(No Model.) 2 Sheets—Sheet 1.

E. TWEEDY & G. YULE.

HAT IRONING MACHINE.

No. 316,585. Patented Apr. 28, 1885.

Fig. 1.

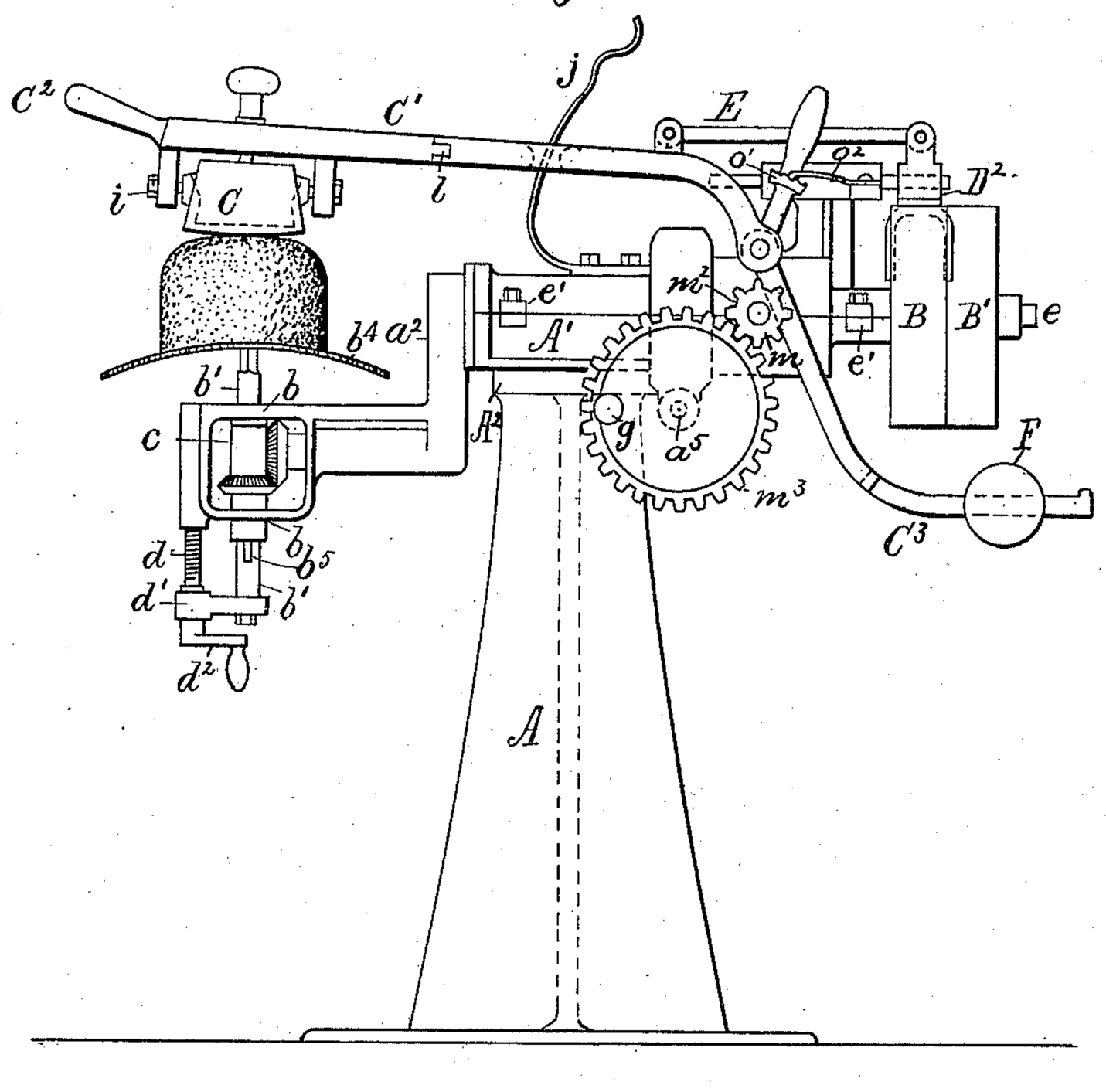
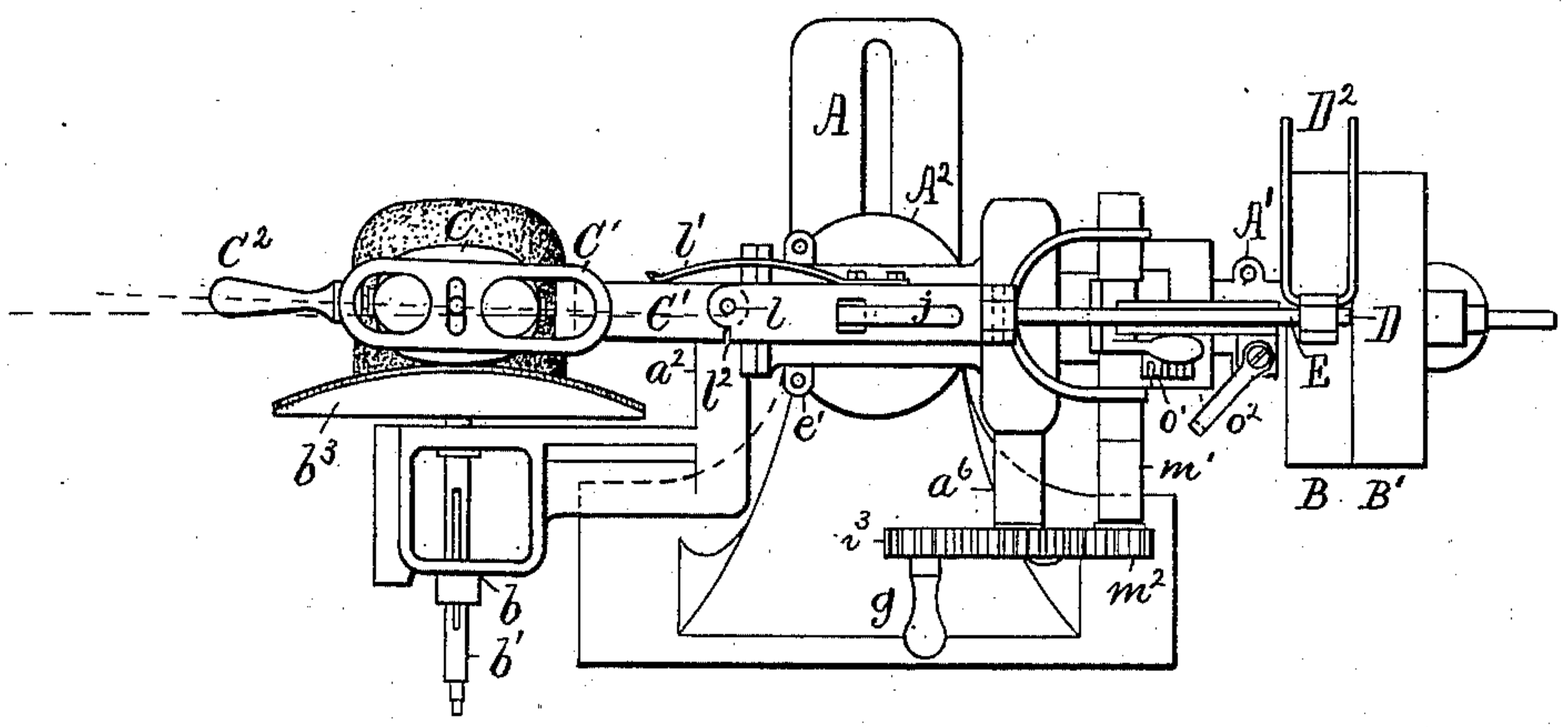


Fig. 2.



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(No Model.)

2 Sheets—Sheet 2.

E. TWEEDY & G. YULE.

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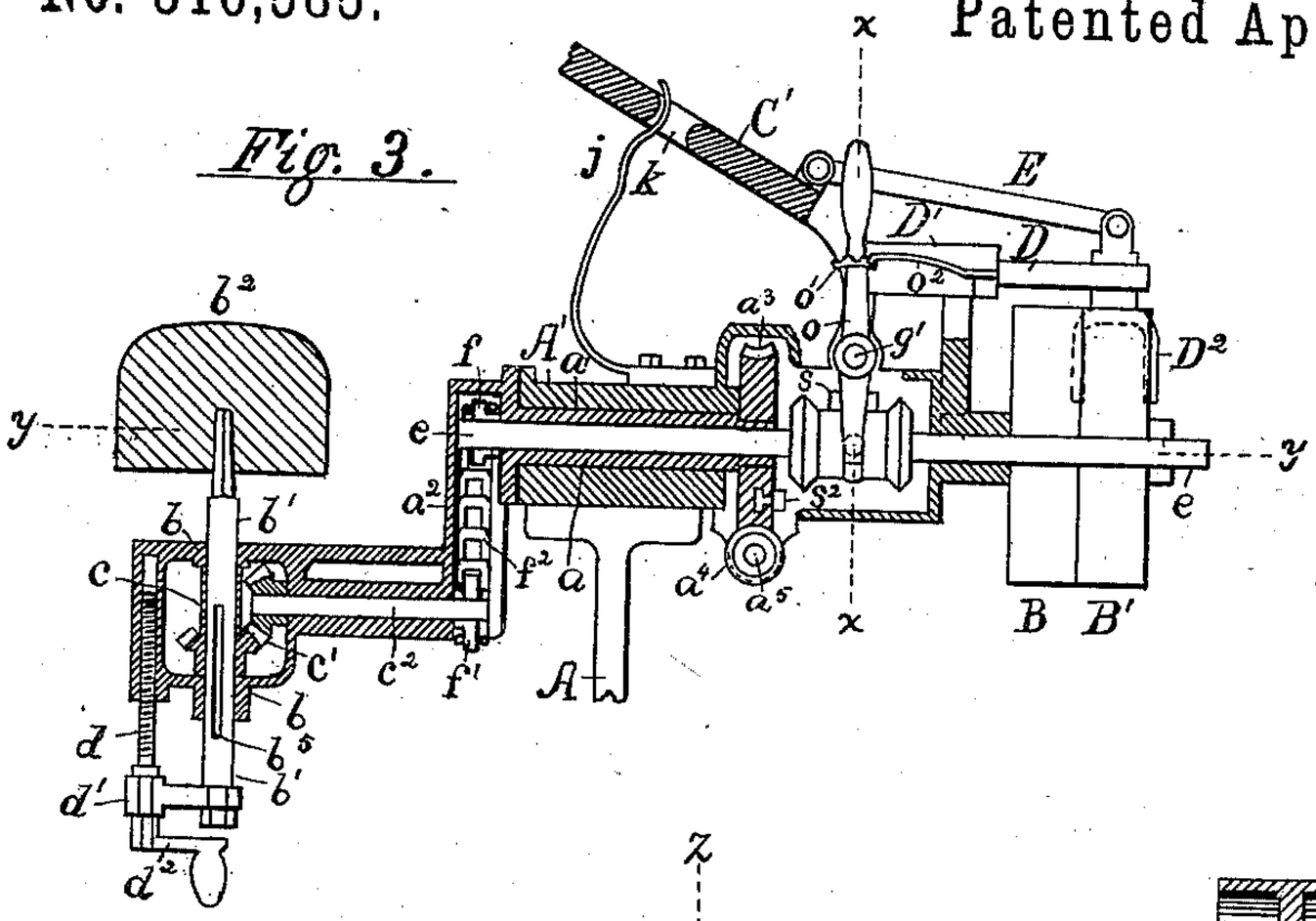
Fig. 3.



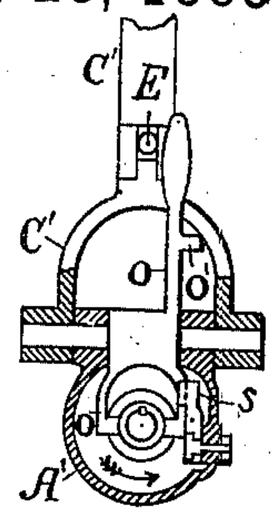


Fig. 5

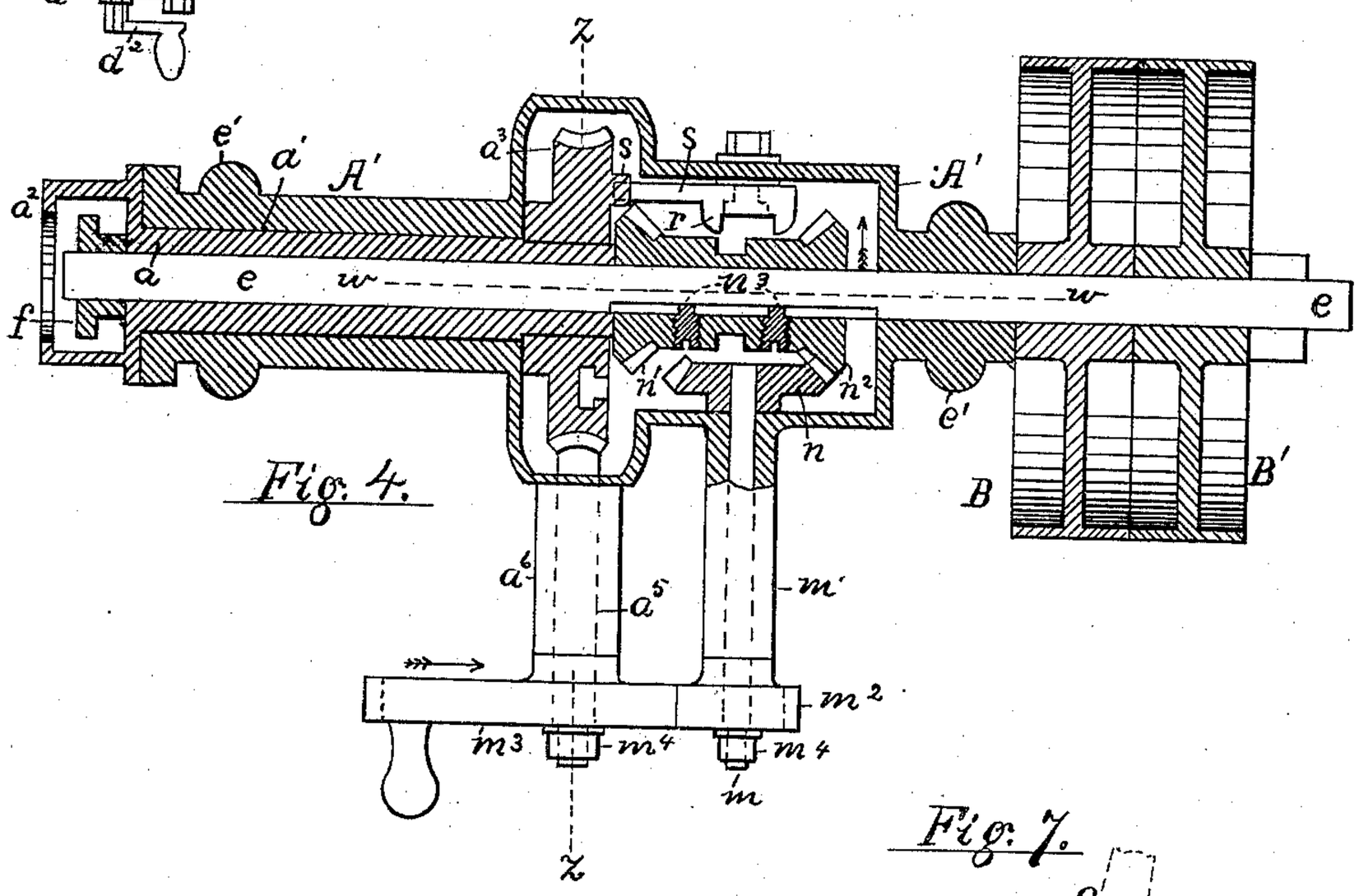


Fig. 4.

Fig. 6.

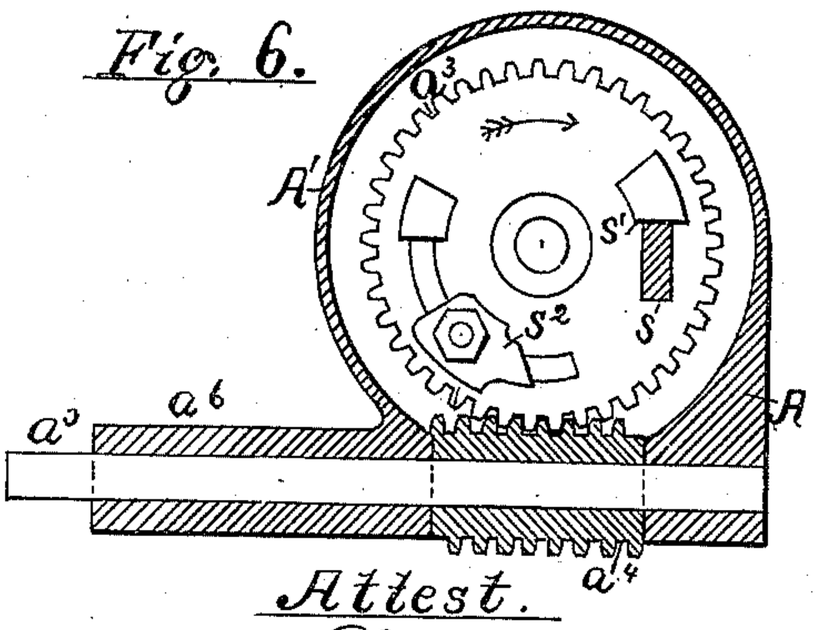
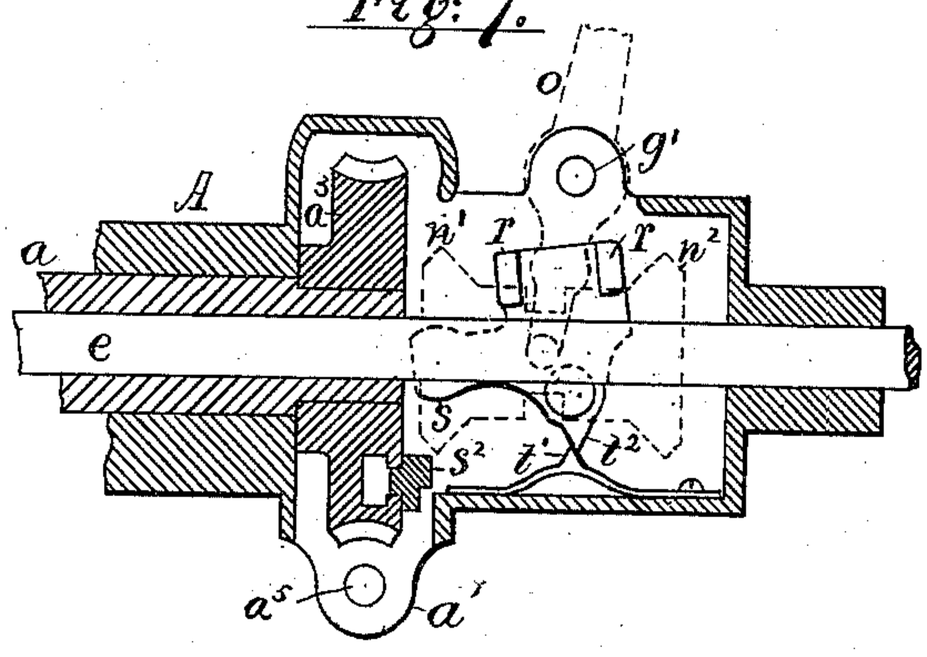


Fig. 7.



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per Thos. S. Crane, atty.

UNITED STATES PATENT OFFICE.

EDMUND TWEEDY, OF DANBURY, CONN., AND GEORGE YULE, OF NEWARK, N. J., 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. 316,585, dated April 28, 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 patent application relates to certain modifications of an invention partially claimed in another application filed herewith, and numbered 142,210, and in which we described a class of machines having a yielding iron and revolving hat-block arranged to move around an intermediate axis of motion fixed at an angle of about ninety degrees with the said spindle.

In this application the claims relate, chiefly, to a machine in which the yielding iron is held in a given position when in operation, and the hat-block spindle is mounted radially upon an oscillating arm, the specific features claimed being, first, the mounting of the spindle at right angles to the axis of motion, and the provision of means for adjusting the tip of the hat-block in relation to such axis; second, the adjustment of the hat-block tip by moving the spindle lengthwise in its bearing; third, the mounting of the spindle radially to the axis of motion by means of an arm attached to an axial shaft; fourth, the combination, with such shaft and arm, of means for oscillating or moving the same; fifth, the combination, with a hollow axial shaft, of a central arbor for driving the spindle; sixth, the means for oscillating the axial shaft by a connection to the arbor; seventh, the means for oscillating the axial shaft by hand; eighth, the means for regulating the automatic oscillation of the shaft; ninth, the means for connecting the arbor with the hat-block spindle; tenth, the means for adjusting the spindle endwise; eleventh, the clutch mechanism for oscillating the axial shaft; twelfth, the means for varying the speed of the shaft's oscillations; thirteenth, the arrangement of the shaft horizontally with the tool-carrier above it; fourteenth, the pivoting of the iron upon the carrier to turn sidewise; fifteenth, the construction of the carrier-lever with a lateral yielding hinge; sixteenth, the adjustment of the spindle endwise in any similar machine, and other constructive features that are described herein.

The nature of these improvements will be understood by reference to the annexed drawings, in which Figure 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. 4, and Fig. 7 is a vertical section on line *w w* in Fig. 5.

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 the 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 upon the frame for the same, and *g* a crank affixed to the worm-shaft to rotate the axial shaft, and thus enable the operator to move or turn the hat-block and hat by hand 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 above 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 shown in Fig. 1 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 shipper 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. The operator may also, by means of the handle C^2, move the iron up and down in contact with the brim, and thus increase the friction therewith.

To secure a yielding pressure with the side of the iron, the lever C′ is formed at one point with a vertical hinge, *l*, and a spring, *l′*, one side of the hinge being constructed with an abutment, as at l^2, so that the spring normally holds the lever straight. The movement of the flange b^3 toward the side of the iron tends to bend the lever somewhat and brings the spring into play, thus producing a spring-pressure upon 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′* and m^2 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 6, 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, as 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.

As the operation of the iron upon the hat may be commenced at either the tip or the side, the arm a^2 would, whether stopped at each extreme of movement or not, be necessarily oscillated back and forth from its lower position (shown in Fig. 1) to its position at one side of the shaft, as seen in Fig. 2, the movement in either direction sufficing to iron a hat in some cases, while two or even more of such movements would be required with hats of different texture. The arm may therefore be termed an "oscillating arm," and the shaft a and its operative mechanism be termed "oscillating," in view of the movements they perform, whether the oscillations are effected by automatic clutch mechanism or by the application of the operator's hand to the clutch-lever o or worm-crank g in moving the arm back and forth. The crank g in all cases furnishes the means to set the hat in any desired position under the iron or to shift any part of the hat into contact with the iron for refinishing such part. The setting of the spindle b' radially to the axial shaft necessitates a swinging arm of some kind to sustain the bearing b; but it is obviously immaterial how the bearing is formed upon the arm, although it is represented in the drawings as cast of metal in one piece with the arm. It is also immaterial how the motion is transmitted from the arbor to the spindle, as bevel-gears and another shaft similar to the shaft c^2 may be fitted upon the arm in place of the chain f^2, and the spindle itself may be adjusted endwise by set-screwed collars, or by making the arm a^2 to extend in length, and the use of the screw d and swivel d' thus be avoided. Any equivalent mechanism may also be substituted for the clutch shown herein, and for the fast and loose pulleys used to drive the arbor e, as either of such mechanisms is often substituted for the other in analogous constructions, and it is immaterial what means be used to actuate the swinging arm in the desired manner.

The construction shown is adapted particularly for inclosing the working parts in the metal shell A′, to protect them from the dust and lint of a hat-shop, and the worm-gearing is provided to secure the requisite power and slow motion, as it secures only one oscillation or movement of the arm a^2 for forty or fifty revolutions of the hat-block spindle.

For the convenience of construction the shell A′ is made in upper and lower parts, the latter being secured to a flange, A^2, upon the column A, and the former being bolted to it by means of lugs or ears e'.

By the arrangement of the iron or tool carrier above the hat it is pressed upon all parts of the hat by gravity with uniform force, and as the adjustment of the spindle endwise affords the means of setting both the tip and the side crown of the hat at the same or any desired distance from the axis of the oscillating motion, the effect of the iron upon different parts of the hat-crown may be made as uniform as is effected by a skilled operator when moving the iron over the revolving hat by hand in the ordinary way. The pressure exerted by the iron upon the hat may also be varied in any desired degree by applying removable weights to the carrier-lever, or by making the iron and lever heavy enough for the maximum pressure desired, and providing an adjustable counter-balance, F, upon an extension of the lever at the opposite side of the fulcrum g', as shown at C^3 in Fig. 1.

Having thus shown the nature and operation of our improvements, it is obvious that some part of them—as the longitudinal adjustment of the spindle and the swinging of the hat spindle and block around the iron—may be used apart from the others, and in machines of different construction from that shown herein, and we do not, therefore, limit ourselves to the precise construction or the entire combination shown. The movements of the hat-finishing iron are also analogous to those of the pouncing-tool applied to the crown of a hat, and we have therefore claimed our invention as applied to a tool-carrier supporting any instrument adapted to operate upon a hat thus mounted and moved, as a pouncing tool or instrument may be substituted for the iron shown herein and operated in the required manner by the use of the automatic appliances we have described herein.

We have shown and claimed a modification of our present invention in another pending application, No. 142,210, of even date herewith, and therefore disclaim herein any sub-

ject-matter that may be allowed in said co-pending 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 axis of motion intersecting the hat-block at right angles to the hat-block spindle, means for adjusting the axis and tip of the hat-block in relation to one another, and means for moving or oscillating the spindle and tool-carrier in relation to one another upon said axis.

2. The combination, with a yielding iron, a hat-block spindle, and means for revolving the spindle and adjusting it endwise, of an axis of motion at right angles to such spindle, and means for moving or oscillating the spindle and iron in relation to one another around said axis.

3. The combination, with a revolving hat-block spindle, an axial shaft at right angles to the spindle, and means for adjusting the spindle radially in relation to the axial shaft, of means for moving or oscillating said shaft, and thereby oscillating the iron and spindle in relation to one another.

4. The combination, with an axial shaft, of an arm sustaining a revolving hat-block spindle radially to the shaft, a yielding iron, and means for oscillating the shaft.

5. The combination, with an axial shaft, of an arm sustaining a revolving hat-block spindle radially to the shaft, means for oscillating the shaft and for adjusting the spindle radially thereto, and a yielding iron for pressing the hat.

6. The combination, with an axial shaft, of a revolving hat-block driver mounted central therewith, an arm affixed to said shaft and sustaining a hat-block spindle radially thereto, means for adjusting the spindle radially to the shaft, and means applied to the arm for connecting the hat-block spindle with the driver, and thereby revolving the hat-block.

7. The combination, with an axial shaft having an arm sustaining a revolving hat-block spindle radially to said shaft, of mechanism for rotating the shaft in opposite directions to oscillate the arm, and means operated by the shaft for automatically reversing such rotating mechanism.

8. The combination, with a shaft having an arm sustaining a revolving hat-block spindle radially to said shaft, of mechanism for rotating the shaft in opposite directions to oscillate the arm, means operated by the shaft for automatically reversing such rotating mechanism, means for disengaging such rotating mechanism from the shaft, and means for rotating or oscillating the shaft by hand.

9. The combination, with a hollow shaft and an arm sustaining a hat-block spindle radially to such shaft, of a central arbor extending through the shaft and provided with suitable connections to the spindle, reversible gearing connected with the arbor for oscillating the shaft, and adjustable means connected with said shaft for automatically reversing the motion of the shaft at the desired point.

10. The combination, with the hollow oscillating shaft and the revolving arbor extending through the same, of the arm affixed thereto and carrying the hat-block spindle in a bearing radially to the shaft, the bevel-gear shaft mounted with the bearing, the bevel-gears connecting said shaft with the spindle, and the chain-wheels and chain connecting the arbor and bevel-gear shaft.

11. The means for driving the hat-block spindle and adjusting it radially upon the oscillating arm, consisting in the bearing affixed to the arm, the feathered bush carried by the bearing, the gearing-connections to revolve said bush, and a screw mounted with the bearing for traversing and holding the spindle at the desired point in the bush.

12. The means for rotating and stopping the oscillating shaft, consisting in the shifting-clutch, the frog for moving said clutch, and the dogs attached to the oscillating shaft and operating to shift the clutch at the desired point.

13. The means for rotating the oscillating shaft at various speeds, consisting in the worm-wheel, worm and worm-spindle, the revolving arbor, the shifting clutch-wheels, the intermediate gear and its shaft, and means, as pulleys or gear-wheels, for transmitting a variable speed from the intermediate shaft to the worm-spindle.

14. The combination, in a hat-ironing machine, of the frame supporting an oscillating shaft horizontally, an arm attached to said shaft and carrying a revolving hat-block spindle in a bearing radially to said shaft, and an iron held by a carrier so as to rest freely upon the upper side of the hat-block.

15. The combination, in a hat-ironing machine, of the frame supporting an oscillating shaft horizontally, an arm attached to such shaft and carrying a revolving hat-block in a bearing radially to said shaft, and an iron mounted upon a pivot parallel with said shaft in a carrier above the hat-block, so as to rest freely upon the upper side of the hat-block and to turn as the hat-block is inclined by the oscillation of the supporting-arm.

16. The combination, in a hat-ironing machine, of the frame supporting an oscillating shaft horizontally, an arm attached to such shaft and carrying a revolving hat-block in a bearing radially to said shaft, and a lever hinged to the frame above the shaft and carrying an iron in contact with the upper side of the hat when placed upon the block.

17. The combination, with a hat-block mounted upon a spindle in a radial bearing upon a vertically-oscillating arm, and oscillated by said arm in the manner described, of an iron mounted above the hat-block upon a vertically-swinging lever or arm constructed to yield in a horizontal direction when pressed by the hat brim or flange.

18. In a hat-ironing machine, the combina-

tion, with a yielding iron and means for applying it continuously to the tip and side crown of a hat, of a hat-block mounted upon a spindle having a longitudinal adjustment, as and for the purpose set forth.

19. The combination, with the axial shaft, its contained arbor, and the clutch-gearing, arranged as described, of the shell A′, formed in two halves to insert the said parts, and provided with a fulcrum for the tool-carrier, substantially as shown and described.

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.