

(No Model.)

2 Sheets—Sheet 1.

E. A. MILLS.
LAPPING MACHINE.

No. 543,774.

Patented July 30, 1895.

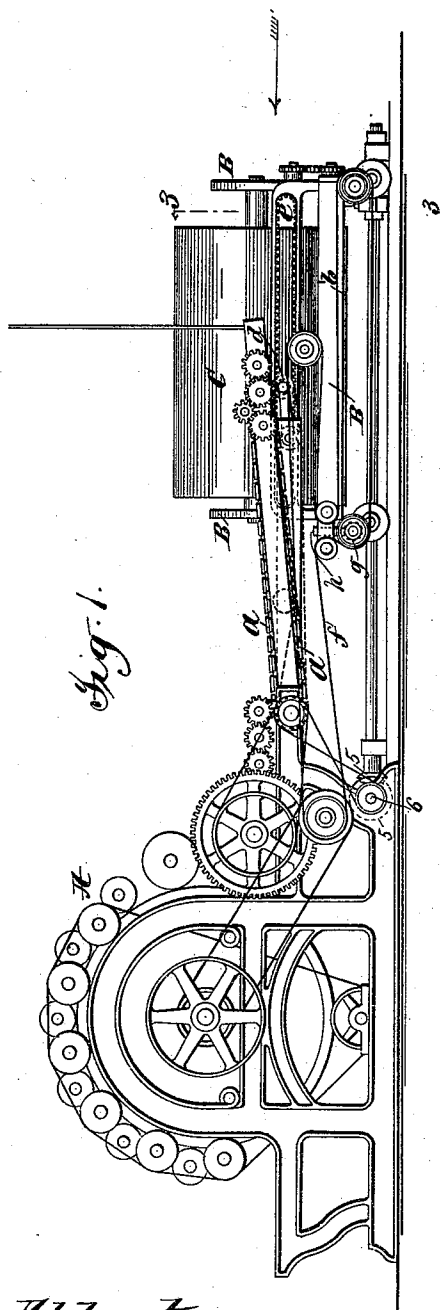


Fig. 1.

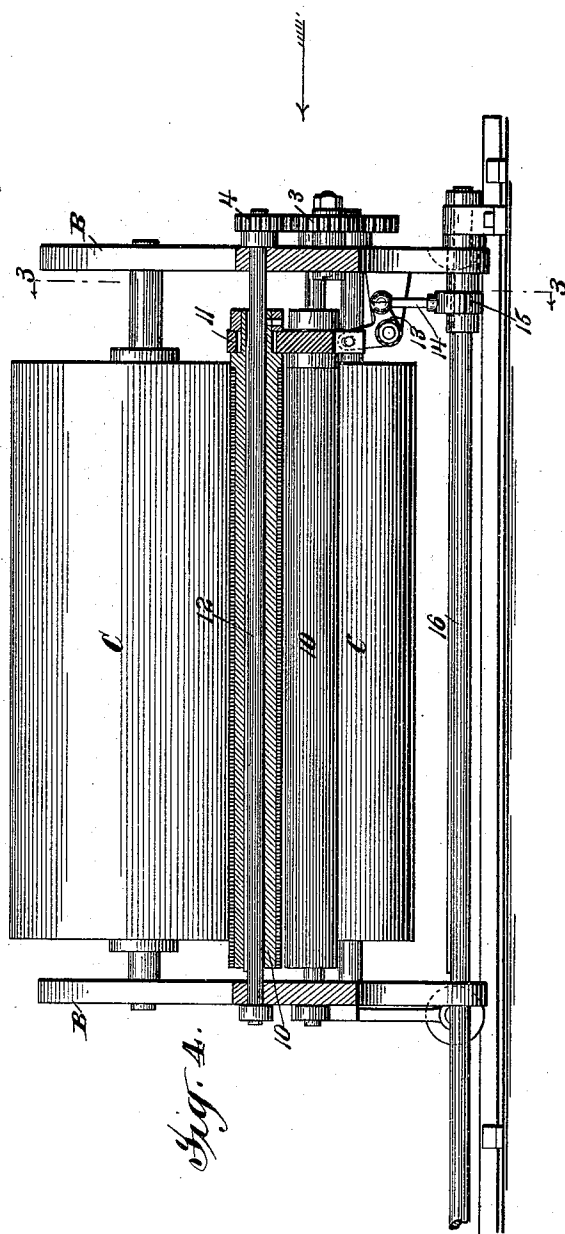


Fig. 4.

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By Philipp Munson Phelps
Atty.

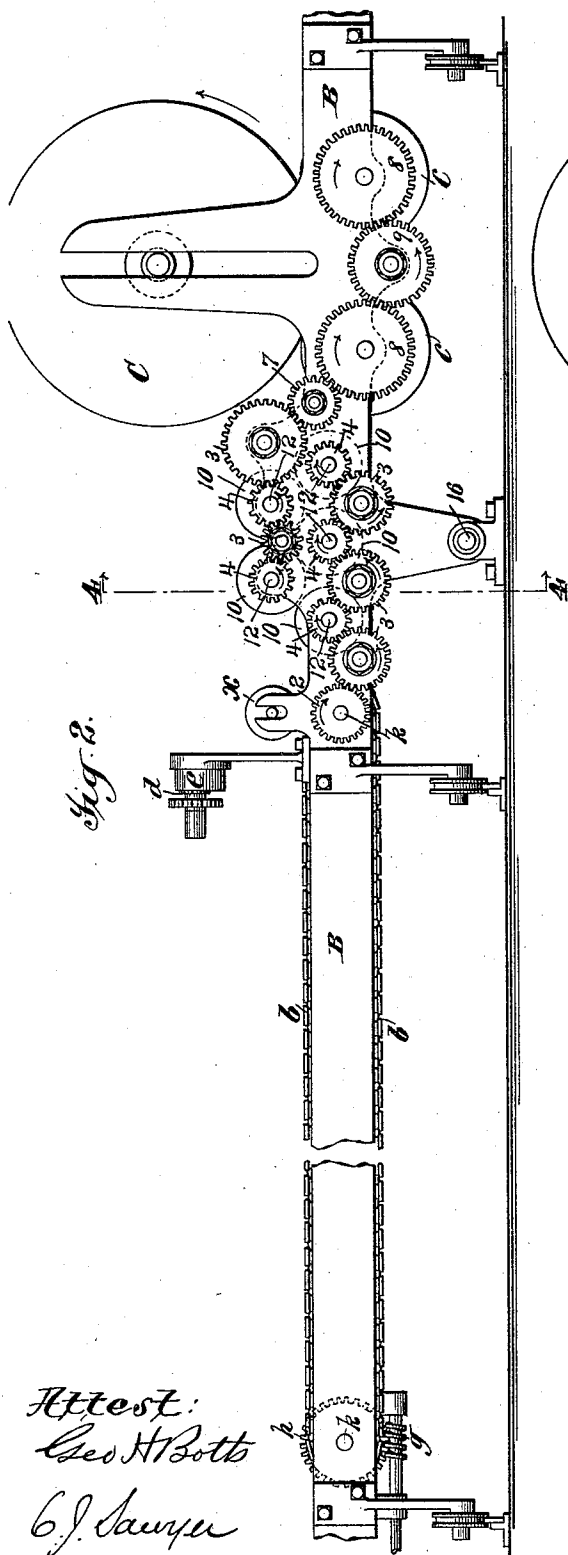
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2 Sheets—Sheet 2.

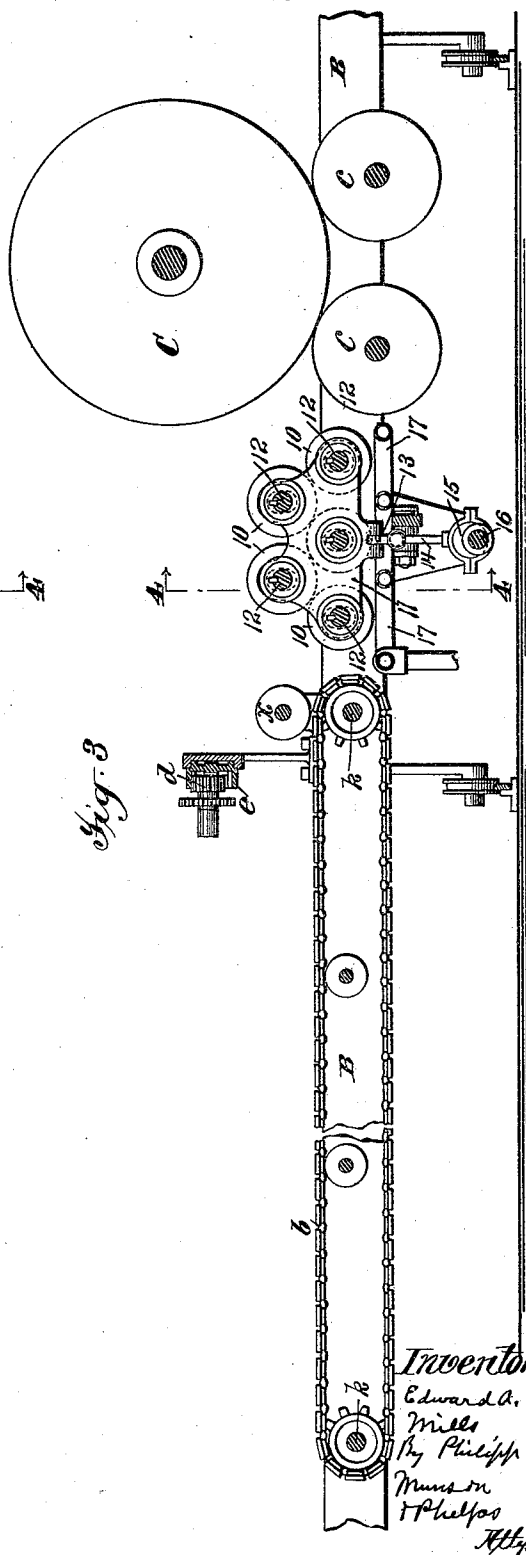
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UNITED STATES PATENT OFFICE.

EDWARD A. MILLS, OF LITTLE FALLS, NEW JERSEY, ASSIGNOR TO ROBERT BEATTIE, OF SAME PLACE.

LAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,774, dated July 30, 1895.

Application filed July 12, 1894. Serial No. 517,304. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. MILLS, a citizen of the United States, residing at Little Falls, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Lapping-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In lapping or bat-forming machines for making laps or bats of carded material in the manufacture of felt and other materials, the bat, consisting of a number of layers superposed by the crosser, has not been condensed or hardened in passing from the crosser to the bat-roll, but only compacted, as by a weighted pressure-roll and the feeding-rolls coacting with the bat-roll, the condensation or hardening being done by a separate hardening-machine through which the bat is passed when unwound from the bat-roll. The result is that the condensation or hardening process for forming felt or other material is slow, on account of the large reduction of thickness that must be made, and it is found in practice that the layers of the loosely-compacted bat are liable to stick together in unwinding, causing the tearing away of parts and consequent irregularities in the material produced.

The object of the present invention is to provide an improved lapping or bat-forming machine in which the bat shall be so far condensed or hardened before rolling that this difficulty of tearing the bat in unwinding shall be avoided and the process of the hardening-machine expedited by reducing the work there required. I secure this result by providing one or more vibrating condensing-rolls, which act upon the bat before reaching the bat-roll, and preferably between a pressure-roll and the bat-roll, these vibrating condensing-rolls acting to reduce the bat largely in thickness and partially condense or harden it in the machine. By this construction it is found that the work of the hardening-machine is largely reduced and the fibers of the bat are so far condensed that they do not adhere and tear in unwinding. I preferably use in combination with the condensing-rolls means by which the bat is heated, and prefer-

ably moistened also, as it passes through the rolls, thus aiding in securing the condensing or hardening of the bat.

It is obvious that the invention is generally applicable to lapping or bat-forming machines, and may be applied in connection with machines of widely-different form, and that the condensing-rolls may be actuated by any suitable means, which will be varied in accordance with the particular class of machine to which the invention is applied. For the purpose of illustration, however, the invention will be shown as applied to a lapping-machine of a common construction, and the description of the machine and devices combined therewith embodying the invention in the preferred form will now be given, in connection with the accompanying drawings, forming a part of this specification, and the features forming the invention then be specifically pointed out in the claims.

In the drawings, Figure 1 is a side view of the machine. Fig. 2 is an end view of the crosser-end of the machine. Fig. 3 is a section on the line 3 of Figs. 1 and 4. Fig. 4 is a section on the line 4 of Figs. 2 and 3.

Referring to said drawings, A is the carding-machine, from which the fleeces pass on the apron *a* to the crosser-apron *b* on the carriage B, and from which apron *b* the superposed fleeces pass under the weighted pressure-roll *x* to the bat-roll C and feeding-rolls *c c*, by which the bat is rolled up. All these parts may be of the usual or any suitable construction and actuated by any suitable means. A common construction is shown, in which the crosser-carriage is reciprocated by a gear *d*, engaging a mangle-rack *e*, and the crosser-apron *b* is driven from the driving mechanism of the machine by a belt *f*, which drives a worm *g*, engaging a worm-gear *h* on the end of one of the apron sprocket-shafts *k*.

Referring now to the parts by means of which the invention is applied in connection with this machine, a series of condensing-rolls 10 is mounted in a vibrating frame 11 between the weighted pressure-roll *x* at the end of the apron *b* and the bat-roll C. Five of these rolls are shown, two above and three below the path of the bat from the crosser to the bat-roll, but it will be understood that a

different number of rolls may be used, either one or more, and these may be arranged in any other suitable manner. A number of rolls will probably be used, however, and the construction shown will be found efficient. These

condensing-rolls are preferably covered with leather or some similar material, as shown, to increase their rubbing action on the bat. The rolls 10 are splined on shafts 12, mounted in the side frames of the carriage B, so that the rolls may slide with the frame 11 upon the shafts 12, while driven by the latter. Any suitable means may be used for vibrating the frame 11. As shown, this frame is actuated by a bell-crank lever 13, pivoted thereto and having its other arm connected by an eccentric-rod 14 to an eccentric 15, carried by a sleeve mounted in the carriage-frame and splined on shaft 16, so as to be rotated by the latter while sliding thereon with the carriage, and the eccentric 15 rocks the lever 13 and thus vibrates the frame 11, carrying the rolls 10 transversely to the bat.

In the construction shown, the driving mechanism is as follows, but it will be understood that any other suitable driving mechanism may be used: The sprocket-shaft $\frac{1}{2}$ next the bat-roll carries a gear 2, which, through series of intermediates 3 and gears 4 on the shafts of the rolls 10, drives the latter, and the feeding-rolls c are driven from the shaft 12 on the last condensing-roll through an intermediate 7, gears 8 on the shafts of the feeding-rolls, and an intermediate 9 connecting said last-named gears. For the comparatively-high speed required for vibrating the frame 11 for the rubbing action the shaft 16 is preferably driven independently of the rolls 12, and in the construction shown the shaft 16 is extended to the carder and driven in any suitable manner therefrom, as by bevel-gears 5 from countershaft 6, as shown, the eccentric 15 sliding on the shaft 16, as above described.

As above stated, on some material the bat is preferably heated and moistened for the action of the condensing-rolls, and for this purpose steam-pipes 17 are shown below the condensing-rolls, one of these pipes between each two of the lower condensing-rolls being perforated to spray upward against the under side of the bat a sufficient amount of the steam for the result desired. In handling certain kinds of material the steam-pipes or other suitable means for heating the bat may be used without moistening it. It will be understood, also, that either heating or moistening is not essential to the invention, and in many cases may not be used.

In the construction shown all the condensing-rolls are mounted in fixed bearings and positively driven. It will be understood, however, that other forms of rubbers or condensers may be used, with some or all of the rolls not positively driven, or with the rolls weight or spring pressed against the bat, the

particular form used depending to some extent upon the material to be operated upon. It will be understood, also, that the rolls are to be so arranged relatively to the surface of the bat, and their pressure upon the bat be such as to condense the bat by rubbing action of the rolls upon it, and that the pressure should not be so great as to shift the bat bodily or produce a rolling action upon it, which would tend to separate the fibers. The arrangement of the rolls will be varied, according to the material operated upon and the amount of condensing and thickness of the bat desired, as will be readily understood by those skilled in the art.

What is claimed is—

1. The combination with a lapping or bat forming machine, of a condenser acting upon the bat before it is wound upon the bat roll, said condenser including one or more condensing rolls so arranged and acting under such pressure as to condense the bat by rubbing action upon it, and means for vibrating said condensing rolls transversely to their plane of rotation, substantially as described.

2. The combination with a lapping or bat forming machine having a pressure roll and bat roll, of a condenser between the pressure roll and the bat roll, said condenser including one or more condensing rolls so arranged and acting upon the bat under such pressure as to condense the bat by rubbing action upon it, and means for vibrating said condensing rolls transversely to their plane of rotation, substantially as described.

3. The combination with a lapping or bat forming machine, of a condenser acting upon the bat before it is wound upon the bat roll, said condenser including one or more condensing rolls so arranged and acting under such pressure as to condense the bat by rubbing action upon it, means for vibrating said condensing rolls transversely to their plane of rotation, and means for heating the bat during the action of the condenser, substantially as described.

4. The combination with a lapping or bat forming machine, of a condenser acting upon the bat before it is wound upon the bat roll, said condenser including one or more condensing rolls so arranged and acting under such pressure as to condense the bat by rubbing action upon it, means for vibrating said condensing rolls transversely to their plane of rotation, and means for heating and moistening the bat during the action of the condenser, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD A. MILLS.

Witnesses:

C. J. SAWYER,
ARTHUR L. KENT.