(No Model.) 3 Sheets—Sheet 1.

J. S. TAYLOR.

HAT SCALDING AND FELTING MACHINE.

No. 263,075. Patented Aug. 22, 1882.

Fig 1.

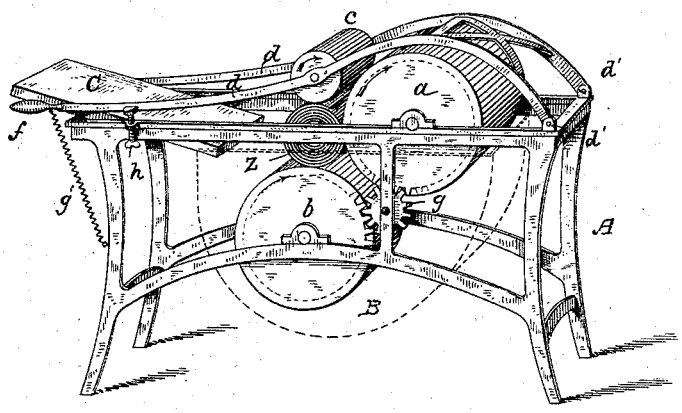
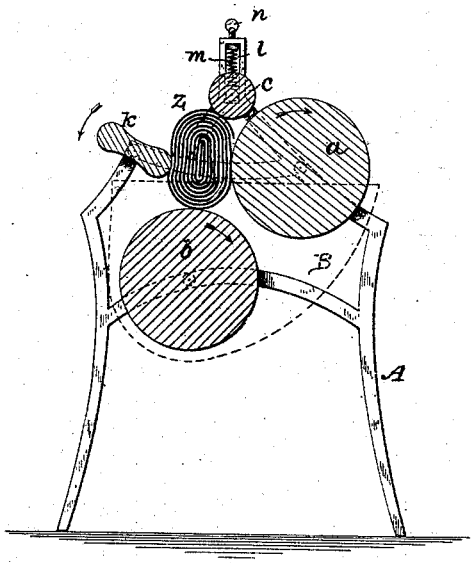


Fig 2.



WITNESSES

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(No Model.) 3 Sheets—Sheet 2.

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Fig 3.

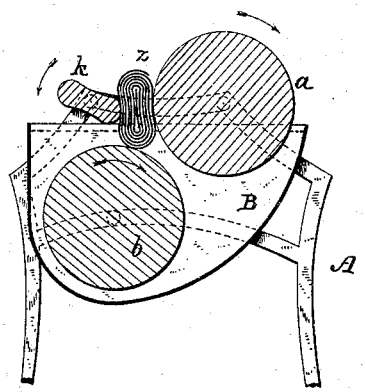

Fig 4.

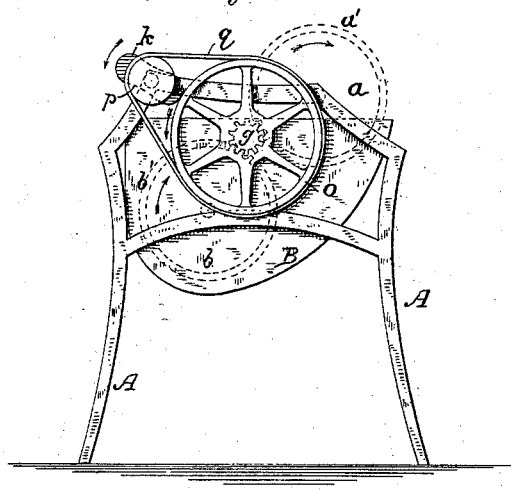

Fig 6.

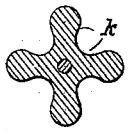

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Fig 5.

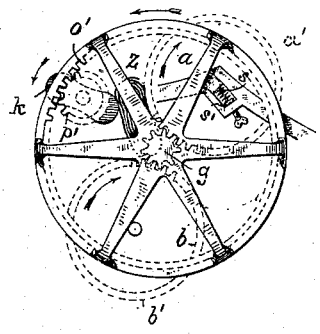
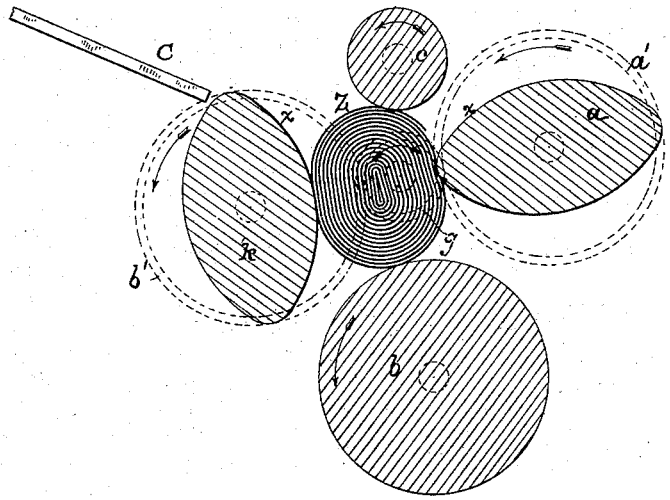


Fig 7.



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UNITED STATES PATENT OFFICE.

JAMES S. TAYLOR, OF DANBURY, CONNECTICUT.

HAT SCALDING AND FELTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 263,075, dated August 22, 1882.

Application filed June 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. TAYLOR, of Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Hat Scalding and Felting Machines, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of the invention is to increase the efficiency of this class of machines and the process involved in their use, especially by adapting the machine to give the necessary fulling or wringing and fulling motion to the goods while in process of manipulation.

The invention consists in a method of operation and in various combinations of parts of mechanism, as hereinafter fully described.

In the accompanying drawings, Figure 1 is a perspective view of the machine. Fig. 2 is an end view of a modified construction of the same. Fig. 3 shows a modification in the construction of the rollers. Fig. 4 shows an end view of the machine with an arrangement of gearing and pulleys for driving the rollers as placed in Fig. 3. Fig. 5 shows a modification in the arrangement of the gearing. Fig. 6 shows a modified form of roller. Fig. 7 shows a further modification in the shape and arrangement of the rollers.

Similar letters of reference indicate similar parts in the respective figures.

A is the frame of the machine, within which is supported a vat or kettle, B, for holding hot water wherewith to saturate the goods.

Mounted in suitable bearings in the frame A are rollers *a* and *b*, which are revolved in the same direction, as shown by the arrows, having a positive motion given to them by means of the pinion *g*, which engages with a gear-wheel placed at end of each of the rollers *a* and *b*.

A roller or idler, *c*, is suspended in bearings formed in arms *d d*, hinged at *d' d'* to the frame A. One of the arms *d* is provided with a handle, *f*, to which a spiral spring, *g'*, is connected, being fastened to the frame A, the effect of the spring being to depress the roller or worker *c*. The worker *c* is without gearing, and is revolved by the traction of the roll of goods. The rollers *a* and *b* are from four to five inches in diameter and about twenty inches in length, and may be of any formation suited to the particular work to be performed, as straight, concave, convex, plain, fluted, corrugated, or of other shape or character of surface. The worker *c* is of the same length or shorter, but preferably smaller in diameter, and may have a shape and character of face corresponding with that of the rollers *a* and *b*.

The roll of goods is represented by *z*.

In operation the goods are rolled upon the plank C and put in the open chamber or receptacle formed by the relative position of the rollers, and revolved by the rotary motion of the rollers *a* and *b*. Rotary movement is imparted by the goods *z* to the worker *c*. A screw, *h*, is used for adjusting the position of the worker. The forward-carrying motion of the roller *b* carries the roll of goods under the worker *c*, which is raised by the upward pressure of the goods, and also revolved in the direction indicated by the arrow, the gravity of the goods keeping them from being drawn between the rollers *a* and *b*. The effect of the contact between the goods and the worker *c* is the imparting to the goods of a felting action proportioned to the amount of force expended by the goods in turning the worker. The force exerted by the goods in turning the worker, as the pressure, by means of the screw *h*, is increased or decreased, causes the fibers of the goods to be firmly and evenly felted or knit together. The action of the machine in this respect differs from that of other machines in which the roller corresponding with the worker *c*, instead of being revolved by the goods, acts to revolve them. In my machine the goods both raise the worker and cause it to revolve. For some classes of work it may, however, be found advantageous to give the roller or worker *c* positive motion.

This machine differs from those in which one or more of the rollers must be lifted or removed for entering the goods. In this machine no such necessity exists, and the labor consequent upon the opening and shutting of such machines, perhaps five hundred times in a day, is avoided.

I have found that in some operations the felting action is improved by giving to the

goods an irregular motion instead of a plain rotary movement. I therefore have shown in Fig. 2 a modification of my invention, in which a cam-roller, *k*, is mounted in the frame A, which roller is given a movement in a direction the reverse of that imparted to the rollers *a* and *b*, so that when in motion it exerts on the roll of goods a retarding effect, communicating thereto a felting or fulling motion substantially the same as is given to goods by the well-known process of felting by hand. The cam-roller *k* is used in connection with the worker *c*, as before, which, however, in this case, is not mounted in arms *d d*, as in Fig. 1, but in vertically-slotted posts or standards *l*, within which are placed helical springs *m*, the tension of which can be regulated by means of set-screws *n*.

In Fig. 3 is shown the same arrangement of rollers *a* and *b* and cam-roller *k*, but without the worker *c*, the cam-roller *k* being, in consequence, placed nearer to the rollers *a* and *b*, so as to press the goods against the roller *a* instead of against the worker, as in Fig. 2.

In Fig. 4 is shown an end view of the machine with an arrangement of gearing and pulleys for revolving the rollers, as placed in Figs. 2 and 3. A gear-wheel is placed at one end of each of the rollers *a* and *b*, a pinion, *g*, engaging with both gears. Upon the pinion-shaft is a pulley, *o*, from which a belt, *q*, leads over a small pulley, *p*, on the shaft of the cam-roller *k*. The power is applied to a pulley upon the shaft of the cam-roller, the three rollers turning in the direction of the arrows—that is to say, the rollers *a* and *b* revolving in the same direction and the cam-roller *k* in the opposite direction. The rollers *a* and *b* have a slow movement, while the cam-roller has a rapid motion, as will be seen by the relative proportions of the gearing and pulleys employed.

The cam-roller *k* may have one, two, or more wings or projections. In Figs. 2, 3, and 4 it is shown with two wings, while in Fig. 6 it has four. In all constructions of the cam-roller I intend that the goods shall resume their normal position or shape before the next fulling stroke is given thereto by a wing or projection of the cam-roller, as in fulling-mills or felting stocks, the effect by the use of said roller being a repeated punching motion at regular intervals properly timed.

Fig. 5 shows a convenient arrangement of gearing for the various rollers. The gears *a'* *b'* on the ends of the rollers *a b* respectively are operated by the pinion *g*, attached to the large internally-toothed wheel *o'*, which takes the place of pulley *o* of Fig. 4. The cam-roller shaft is provided with a pinion, *p'*, which in effect corresponds with the pulley *p* of Fig. 4, the pinion engaging with the internally-toothed wheel *o'*. The power is applied to a pulley on the shaft of the cam-roller *k*. By this system of gearing a slow rotary motion in a common direction is given to the rollers *a* and *b*, while to the cam-roller *k* is imparted a more rapid motion in a reverse direction. The roller *a* may rest in spring-bearings, as shown at *s*, there being a segmental slot in the frame, and the spring be capable of adjustment as to tension by means of a screw, *s'*. By this construction the space for receiving the goods is capable of enlargement, while the elasticity given to the roller aids in the manipulation of the goods.

In Fig. 7 a modification in the construction of the machine is represented. In this form of the machine the rollers *a* and *b* are respectively elliptical and round. The third roller, *k*, is also elliptical, and in a measure corresponds, both as to position and effect, with the cam-roller designated by the same letter of reference in Figs. 2, 3, 4, and 5. The roller *b* is without gearing, as also is the roller *c*, which is the worker of Figs. 1 and 2. The goods are entered from the plank C, and caused to rest between the rollers *a* and *k* and upon the roller *b*. In operation the gearing *a' b' g* keeps the elliptical rollers *a k* always in the same relative position, the gears running in the proper connection. The roller *k* does not, as in the other figures, revolve in a direction the reverse of that taken by the other rollers, but in the same direction. The action of the rollers as here arranged is to give the goods the said fulling motion. It will be seen that a portion of the periphery of the elliptical roller *a* moves more rapidly than the opposing surface of the roller *k*, the varying speeds of the respective parts of the two rollers being in the proportion of the lengths of their long and short diameters. In a working machine the greater diameter of the rollers *a* and *k* is about six inches, while the shorter diameter is about four inches. The roller *b* is about five inches in diameter, so that in each revolution it will travel the same distance as is moved by the elliptical rollers. The surfaces of the two elliptical rollers, however, vary in speed with respect to each other, each alternately gaining and losing during revolution, and when passing the quarter-points at *x x* have all the same speed. The elliptical rollers *a* and *k* are geared to make the same number of revolutions. The relative arrangement of the long and short diameters of the elliptical rollers, causing the varying speed of the different parts of their surfaces, impinging on the goods, gives a wringing or pulling motion to the goods, which has long been looked for in scalding and felting machines.

If desired, only one of the rollers—say *k*—may be of elliptical form, and the others round; or all the rollers may be made of elliptical form, and so adjusted as to present the several long and short diameters to the goods in rotation. The rollers may be made with two or more wings or projections or cam-surfaces, as shown in Figs. 2, 3, 4, and 5, or Fig. 6, so that they present alternately their long and short diameters to the others in proper order.

I claim as my invention—

1. The improvement in the art of scalding and felting hats, which consists in rolling and manipulating the goods while saturated with

hot water, and subjecting them to a fulling or equivalent action derived from and limited in extent by the contact of the goods with a surface revolved by the same, substantially as set forth.

2. The improvement in the art of scalding and felting hats, which consists in rolling the goods, while saturated with hot water, on open rollers and subjecting them to an intermittent retarding or punching action, which tends to revolve them in an opposite direction, substantially as set forth.

3. The improvement in the art of scalding and felting hats, which consists in rolling the goods, while saturated with hot water, on or between eccentrically-revolving surfaces, substantially as set forth.

4. In a hat scalding and felting machine, a pair or series of rollers geared to revolve in a common direction, combined with an ungeared or loose supplemental roller or worker, the rollers and worker forming an open or unobstructed chamber into and from which the goods may be conveniently inserted and removed, substantially as set forth.

5. In a hat scalding and felting machine, a pair or series of rollers geared to revolve in a common direction, combined with an ungeared or loose supplemental roller or worker in elastic bearings, the rollers and worker forming an open or unobstructed chamber into and from which the goods may be conveniently inserted and removed, substantially as set forth.

6. In a hat scalding and felting machine, a pair or series of rollers geared to revolve in a common direction, and a cam-shaped roller geared to revolve in the opposite direction, combined with a worker for exerting superimposed pressure on the goods, the arrangement of the rollers, cam-shaped roller, and worker being such as to form an open or unobstructed chamber into and from which the goods may be inserted and removed without lifting any roller therefrom, substantially as set forth.

7. In a hat scalding and felting machine, a pair of rollers geared to revolve in the same direction, combined with a cam-shaped roller geared to revolve in the opposite direction, the relative arrangement of the three rollers forming an open chamber into and from which the goods may be placed and removed without any change being effected in the position of the axes of the rollers, substantially as and for the purposes set forth.

8. In a hat scalding and felting machine, a combination of elliptical rollers arranged to present alternately during revolution their long and short diameters to each other in proper order, and to form an open chamber for the entrance and removal of the goods, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand this 5th day of June, 1882.

JAMES S. TAYLOR.

Witnesses:
LUMAN L. HUBBELL,
ELI C. BURMAN.