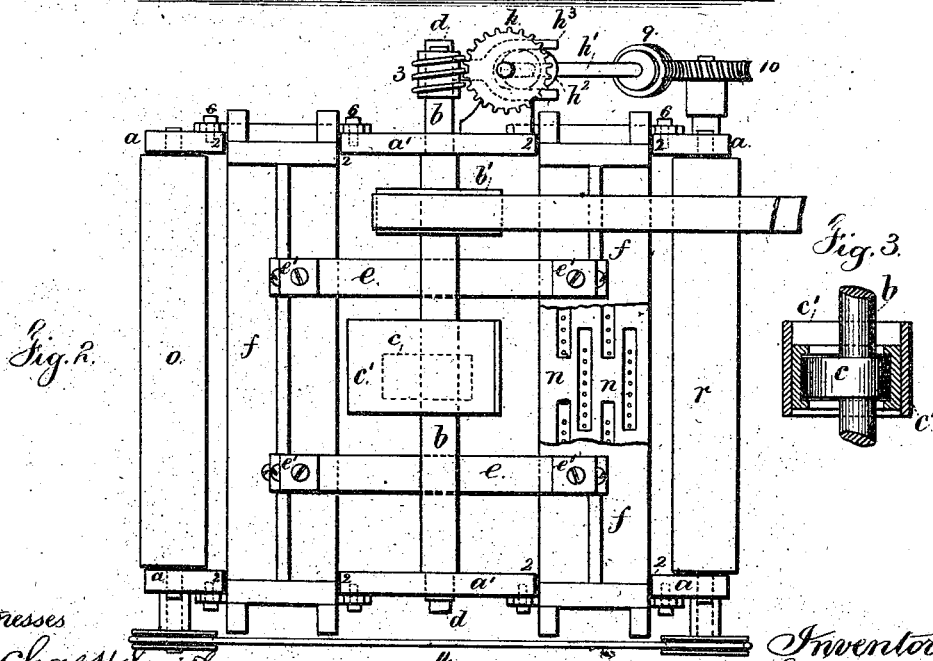
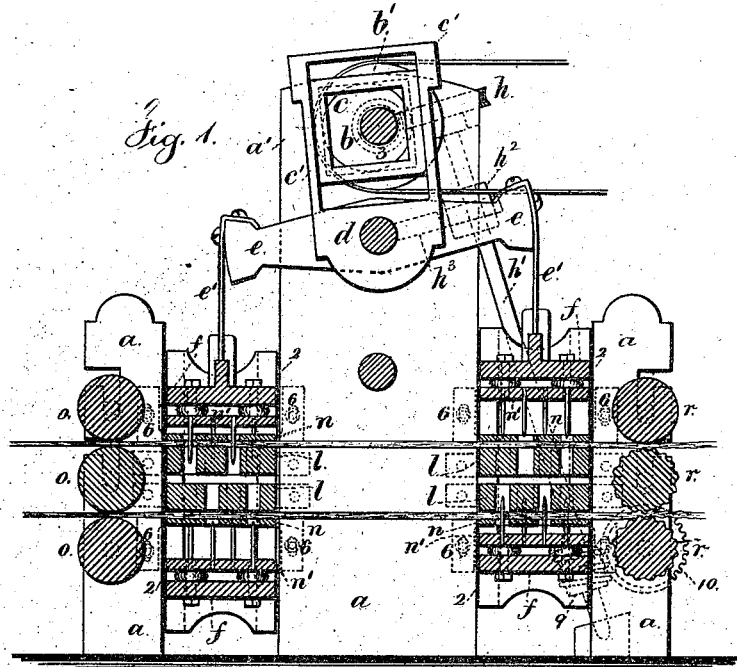


G. B. FIELD.
 Felting-Machine for Making Felted and Napped Fabrics.

No. 202,252.

Patented April 9, 1878.



Witnesses
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FELTING-MACHINES FOR MAKING FELTED AND NAPPED FABRICS.

Specification forming part of Letters Patent No. 202,252, dated April 9, 1878; application filed February 21, 1878.

To all whom it may concern:

Be it known that I, GEORGE B. FIELD, of St. Louis, in the State of Missouri, have invented an Improvement in Felting-Machines for Making Felted and Napped Fabrics, of which the following is a specification:

Machines have been made in which gangs of barbed needles are reciprocated into and out of a bat or sheet of fibrous material for felting the same by a mechanical interlacing of the fibers, such as in Letters Patent Nos. 123,136 and 173,704.

My improvements are made for the purpose of equalizing the action of the felting-needles, and for balancing the machine in such a manner that great speed can be obtained without undue wear or risk of injury.

In the drawings, Figure 1 is a vertical section longitudinally of the machine. Fig. 2 is a plan, partially in section.

The frame *a* is of a size and shape adapted to the other parts of the machine. The upper portions *a'* of the frames are provided with bearings that support the main driving-shaft *b*, that is propelled by suitable power applied to the pulley *b'*. Upon the shaft *b* is an eccentric, *c*, within a square box having inward flanges, as seen in Fig. 3, to retain the lubricating material, and this eccentric and box are within the slotted arm *c'* of the rocker-shaft *d*, and this shaft *d* is in bearings in the frame *a'*, and is capable of an endwise motion as well as a rocking motion. The double arms *e e*, similar to walking-beam levers, are fastened to this rocker-shaft *d*, and are connected by spring-plates *e'* at their outer ends with the followers *f*, so as to reciprocate such followers rapidly, and these followers are guided by the vertical portions 2 2 of the frame *a*, and they are free to move up and down, and endwise also, in their guides 2 2. These followers contain the gangs or rows of felting-needles, and being of nearly the same weight balance each other, and the inertia of one of the followers in which the needles are being drawn out of the bats of fiber aids in driving the needles of the other follower into the bats of fiber, and the weight and forces being balanced there is an economy in the power employed.

I have shown four followers, each with its

rows or gangs of needles. Two followers act below the fabric or bat and two above. These might all act upon one sheet passing through the machine, or upon several sheets of materials brought together to form one bat. I have, however, shown the machine as adapted to two separate bats or sheets passing through the machine, as hereinafter set forth.

There is an endless screw, 3, at the end of the shaft *b* that turns the wheel *h* and shaft *h'* continuously, and upon this shaft *h'* there is a cam, *h²*, that is within a jaw, *h³*, that projects laterally from the rocker-shaft *d*, whereby said shaft *d* is moved endwise in first one direction and then the other, and with said shaft the cross-arms *e* and followers *f* also are moved. By this end movement of the shaft and the followers containing the felting-needles, the perforations and interlacings of the fibers in the bat or sheet that is operated upon are not in straight lines; but they are undulating in consequence of such end movement, so as to make a more thorough felting operation.

The respective sheets or bats or layers of fiber to be felted, of whatever nature they may be, pass through between the bed-plates *l* and guard-plates *n*, that are placed in pairs between the followers, and they are at a suitable distance apart to allow the layers of fiber to pass between them. The bed-plates *l* are rigidly affixed to the frames *a*, so as to withstand the thrust of the needles; and the guard-plates *n* are adjustable by slots and screws 6 6, so as to vary their distance from the bed for different thicknesses of material.

As before mentioned, the needles are in rows, but the rows are sectional, the needles of one section being opposite and overlapping the blank space between the needles of the next row. These needles may be barbed or simply blunt pins, according to the work to be performed. The plates *l n* are slotted in the proper places to accommodate the needle-sections; but the slots are longer than the sections, to allow for the end movement before named of the followers with their needles.

The fabrics, as drawn along between the respective pairs of bed-plates *l* and guard-plates *n*, are subjected to the felting or interlacing operation by the lines of needles of both fol-

lowers, so that the operation is performed with great thoroughness and perfection.

By connecting the needles to an auxiliary follower, *n'*, and employing rubber or other springs between the same and the follower *f*, and screws or bolts, the positions of the points of the needles to the fabric can be varied by adjusting such auxiliary followers nearer to or farther from the followers *f*.

The supply-rollers *o o* may have a friction applied to them to produce sufficient tension on the bat or sheet to draw it straight, and the take-up rollers *r r* are preferably corrugated lengthwise, in order that the fabric may be firmly grasped and moved along. The take-up requires to be very positive, for avoiding inequality in the movement of the sheet, and consequently in the felting operation.

The feed movement is effected by a screw-pinion, 9, upon the shaft *k*, and a gear-wheel, 10, upon the lower roller *r*, and from the shaft of this roller motion is communicated to the supply-rollers *o* by means of pulleys and a belt, 11.

The supply-rollers should revolve at the same speed, or nearly so, as the take-up rollers, and the central supply-roller may be corrugated, to aid in feeding the bats into the machine.

I claim as my invention—

1. The combination, in the felting-machine, of the rock-shaft *d*, double arms *e*, followers *f*, with felting-needles, and the slotted bed-plates *l*, substantially as set forth.

2. The slotted bed-plates *l*, guard-plates *n*, followers *f*, double arms *e*, and rock-shaft *d*, in combination with mechanism, substantially as set forth, for giving a progressive end movement to the rock-shaft and followers, substantially as set forth.

3. The combination of the two followers *f* with the bed-plates *l*, guard-plates *n*, and mechanism for actuating the followers, whereby the felting-needles are made to operate in succession upon one sheet of fabric passing between the two pairs of bed and guard plates, substantially as set forth.

4. The combination, with the followers, needles, bed-plates, and guard-plates, of the feeding-rollers *r* and screw-pinion 9, for actuating the same and moving the material, substantially as set forth.

5. In combination with the reciprocating followers and felting-needles in gangs or interrupted rows, the bed-plate *l* and guard-plates *n*, provided with slots, for the purposes set forth.

6. The two pairs of followers, each provided with felting-needles, in combination with the rock-shaft *d*, actuating-levers *e*, bed-plates *l*, and guard-plates *n*, the parts being arranged and acting substantially as set forth.

Signed by me this 28th day of January, A. D. 1878.

GEORGE B. FIELD.

Witnesses:

JAMES A. CLARY,
J. T. PERCY.