

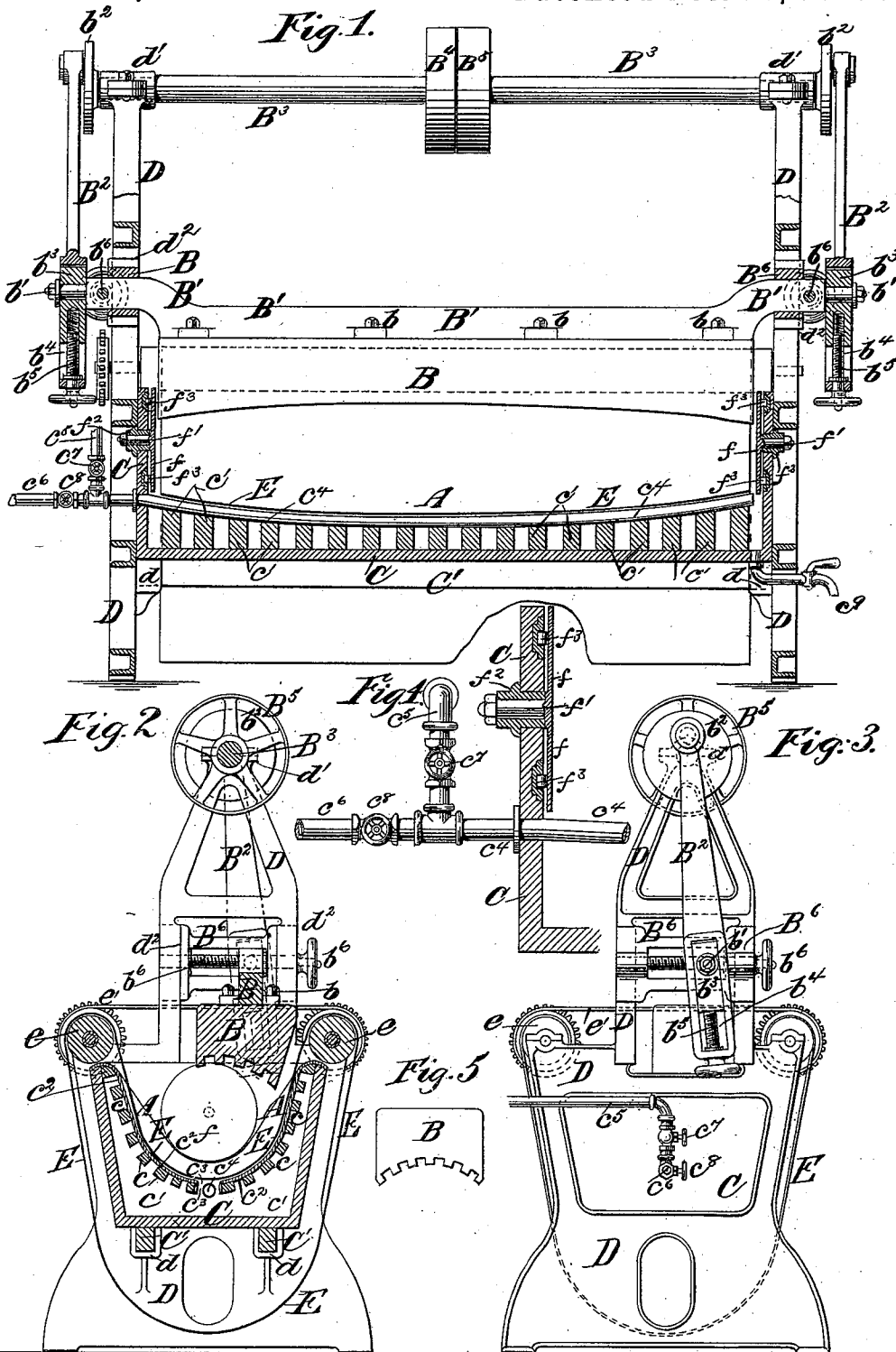
(No Model.)

J. T. WARING.

MACHINE FOR FULLING HAT BODIES, &c.

No. 355,042.

Patented Dec. 28, 1886.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FULLING HAT-BODIES, &c.

SPECIFICATION forming part of Letters Patent No. 355,042, dated December 28, 1886.

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To all whom it may concern:

Be it known that I, JOHN T. WARING, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Machines for Felting Hat-Bodies and other Articles, of which the following is a specification.

My invention relates to machines which may be employed for felting hat-bodies and other articles by subjecting them to a felting or fulling operation, and it is more particularly intended for carrying out the improvement in the art of felting hat-bodies and other articles which forms the subject of my pending application for Letters Patent, Serial No. 206,070, filed June 24, 1886.

In carrying out my invention I employ a bed upon which the hat-bodies or other articles are supported and a beater whereby the mass of articles is subjected to blows, which are preferably of definite range and force. I prefer, also, to support the articles while they are subjected to blows from the beater upon a moving or traveling surface, and this result may be secured by causing an apron to travel by a progressive movement over the bed on which the articles are supported, whereby the articles will be supported by the bed against the action of the blows of the beater and will at the same time be moved or caused to rotate by the action of the apron, which is interposed between the mass of articles and the bed.

The invention consists in novel combinations of parts, which are hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a longitudinal section of a machine embodying my invention. Figs. 2 and 3 are respectively a transverse section and an end elevation of the machine. Fig. 4 is a sectional view, upon a larger scale, of one end portion of the bed and appurtenances thereof; and Fig. 5 is an end view of a beater of modified form which may be used.

Similar letters of reference designate corresponding parts in all the figures.

A designates the concave bed, and B the beater, of the machine, the bed being presented upward and the beater preferably having a direct reciprocating movement in an approximately vertical path toward and from the bed.

As here represented, the bed is composed of a trough or box, C, resting upon girders or beams C', which extend between end frames or standards, D, and are sustained by pockets or flanges d, formed on said frames or standards. Within the box or trough C are longitudinal and transverse ribs e e', notched one into the other, and forming a cellular support for a metal lining, e². This construction of the bed affords ample support to the metal lining and allows water and steam in the box or trough C to come in contact with the lining. The lining e² may be of copper or other sheet metal, and may be tinned on its exposed surface. It is not continuous across the bottom of the bed A, but a narrow longitudinal slot or opening, e³, is left, in which is arranged a pipe, e⁴, perforated in its upper portion to permit the escape of steam or water upward within the bed to permeate the articles undergoing treatment on the bed. By means of branch pipes e⁵ e⁶, provided with valves e⁷ e⁸, water or steam, at the will of the operator, may be admitted to the pipe e⁴, and the level of water which it is desired to maintain in the bed may be controlled by an outlet cock or pipe, e⁹.

The beater B, which is here shown as extending from end to end of the bed, is or may be attached to a cross-head, B', by bolts b, and at the ends of the cross-head are wrist-pins b', to which are attached connecting-rods B², extending from cranks b² on an overhead crankshaft, B³. This shaft may be mounted in bearings d' on the end frames, D, and may be rotated by a belt driving onto fast and loose pulleys B⁴ B⁵. By means of this or other suitable mechanism the beater is operated, and preferably has imparted to it a direct reciprocating movement, and is caused to deliver rapid blows of definite range and force on the mass of articles in the bed.

As here shown, the boxes b³, which receive the wrist-pins b', are fitted to and adjustable by screws b⁵, within slots b⁴ in the connecting-rods. By lowering the boxes in said slots the effective length of the rods will be increased and the beater will, at the lower termination of its movement, approach nearer to the bed. By raising the boxes in the slots b⁴ a reverse adjustment will be secured. In this way I provide for properly regulating the range of

movement and the effect of the blow of the beater to suit the quantity of articles being operated on, and also their varying condition as the fulling or felting operation progresses. It is also desirable to adjust the beater B so that it may operate on the mass of articles on the bed opposite the center of the mass and bed, or nearer one side of the bed than the other, as the case may be. To provide for such adjustment I have shown the cross-head B' as adjustable laterally by screws b^6 in end pieces, B⁶, which are fitted to suitable guides, d^2 , in the end frames, D. By means of the screws b^6 the beater and cross-head B B' may be adjusted to the position shown in Fig. 2, so as to deliver blows on the mass of articles at a point away from the center or at one side thereof and near to the side of the bed. The beater then employed may be of the form shown in Fig. 2, or of any other suitable form, and its blows will tend to turn or rotate the mass of articles on the bed, and to thereby bring different portions of the mass in position to receive the blows of the beater. I may also employ a beater, B, having a concave face, as shown in Fig. 5, and when using this beater the cross-head may be adjusted to the middle of the bed, so that the beater will act upon the mass of articles opposite the center, and will be adapted for performing the final fulling or felting operation.

To facilitate the rotary motion which it is desired to impart to the mass of articles under operation, I employ an apron, E, or other moving or traveling surface, and such apron preferably has a progressive travel, and on it the articles are supported while under the action of the beater. This apron E is here shown as endless, and passes over rollers e at opposite sides of the bed. These rollers may be geared together by a chain, e' , or other means, and motion may be given to one of them by a belt and pulley from an outside source, and such motion is by the chain transmitted to the other roller, and by the two rollers to the apron. This apron conforms to the curvature of the bed, and by its travel continuously in one direction it greatly aids in imparting rotary motion to the mass of articles on the bed.

The rollers e form guides whereby there is maintained between them a loop in the apron E, which conforms to the curvature of the concave bed, and which directly supports the articles, while generically the mass of articles and the apron are supported by the concave bed.

During the final part of the fulling or felting operation, when it is desired to use the beater shown in Fig. 5, or any beater analogous thereto having a concave face, the beater may be adjusted laterally, so as to bring it to position to deliver its blows on the mass of articles opposite the center of the bed, and, although this beater then has no function in turning the mass of articles, the latter will be kept in rotary motion by the progressive travel of

the apron, and the mass of articles will be worked into a cylindrical roll, new surfaces being presented successively to the action of the beater.

The surfaces of the beaters may be lagged or otherwise constructed to perform effective work, and the apron E may be lagged or otherwise constructed with a roughened surface to give it a hold on the mass of articles to turn them by its progressive movement.

In order to counteract the tendency of the mass of articles to elongate while under the action of the beater, I may make the face of the bed or beater, either or both, longitudinally concave. I have shown both these surfaces concave in Fig. 1. Should it be found that the longitudinal concavity of the bed interferes with the proper travel of the apron, a number of belts arranged side by side may be substituted for the apron.

In order to prevent the rotary motion of the mass of articles from being in any way impeded by the friction of the ends of the mass upon the ends of the bed A, I may cover the ends of the bed with smooth copper or other metal, or I may mount at each end of the bed a rotary disk, f , supported by a central stud or shaft, f' , fitting a bearing, f^2 , in the end of the bed. This disk may be supported at the back by anti-friction rollers f^3 , to enable it to turn easily with the mass of articles in a rotary path. A disk or piece of felt or other material might be placed in the end of the bed for a like purpose, and to prevent any abrasive action on the articles as they turn in the bed.

The machine above described is very simple in construction and capable of performing effectively and rapidly the fulling or felting of hat-bodies or other articles in large quantities and very rapidly.

The beater here shown extends the entire length of the bed; but, obviously, two or more beaters operating simultaneously or successively might be employed in lieu thereof.

I am aware that it is not new to subject goods to a fulling operation by beaters operated by cranks and connecting-rods both vertically and horizontally while the goods are supported on a fixed segmental bed, and hence do not desire to include such a combination, broadly considered, in my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a felting-machine for hat-bodies and other articles, the combination, with a bed and a beater, of mechanism, such as cranks and connecting-rods, for reciprocating the beater to deliver blows of definite range and force upon the mass of articles, such mechanism being adjustable to vary the approach of the beater toward the bed to suit the varying size of the mass of articles undergoing operation, substantially as herein described.

2. In a felting-machine for hat-bodies and other articles, the combination, with a bed, of a beater, cranks for operating the same, and

connecting-rods of variable length, through which said cranks transmit motion to the beater, whereby the beater is caused to deliver blows upon the mass of articles, and whereby the approach of the beater toward the bed may be varied by adjustment to suit the varying size of the mass of articles, substantially as herein described.

3. In a felting-machine for hat-bodies and other articles, the combination, with a bed, of a beater for operating on the mass of articles on the bed, and which is adjustable widthwise of the bed, so that the beater may be caused to operate on the mass opposite its center or upon one side of the center, substantially as herein described.

4. In a felting-machine for hat-bodies and other articles, the combination, with a bed, concaved both in transverse and longitudinal directions, of a beater for delivering blows upon the mass of articles on the bed, substantially as herein described.

5. In a felting-machine for hat-bodies and other articles, the combination, with a bed, of a beater having its face longitudinally concaved and operating to deliver blows upon the mass of articles in the bed, substantially as herein described.

6. In a felting-machine for hat-bodies and other articles, the combination, with a bed, of a beater arranged above the bed, guides wherein the beater is caused to reciprocate in a direct line toward and from the bed, and mechanism, substantially as described, for operating the beater to deliver blows upon the mass of articles, substantially as herein set forth.

7. In a felting-machine for hat-bodies and other articles, the combination, with a bed provided with abutments at the ends, of a beater for delivering blows upon the mass of articles on the bed while the mass is confined at the ends by said abutments, substantially as herein described.

8. In a felting-machine, the combination, with a transversely-concaved bed presented upward, of a beater having a transversely-concaved face for delivering blows upon the mass of articles upon the bed, substantially as herein described.

9. In a felting-machine for hat-bodies and other articles, the combination, with a bed, of a beater for delivering blows on the mass of articles on the bed and abutments at the ends of the bed with which the ends of the mass of articles make contact and which are movable with said mass, substantially as herein described.

10. The combination, with the upwardly-presented and transversely-concaved bed A, of the beater B and rotary disks *f* at the ends of the bed for supporting the mass of articles at its ends, substantially as herein described.

11. The combination, with the transversely-concaved bed A, of the beater B, mechanism, such as cranks and connecting-rods, for imparting motion to the beater, whereby it is caused to deliver blows of definite range and force upon the mass of articles in the bed, and a pipe extending along the bottom of the bed and perforated for the delivery of steam or water among the articles in the bed, substantially as herein described.

12. In a felting-machine for hat-bodies and other articles, the combination, with a movable surface supporting a mass of articles, of abutments at the ends of said surface for supporting the mass at the ends and a beater for delivering blows upon the mass of articles while said mass is supported by the movable surface, substantially as herein described.

13. In a felting-machine for hat-bodies and other articles, the combination, with a beater for delivering blows on the mass of articles, of a movable surface whereby the mass of articles is entirely supported and by which the mass is moved to present different portions of its surface to the action of the beater, substantially as herein described.

14. In a felting-machine for hat-bodies and other articles, the combination, with a movable surface for entirely supporting the mass of articles, of a beater and mechanism, such as cranks and connecting-rods, for operating the beater to deliver rapid blows of definite range and force upon the mass of articles, substantially as herein described.

15. In a felting-machine for hat-bodies and other articles, the combination, with a traveling apron and guides or rollers whereby there is maintained therein a depending loop, of a beater for delivering blows directly upon the mass of articles in the said loop, substantially as herein described.

16. In a felting-machine for hat-bodies and other articles, the combination, with a traveling apron and guides or rollers whereby there is maintained therein a depending loop, of a beater for delivering blows on the mass of articles in the said loop and abutments for closing the ends of the loop and confining the mass of articles therein, substantially as herein described.

17. In a felting-machine for hat-bodies and other articles, the combination, with a transversely-concaved bed and an apron supported thereon and having a progressive travel, of a beater for delivering blows upon the mass of articles while the mass is supported by the bed and traveling apron, substantially as herein described.

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