

(No Model.)

M. H. RYDER.  
HAT CURLING MACHINE.

3 Sheets—Sheet 1.

No. 287,865.

Patented Nov. 6, 1883.

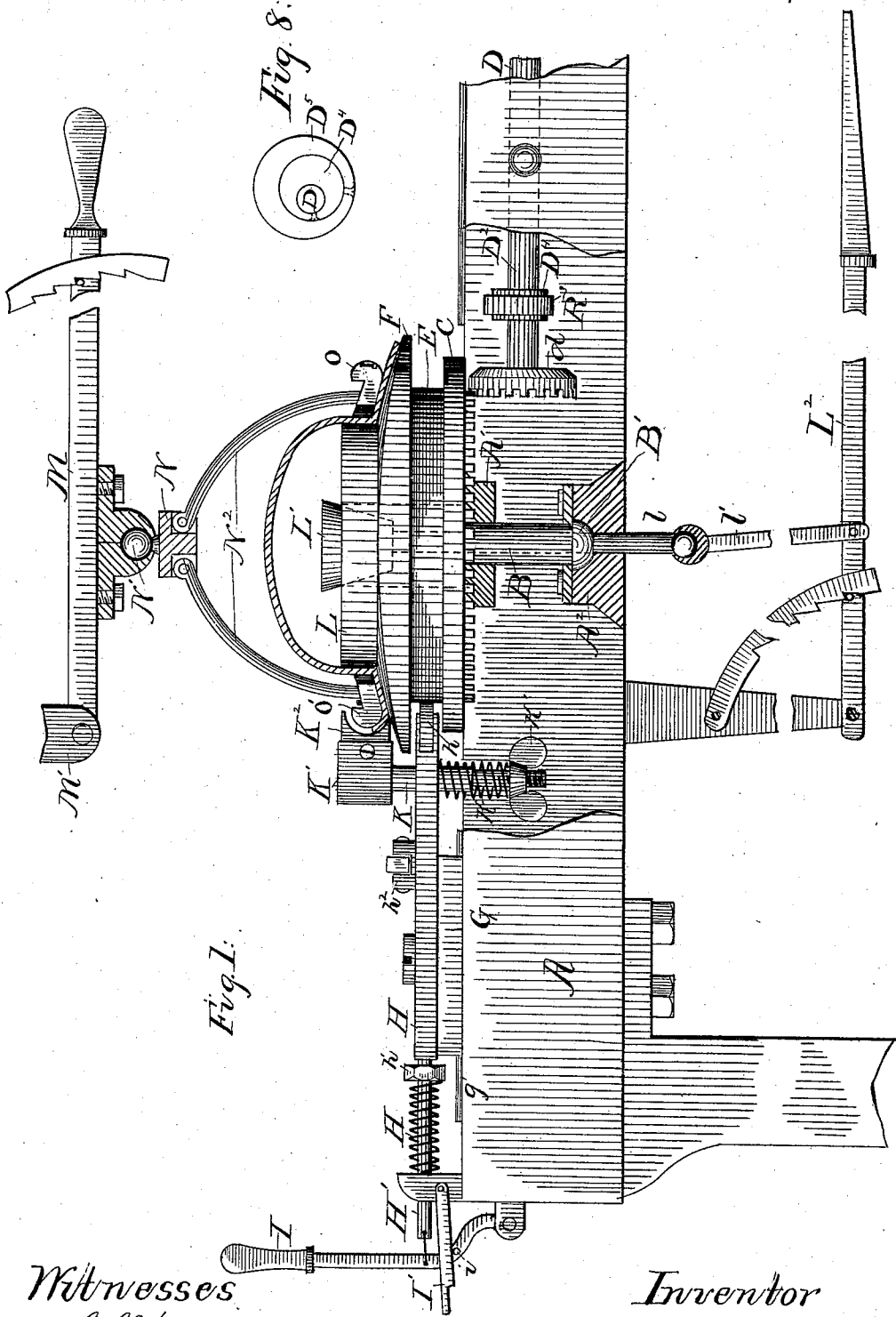


Fig. 1.

Fig. 8.

Witnesses  
S. S. Williamson  
A. M. Wooster

Inventor  
Martin H. Ryder  
By Wooster & Smith  
Attys



(No Model.)

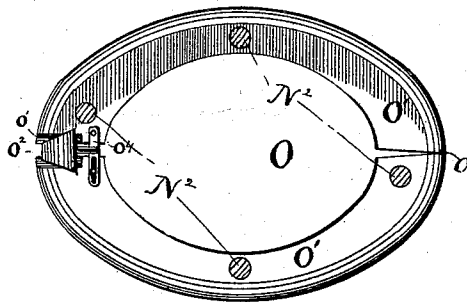
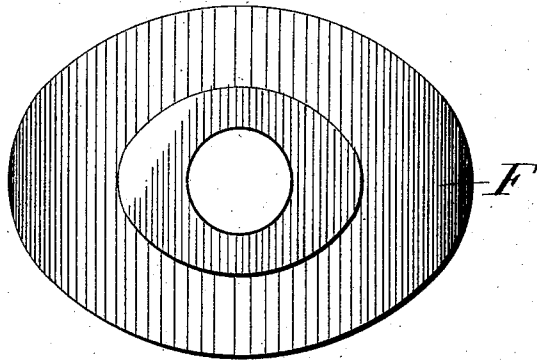
3 Sheets—Sheet 3

M. H. RYDER.  
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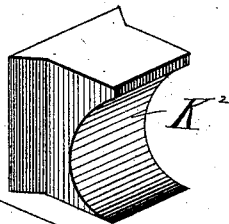
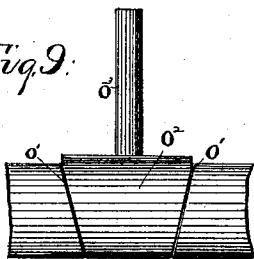
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*Fig. 3.*

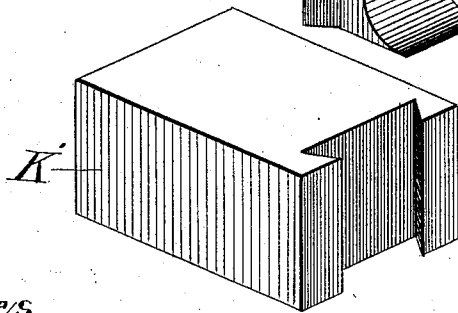


*Fig. 4.*

*Fig. 9.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

MARTIN H. RYDER, OF STAMFORD, CONNECTICUT, ASSIGNOR OF TWO-THIRDS TO ELIZA A. WHITE, OF SAME PLACE, AND ALDEN SOLMANS, OF SOUTH NORWALK, CONNECTICUT.

## HAT-CURLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 287,865, dated November 6, 1883.

Application filed July 16, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN H. RYDER, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Hat-Curling Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hat machinery, and has for its object to curl hats, and at the same time to give the "set" to the brims.

With these ends in view, my invention consists in the construction and combination of elements, which will be hereinafter fully described, and then specifically designated by the claims.

For the purpose of enabling those skilled in the art to which my invention relates to understand and use my improved machine, I will proceed to describe the same, referring by letters to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in section, with a portion of one side plate broken away. Fig. 2 is a plan view with the former removed. Fig. 3 is a view of the former. Fig. 4 is a view of the die. Fig. 5 is a view of the curler and block separated; Fig. 6, a side elevation of the rock-shaft; Fig. 7, an end view of crank S with the rock-shaft in section, showing groove *r*. Fig. 8 is an end view of the double or compressed eccentric upon the counter-shaft, and Fig. 9 is an enlarged view of the ends of the die expanded and the cam.

Similar letters indicate like parts in all the figures.

A represents the table. Supported in cross-pieces A' A<sup>2</sup> of the table is a vertical shaft, B, the lower end of which rests in a socket, B', in cross-piece A<sup>2</sup>. This shaft carries a turn-table, C.

Motion may be imparted to the turn-table in any suitable manner; but I have shown it in the drawings as provided on its under side with cogs, which mesh with a pinion, *d*, on the counter-shaft D, the counter-shaft being made

in two parts, D' D<sup>2</sup>. D<sup>3</sup> is a clutch of ordinary construction, by means of which the two parts are connected and the machine is thrown into and out of operation.

Resting on the turn-table and turning therewith is a cam, E. Either turn-table or cam is provided with steady-pins *e*, which engage with holes in the other part, so that both must turn together. The former F rests upon the cam, and is also caused to rotate with it in a similar manner. The face or upper surface of this former is so constructed as to give the proper curve or set to the brim of the hat.

G is a plate sliding on ways *g*, to which the curler-arm H is pivoted, as at *g'*. At the inner end of this arm is an anti-friction roller, *h*, which bears against the surface of the cam. The rear end of arm H terminates in a rod, H', around which a spring, H<sup>2</sup>, is coiled, which, bearing against an abutment, *a*, and a tension-nut, *h'*, tends to force the arm against the cam. A hand-lever, I, attached to the table, and to which rod H' is attached, may be used to withdraw the arm from contact with the cam. A latch, I', engages with a pin, *i'*, upon the hand-lever, and acts to hold the arm in its retracted position.

Passing through arm H is a rod or support, K, carrying a box, K', which is provided with a dovetail groove, into which the curler K<sup>2</sup> slides, where it is retained in position by a set-screw. The curler-box is made hollow for the purpose of being heated in any ordinary manner. A spring, *k*, is coiled around the support below the arm, one end of which bears against the arm itself, and the other against a tension-nut, *k'*. This spring acts to hold the curler down upon the former.

L is an expansion-ring, upon which the hat is placed. This ring may be made of metal; but I prefer to use a vulcanized-rubber ring, which I expand by means of a conical plug, L', attached to a rod, *l*, which passes through shaft B. This rod is connected by strap *l'* and ball-and-socket joint with a foot-lever, L<sup>2</sup>, which is pivoted to a bracket beneath the table and acts to expand the ring. A rack and pin or any suitable means may be used to hold the foot-lever down.

M is a supporting-lever pivoted to a bracket, M', which depends from the ceiling or a cross-beam. A block, N, is attached to the supporting-lever by a ball-and-socket joint, N'.  
 5 In this block are pivoted arms N<sup>2</sup>, which support the die O. This die is made in two parts, O' O', which are hinged together at *o* in such a manner that no break occurs in the edge of the die. The other ends are beveled, as at *o'*,  
 10 and are forced apart by a cam, *o*<sup>2</sup>, which is correspondingly beveled, and is pivoted between the two halves of the die.

*o*<sup>3</sup> is a handle, which is used to operate the cam.

15 *o*<sup>4</sup> is a stop to limit the expansion of the parts of the die. When the die is expanded, the outer edge of the cam coincides with the edge of the die, so that no break in its edge occurs. The brim of the hat is curled over the edge of this die. After the operation of curling is completed, the cam is turned backward,  
 20 which allows the two ends of the die to be closed together, so that the edges of the die fall within the inner edge of the curl of the brim, and the die may be readily removed. The under surfaces of the die conform to the upper surface of the former. It will thus be seen that the three elements—former, die, and curler—  
 25 and their operating mechanism, accomplish a result never heretofore accomplished in the manufacture of hats—that is to say, they completely finish the curling and setting of the brims, so that no hand curling or setting is required.

35 P P are two brackets projecting outward from the side of the table, which support a rock-shaft, R, one end of which is provided with a crank, R', which is connected by a rod, R<sup>2</sup>, and strap R<sup>3</sup> with a double or compound eccentric, D<sup>4</sup> D<sup>5</sup>, upon the counter-shaft, (see Fig. 8,) by means of which a rocking motion is imparted to shaft R. By adjusting the eccentric upon the counter-shaft I am able to regulate the oscillatory movements of the curling-tool. The object of using a compound eccentric is to secure a more delicate adjustment. This construction, however, is not essential to the operativeness of my invention.  
 45 The other end of shaft R is provided with a groove, *r*. A crank, S, having a spline, *s*, engaging with groove *r*, slides upon this shaft, and is connected by an arm, S', to swiveled lug *h*<sup>2</sup> upon curler-arm H, to which it imparts an oscillatory motion, for a purpose presently  
 50 to be explained. G' G' are arms which project from plate G and slide freely upon shaft R as the plate moves backward or forward upon ways *g*. The crank is located between these arms and slides with them upon shaft R.  
 60 The operation of the machine is as follows: The hat is placed upon the expansion-ring, and foot-lever L<sup>2</sup> is operated to draw down the plug, which expands the ring and causes it to fit the hat tightly and hold it in place. Lever  
 65 M is then lowered, and the die is allowed to rest upon the hat, and the sliding plate and curler-arm to move forward, which brings the

curler K<sup>2</sup> up against the edges of the die, the edge of the brim being held between the die and the curler.

The box or the curler, or the cam and former, or any of them, may be made hollow, in order that they may be heated by gas or slugs, or any convenient manner, in order to soften the hat. I have usually found it desirable to heat both the curler-box and the former. It is necessary that the brim should be thoroughly softened; but the particular way of doing it is not of the essence of my invention.

The two parts of the counter-shaft are connected by clutch D<sup>3</sup>, and motion is imparted to the turn-table and all parts resting upon it. The ball-and-socket joint N' allows block N, and with it the die, to turn freely with the other parts. The action of spring H<sup>2</sup> is to force the curler-arm forward against the cam, which is elliptical in form, its general outline being that of the hat to be curled. As the cam is rotated, it necessarily imparts to the curler-arm a longitudinal reciprocating movement, each revolution of the cam causing two reciprocations of the arm and curler. The curler rests upon the surface of the former, the action of spring K being to draw it downward. As the surface of the former corresponds with the set of the brim of a completed hat, it follows that the box and curler must reciprocate vertically in conformity with the curves of the former.

In addition to its vertical reciprocating and longitudinal reciprocating motions, the curler has an oscillatory motion, which conforms almost exactly with the movements of a hand curling-tool when operated by a skillful workman. This movement is imparted to the curler-arm by crank and arm S S' upon rock-shaft R, which is oscillated, as already explained, by cam D<sup>4</sup> D<sup>5</sup> upon the counter-shaft. It will thus be seen that I am enabled to complete the curling of a hat at a single operation, and in a much simpler and more effectual manner than has ever heretofore been accomplished. In fact, so far as I am aware, no machine has yet been devised which is capable of curling the brim and completing the shaping thereof in one and the same operation.

I have only shown one set of ways, curling-tool, &c.; but in practice I have found it desirable to duplicate parts G H K, &c., on the opposite side of the machine, thus letting two curlers do the work instead of depending on one.

When not in use, lever M and the parts attached thereto may be lifted up out of the way and secured in any convenient manner. As the cam and former are simply held in position by steady-pins, they may be readily changed when it becomes necessary to alter the curl of the brims. The die is secured to arms N<sup>2</sup> in any simple and convenient manner, so that it may be readily changed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hat-machine, a rotating die over which the brim is curled, and which may be contracted in order to remove the hat.
2. In a hat-machine, a die made in two parts, which are hinged together at one end, and whose other ends are expanded by a cam or equivalent device, so that when in use the curve of the edge of the die is unbroken, for the purpose set forth.
3. A rotating former whose surface determines the set of the brim, and a rotating expandible die over which the brim is curled, in combination with a curling-tool and operating mechanism.
4. In a hat-machine, the combination of a rotating die, a rotating former, and one or more curling-tools, constructed as described, with mechanism for operating said parts, whereby the curling and the setting of the brim are completed at a single operation, and the use of hand-tools is entirely dispensed with.
5. In a hat-machine, a curling-tool and mechanism for imparting thereto a vertical reciprocating and a longitudinal reciprocating motion, in combination with a rotating former whose upper surface is curved to give the set to the brim.
6. A curling-tool and mechanism for imparting thereto a vertical reciprocating, a longitudinal reciprocating, and an oscillatory motion, in combination with a rotating former, constructed as described.
7. In a hat-machine, a cam whose outline conforms to the ellipse of a hat, in combination with a former whose surface determines the set of the brim, and a die whose under surface conforms to the former and whose edge determines the curl of the brim.
8. The former constructed as described, the expansion-block, and the die, to all of which rotary motion is imparted, in combination with the curler.
9. In a hat-machine, the two-part die, constructed as described, and the arms, in combination with the block having ball-and-socket joint.
10. The ball-and-socket joint, arms, and die, in combination with the former, cam, and the curler.
11. The turn-table, cam, and former, in combination with the expansion-ring and the conical plug, for the purpose set forth.
12. The expansion-ring and conical plug, in combination with the rod, the central shaft, and the foot-lever.
13. In a hat-machine, a curling-tool, in combination with mechanism for imparting thereto a reciprocating motion in a plane tangential to the periphery of the former.
14. The curler-arm, in combination with the rock-shaft, the counter-shaft provided with an eccentric, and connecting mechanism.
15. Sliding plate G, having arms G', in combination with the grooved rock-shaft and the crank S, having a spline engaging the groove in the rock-shaft.
16. Curler-arm H and tension-spring H<sup>2</sup>, in combination with rod K, tension-spring k, box K', and curler K<sup>2</sup>.
17. Curler-arm H and sliding plate G, in combination with crank and arm S S' and rock-shaft R.
18. Rotating cam, former, and die, secured together as described, in combination with a curling-tool, to which said elements impart a vertical reciprocating, a longitudinal reciprocating, and an oscillatory motion.
19. Lever M and joint N, in combination with the die, socket, and former, substantially as described.
20. Rock-shaft R, having cranks R' and S, in combination with curler-arm H, pivoted to sliding plate G.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN H. RYDER.

Witnesses:

A. M. WOOSTER,  
S. S. WILLIAMSON.