with the said driving-arbor, and thereby moving the spindle and tool-carrier in relation to one another automatically.

8. The combination, with a yielding iron and a hat-block spindle mounted to move or turn about an intermediate axis of motion in the manner described, of the worm-wheel, worm, and worm-spindle for producing such turning motion by hand, the hat-block-driving arbor mounted upon said axis of motion, the intermediate shaft connected with the worm-spindle, the intermediate bevel-wheel upon such shaft, adjacent to the arbor, the shifting-clutch provided with two opposed bevel-wheels revolving with the arbor, and means for shifting and securing either of the two opposed bevel-wheels in gear with the intermediate bevel-wheel, as and for the purpose set forth.

9. The combination, with a hat-block spindle, of a driving-arbor provided with mechanism for revolving the same, a tool-carrier mounted above the hat-block upon a vertically-swinging carrier-lever, a shipper for shifting the driving mechanism, and a connection from the carrier-lever to the shipper for automatically stopping said mechanism when the tool is removed from the hat.

10. In a hat-ironing machine, the combination, with a yielding tool-carrier and a spindle for supporting the hat-block, of two mechanisms, one for rotating the said spindle and turning the hat around in the plane of its brim and one for shifting the spindle in relation to the iron and presenting the tip and side crown continuously to its action.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

EDMUND TWEEDY.
GEORGE YULE.

Witnesses:
THOMAS E. TWEEDY,
THOS. S. CRANE.