(Model.)

I. GILL.

MACHINE FOR WORKING, FELTING, NAPPING, AND SIZING FUR, &c.

No. 260,475. Patented July 4, 1882.

Fig. 1.

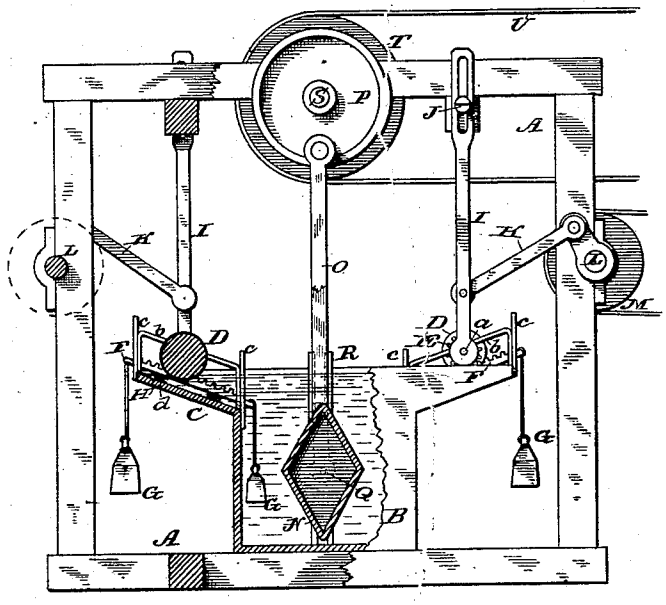


Fig. 2.

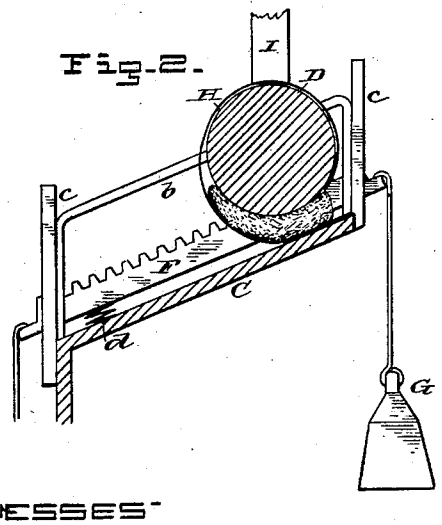
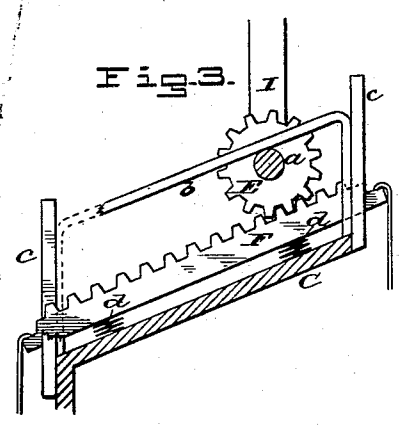


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR WORKING, FELTING, NAPPING, AND SIZING FUR, &c.

SPECIFICATION forming part of Letters Patent No. 260,475, dated July 4, 1882.

Application filed May 11, 1882. (Model.)

To all whom it may concern:

Be it known that I, IRA GILL, of Walpole, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Machines for Working, Felting, Napping, and Sizing Fur, &c., of which the following is a specification.

My invention relates to a machine for working, felting, napping, and sizing fur and other materials; and it consists in various features and details of construction hereinafter set forth.

In the accompanying drawings, Figure 1 represents a side elevation of my improved machine, partly in section; Figs. 2 and 3, enlarged views, showing certain details of the machine.

The purpose of my invention is to provide a machine which shall perform the operations of working fur and other materials used in the manufacture of felt goods in a manner closely resembling the present operation of working them by hand, and to render the machine essentially automatic in its action. To this end the machine consists of a tank or vessel to contain the hot water or sizing-liquid, an inclined board at the end, or preferably at both ends, of the tank, a roller arranged to travel over the face of the board, an apron or cloth connected at one end to the outer edge of the board and at the other end to the roller, means for causing the roller to rotate and to prevent its sliding or rubbing, and a plunger adapted to be thrust into the liquid in the tank and to cause said liquid to rise upon the boards and saturate the stock thereon.

The arrangement and operation of parts will be better understood by referring to the drawings, in which A represents a strong framing, within which is mounted a tank or vessel, B, the ends of which extend outward in an inclined position to form the working surfaces or "boards" C, upon which the work is performed.

D represents a roller, the shaft *a* of which is carried outward beneath guards or bars *b* and furnished at its ends with pinions E, which travel upon and mesh with racks F. The racks F are carried between guides *c* at their ends, which permit them to freely rise and fall, but prevent longitudinal or lateral play, and are supported by springs *d*, placed beneath them, and tending always to hold the racks up in close contact with the pinions. The height of the racks will of course determine the distance between the face of the roller D and the board or table C, and this in turn determines the character of the work performed. Hence in order to permit the perfect regulation and control of height or adjustment of the racks, their ends are provided with detachable weights G, which may be removed and replaced by others at will.

H represents a cloth or apron, the outer end of which is made fast to the outer edge of the board or table C, and the inner end of which passes beneath and is attached to the roller D, as more clearly shown in Fig. 2. The stock to be worked, whether merely for felting or sizing or for napping, is laid upon the apron when the roller is carried inward toward the tank, and as the roller moves outward the stock is rolled between the roller and the apron in much the same manner as it is curled or rolled by hand in the ordinary process or method of working.

In order to secure the proper back-and-forth movement of the roller its shaft *a* is carried by rods or bars I, the upper ends of which are slotted and play up and down about a stud or pin, J, at each side of the frame A, and said arms are connected by pitmen K to the cranks of a crank-shaft, L, driven by a belt from a counter-shaft at any suitable point. The belt passes about a pulley, M, and as said pulley rotates and carries with it the crank-shaft the arms or bars I are caused to swing about the studs or pins J and to rise and fall to correspond with the varying distance between the studs and the racks F at different points in the movement. The shaft *a*, passing beneath the guards *b*, is prevented thereby from rising sufficiently to lift the pinions E from the racks.

Instead of being slotted, the arms I may be jointed to swinging rods or links at their upper ends.

N represents a plunger or displacing device, adapted to be carried down into the liquid of tank B and to cause the water to rise upon the boards or tables C by reason of its displacement in the vessel. The plunger is preferably made of diamond shape in vertical cross-section, as shown in Fig. 1, so that it shall enter

the liquid freely and without materially agitating the same, and that it may withdraw therefrom in a similar manner, thereby avoiding all danger of splashing or throwing the liquid over the sides or ends of the tank. In order to make the plunger light and render its raising and lowering easy, it is preferably made hollow. The plunger is raised and lowered by arms or bars O, carried at their upper ends by crank-wheels P, and connected at their lower ends to studs or gudgeons Q, secured to the ends of the plunger, and flattened at their outer ends to travel in slots or guides R in the sides of the tank to maintain the plunger in its proper vertical position, as shown.

The crank-wheels P are mounted upon a shaft, S, carried in boxes or bearings in the frame A, and provided with a pulley, T, by which it receives motion through a belt, U, from a counter-shaft outside of the machine.

The machine being thus constructed, the shafts L and S are put in motion, each being driven independently of the other, so that either may be stopped or started without affecting the other, and one or more blanks or pieces of stock are placed upon the boards or tables C, where they are worked between the roller and bed and wound between the apron and roller, as explained above. At the same time the plunger, rising and falling at properly-regulated intervals, according to the nature of the work to be performed, causes the liquid in tank B to be raised therein until it floods the tables and the stock thereon. The movements of the plunger will be timed and regulated by shifting the belt from a pulley of one size to one of a different size, or in any other common and well-known manner of changing speeds.

When the work is commencing and the stock is light and thick the weights G should be light, in order that the roller may be held up and allowed to bear but lightly upon the stock; but as the work progresses and the stock becomes thinner and firmer the weights should be increased. The amount of weight to be employed at the various stages of operation will depend upon the quality of stock, the manner of working, and the character to be given the finished work.

The machine is primarily intended for working hat-bodies, but is applicable to the treatment or manipulation of other articles of all kinds made of fur or like material by felting or napping. When working hat-bodies and like articles the stock should be removed from time to time and crozed or folded in a new direction to produce a body of uniform thickness, one boy being able to attend several machines.

Having thus described my invention, what I claim is—

1. The herein-described machine for working, felting, napping, and sizing fur, consisting of tank B, roller C, apron H, and plunger N, and means, substantially such as described and shown, for imparting motion to the roller and plunger.

2. The machine for working and felting fur, &c., consisting of frame A, tank B, roller D, provided with pinions E, racks F, arms I, crank-shaft L, plunger N, and crank-shaft S, all combined and operating substantially as set forth.

3. In a machine for working, felting, napping, and sizing fur, the combination of a table or board, a roller arranged to travel over said board, and an apron attached at one end to the edge of the board and at the opposite end to the roller, whereby it is adapted to wind on and off the roller as the roller is carried over the bed.

4. In combination with a tank, a board or table, a roller arranged to travel over the same, and an apron attached at opposite ends to the edge of the table and to the roller, respectively, and means, substantially such as shown and described, for causing the liquid in the tank to rise upon the board or table, as and for the purpose set forth.

5. In combination with the tank and the board or table, a roller arranged to travel over the board, an apron attached at opposite ends, respectively, to the edge of the board and to the roller, and a plunger arranged, substantially as shown and described, to enter the tank and cause the water to rise upon the board, as explained.

6. In combination with the board or table C, roller D, provided with pinions E, and racks F, whereby the roller is caused to rotate in moving over the board or table.

7. In combination with the table C and roller D, provided with pinions E, spring-supported racks F, as and for the purpose set forth.

8. In combination with table or board C and roller D, provided with pinions E, spring-supported racks F, and detachable weights G, whereby the distance between the face of the roll and the board or table may be controlled.

9. In combination with a board or table, C, and with toothed racks F, the roller D, having its shaft provided with pinions E, and the guards *b*, arranged above said shaft, whereby the pinions are prevented from rising from the racks.

10. In combination with the roller D, the slotted arms I, pins or studs J, and means, substantially such as shown and described, for imparting a backward and forward motion to the arms.

11. In combination with the roller D, provided with pinions E, racks F, supported by springs *d*, and carried in guides *c*, whereby they are permitted to rise and fall, but are prevented from moving longitudinally or laterally.

12. In combination with tank B, having extensions or tables C, a plunger, N, adapted to

enter the tank and by displacement raise the water to the tables, as and for the purpose set forth.

13. In combination with tank B, plunger N, provided with flattened studs Q, arranged to travel in slots or guides R, and means, substantially such as shown, for imparting motion to the plunger.

14. In combination with tank B, plunger N, made of diamond form in vertical cross-section, whereby it is caused to enter and withdraw from the liquid in the tank without materially agitating the same.

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