(No Model.) 2 Sheets—Sheet 1.

M. L. KEYES.

MACHINE FOR FINISHING PULP ARTICLES.

No. 423,169. Patented Mar. 11, 1890.

Fig. 1

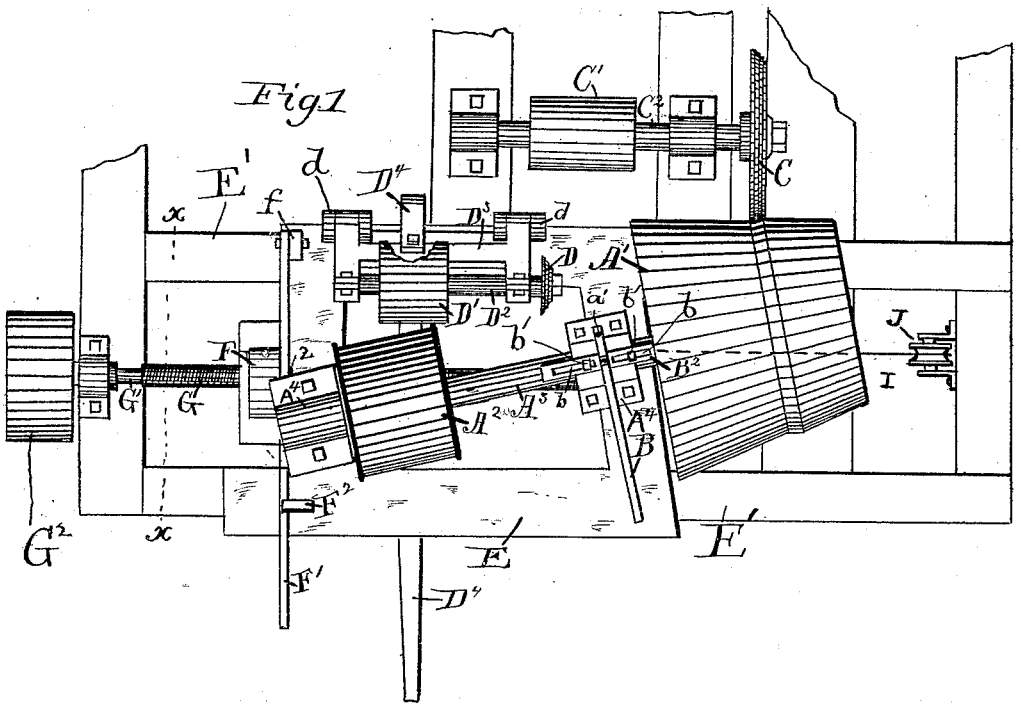


Fig. 3.

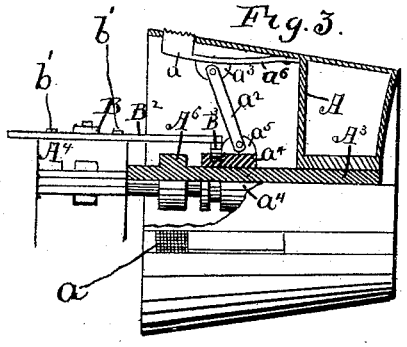
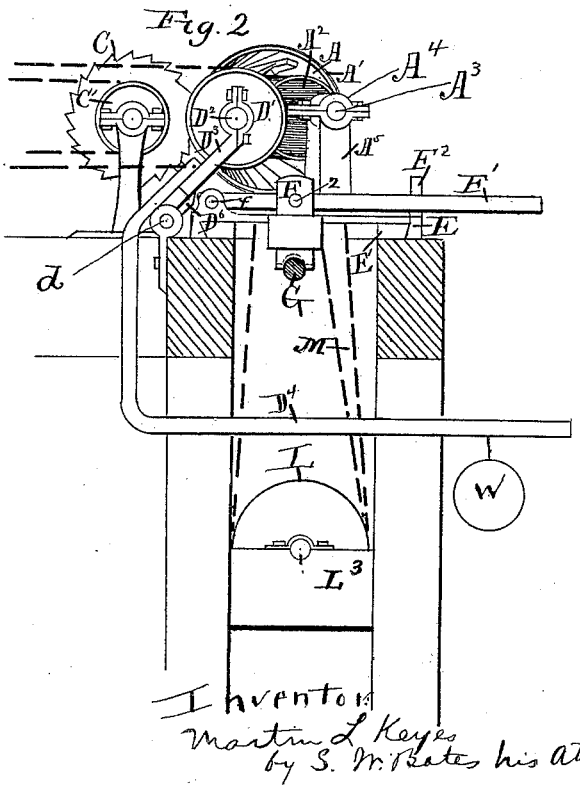


Fig. 2



Witnesses:
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C. B. Burrie

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(No Model.)

2 Sheets—Sheet 2.

M. L. KEYES.

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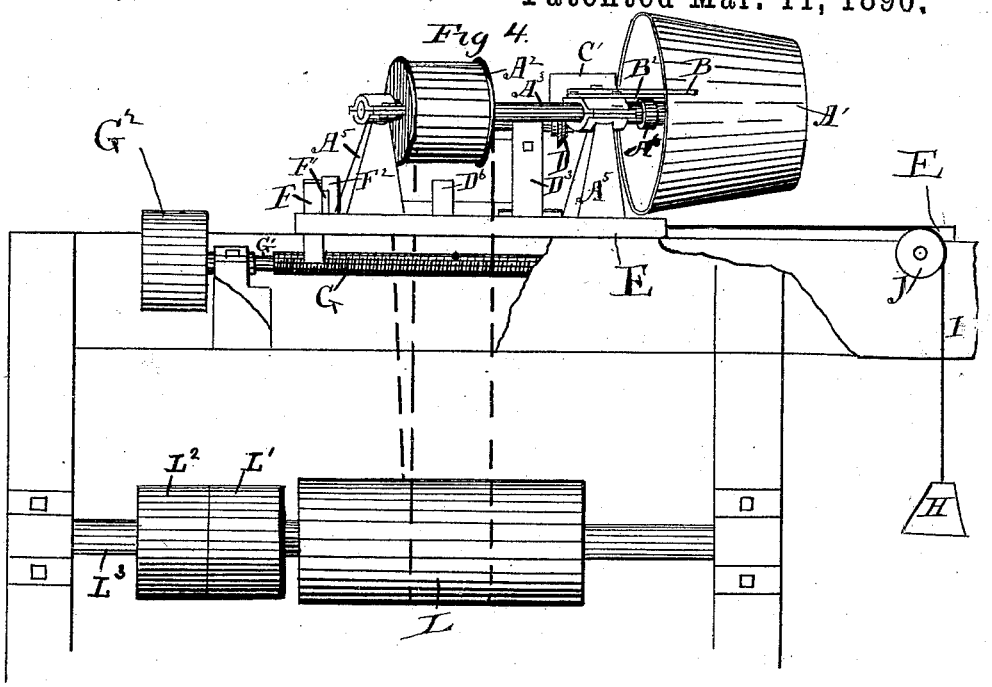
Fig 4.



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Inventor:
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UNITED STATES PATENT OFFICE.

MARTIN L. KEYES, OF GORHAM, ASSIGNOR TO THE UNITED INDURATED FIBER COMPANY, OF PORTLAND, MAINE.

MACHINE FOR FINISHING PULP ARTICLES.

SPECIFICATION forming part of Letters Patent No. 423,169, dated March 11, 1890.

Application filed November 5, 1885. Renewed February 2, 1887. Again renewed June 23, 1888. Serial No. 298,034. (No model.)

To all whom it may concern:

Be it known that I, MARTIN L. KEYES, a citizen of the United States, residing at Gorham, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Machines for Finishing Pulp Articles, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to the manufacture of hollow articles of pulp made from wood or other fiber, and particularly to a machine for producing a finished surface on pails, tubs, and other like hollow articles, my invention being especially adapted for finishing pulp articles made on what is known as the "Bodge" machine.

In this machine the pulp is deposited on the outside of a pervious "former," and is thereafter subjected to pressure between said former and an elastic rubber diaphragm cooperating with the said former. After a sufficient amount of pulp has been deposited the supply is cut off and hydrostatic pressure is applied to the outside of the diaphragm by forcing in water between said diaphragm and a tight case or dome which contains the parts above spoken of. This pressure is exerted equally on all parts of the pulp, and on account of the elastic material of which the diaphragm is composed an uneven surface is produced, which it is necessary to render smooth and true before the pail or other article can be properly finished. The pails by this process are of greater thickness than would otherwise be necessary, and in finishing this extra material must be removed.

Prior to my invention pulp articles of the kind described have been finished by simply sandpapering their surfaces; but this operation was slow and expensive and the outer surfaces of the various articles could not be made uniform.

My invention has for its object to provide a machine in which the outer surface of a hollow article of pulp—such as a pail or tub—may be trimmed or reduced by a suitable reducing tool or surface until the body of the article has been brought to the desired thickness and shape, the said reducing tool or surface and the holder upon which the hollow pulp article is mounted being movable one with relation to the other and so located with respect to each other, as will be described, that the tool acts to trim or reduce the outside of the pulp article gradually in the direction of its length, the reduction or trimming of the said pulp article being continued until it is of the desired thickness, the body of the said article when finished being preferably of substantially uniform thickness.

My invention therefore consists, essentially, in a machine for finishing hollow articles of pulp, of a rotating shaft and a holder mounted thereon and upon which the hollow article to be treated is placed, combined with a rotating tool-shaft and a reducing-tool thereon, the said shafts being movable longitudinally one with relation to the other, whereby the hollow article may be reduced or trimmed in the direction of its length, substantially as will be described.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a plan or top view of a sufficient portion of a machine embodying my invention to enable it to be understood, a portion of the frame and one of the driving-pulleys being broken out; Fig. 2, a vertical transverse section of the machine on line $x\,x$, Fig. 1; Fig. 3, a partial longitudinal section through the holder or head for holding the pail or other hollow pulp article; Fig. 4, a side elevation of the machine represented in Fig. 1, a portion of the frame being broken out to show the actuating-screw.

The holder or head A, to hold the hollow article of pulp to be reduced and finished, is secured to one end of a shaft or arbor A^3, having its bearings in suitable boxes A^4, supported by standards A^5, fastened to a carriage E, herein shown as movable on rails E', (see Fig. 2,) shown as supported by the framework. The shaft A^3 has mounted on it a pulley A^2, which will be connected by a belt (not shown) to a drum or pulley L on a shaft L^3, located below the bed of the machine, (see Fig. 4,) rotation of the shaft L^3 imparting rotation to the shaft A^3 and holder A.

The carriage E is moved longitudinally, as herein shown, by a feeding device, shown as

a screw G, extended underneath the carriage in the direction of its length and mounted in suitable bearings, the said screw engaging the lower portion or end of a block F, extended downward through a slot or opening in the said carriage, the lower end of the said block being threaded or formed as a half-nut to engage the threads on the screw G.

The block F has pivoted to it, as at 2, a lever F′, fulcrumed in a stud *f* on the carriage E, (see Fig. 2,) the said lever in the present machine constituting the starting mechanism by which the carriage is put in motion, the said lever, when it is desired to move the carriage, being brought into engagement with a latch F^2, (shown as a post,) having a slot into which the handle of the said lever is sprung, and which holds or locks the lever in operative position. The forward feed or movement of the carriage is arrested, as herein shown, by a stopping device, shown as a blind slot G′ in the screw G, near its forward end.

The hollow article of pulp, herein shown as a pail A′, but which may be a tub or other hollow article, is shown in Fig. 1 as placed upon the holder and as partially trimmed or reduced. The pail A′ or other hollow article is secured to the holder in the present instance by a dog or dogs *a*, herein shown as a serrated or roughened piece of metal forming part of a spring-arm a^6, fastened to the holder, the said dogs engaging the hollow article. The dogs are brought into engagement with the pail A′ to secure it to the holder, as herein shown, by means of a lever B, pivoted at *a′* to one of the journal-boxes A^4, (see Fig. 1,) and also pivotally connected to a bar B^2, having longitudinal slots *b*, through which extend bolts *b′*, the said bolts securing the said bar loosely to the said journal-box. The bar B^2 has secured to its end a yoke B^3, which is extended into an annular slot in a collar a^4, loosely mounted on the shaft A^3, the said collar having an ear a^5, which is connected to an ear a^3 on the spring-arm a^6 by a link a^2. The shaft A^3 has fixed on it a shoulder or stop A^6, (see Fig. 3,) and the length of the link a^2 and the distance of the stop A^6 from the collar a^4 are so regulated that when the collar comes against the said stop the link a^2 will be substantially at right angles to the shaft A^3.

The pail or other hollow article secured to the holder has its outer surface trimmed or reduced, so as to leave the finished body of the desired or required thickness by a reducing tool or surface, herein shown in Fig. 1 as a gang or set of circular saws C, placed side by side on one end of a shaft or mandrel C^2, rotated by a pulley C′, the said saws, as shown, being of diminishing diameters, with the smaller saw toward the end of the shaft or mandrel.

In practice the saws C act on the pail gradually in the direction of its length, the said pail in the present instance being made to travel past the said saws while it is being rotated, whereas the said saws are revolved without having a longitudinal movement; but it is evident that this construction may be varied while yet retaining the relative longitudinal movements of the saws and the pail. Furthermore, the reducing tool or surface will in practice be so located with relation to the holder that the body of the pail or other article will preferably be left of uniform thickness when finished, which in the present instance is accomplished by so aligning the shaft A^3 on the carriage E that the outer surface of the pail will be substantially parallel to the shaft upon which the reducing tool or surface is mounted.

The edge of the pail or other hollow article is chamfered off or finished by an auxiliary reducing-tool D, herein shown as a set or gang of smaller saws of diminishing diameter mounted on a shaft or arbor D^2, having journal-bearings in a frame D^3, hinged, as at *d*, to the frame of the machine, the said shaft having mounted on it a belt-pulley D′, by means of which the auxiliary reducing-tool is revolved.

The hinged frame D, inclined as shown in Fig. 2 and resting upon a suitable stop D^6, has secured to it an arm or lever D^4, provided, as shown, with a suitable weight W, by means of which the hinged frame is kept in position against the stop D^6, to thus maintain the reducing-tool D in correct working position.

The carriage E, as shown, has connected to it by rope or cord I a weight H, by which the said carriage may be returned to its normal or starting position after a pail has been finished, the said cord passing over a suitable pulley J, mounted at the end of the machine.

As shown in Fig. 1, the saws C are made to present a beveled surface, so that when the pail is moved past them the outer surface of the said pail will be gradually trimmed or reduced from one toward its opposite end.

Instead of the particular tools herein shown, I may employ any other usual or well-known rotary tool having a cutting or abrading surface.

In operation, with a machine such as shown the carriage is normally at the right-hand end of the machine, as in Fig. 1, and when in this position the hollow pail or other article of pulp is applied to the holder, and when the said pail is in its proper position on the holder it may be secured by moving the lever B toward the left in Fig. 1 to cause the dogs to engage the inner side of the pail. The block F is now engaged with the screw G and locked by moving the lever F′ to be caught by the latch F^2, and the carriage is moved forward or toward the left in Fig. 1, thus carrying the revolving pail past the revolving reducing-tool C, which trims or reduces the pail in the direction of its length. When the block F reaches the slot C′, it drops in, and the motion of the carriage is stopped, the pail having passed beyond the reducing-tool C. When the carriage

has reached the end of its forward movement, the inner edge of the pail, which in its unfinished state somewhat overhangs the edge of the holder, is in position to be acted upon by the auxiliary tool D, which latter is then brought into engagement with the said inner edge by turning the hinged frame D^3 through the lever D^4. After the pail has been finished the block F may be disengaged from the screw to permit the weight to restore the carriage to its normal or starting position, the said weight acting as a retractor.

It is evident that many changes and alterations may be made in my machine by substituting for the devices shown other well-known equivalents without departing from the essential principles of my invention—as, for instance, the feeding-screw might be replaced by a rack and pinion and the swinging frame D^3 by a sliding frame; and so, also, the dogs which serve the purpose of securing the pail or article to the holder so as to be rotated with the shaft might be changed and other well-known devices or clamps used instead.

I do not claim a reducing-tool adapted to cut an annular groove in a pail for the reception of a wire hoop.

I claim—

1. In a machine for finishing hollow articles of pulp, a rotating shaft and a holder mounted thereon and upon which the hollow article to be treated is placed, combined with a rotating tool-shaft and a reducing-tool thereon, the said shafts being movable longitudinally one with relation to the other, whereby the hollow article may be reduced or trimmed in the direction of its length, substantially as and for the purpose specified.

2. In a machine for finishing hollow articles of pulp, a rotating shaft and a holder mounted thereon and upon which the hollow article to be treated is placed, combined with a rotating tool-shaft and a reducing-tool thereon, the said shafts being inclined toward and movable longitudinally one with relation to the other, whereby the hollow tapering article may be reduced in the direction of its length, substantially as described.

3. In a machine for finishing hollow articles of pulp, a rotating holder upon which the hollow article of pulp is placed and a rotating reducing-tool, combined with a reciprocating carriage, the said holder and reducing-tool being movable one with relation to the other, as described, whereby the hollow article is acted upon by the reducing-tool and reduced in the direction of its length, substantially as described.

4. In a machine for finishing hollow articles of pulp, a reciprocating carriage and a rotating holder carried thereby, combined with a rotating reducing-tool to act on and reduce the outside of the hollow pulp article, the said holder and reducing-tool being so located with respect to each other that the outside of the pulp article is trimmed or reduced from end to end in the direction of its length, substantially as described.

5. In a machine for finishing pulp articles, the combination of a rotating head mounted on a traveling carriage and adapted to fit the inside of said article, clamps for securing said article to said head, a set of saws for removing the surface of said article, said saws being of decreasing diameters and placed side by side on a mandrel, and means for feeding said carriage in front of said saws, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN L. KEYES.

Witnesses:
J. W. PARKER,
S. W. BATES.