(No Model.) 2 Sheets—Sheet 1.

H. FAIRBANKS.

MACHINE FOR MAKING PULP PIPES AND PULP COVERED ROLLS.

No. 583,898. Patented June 8, 1897.

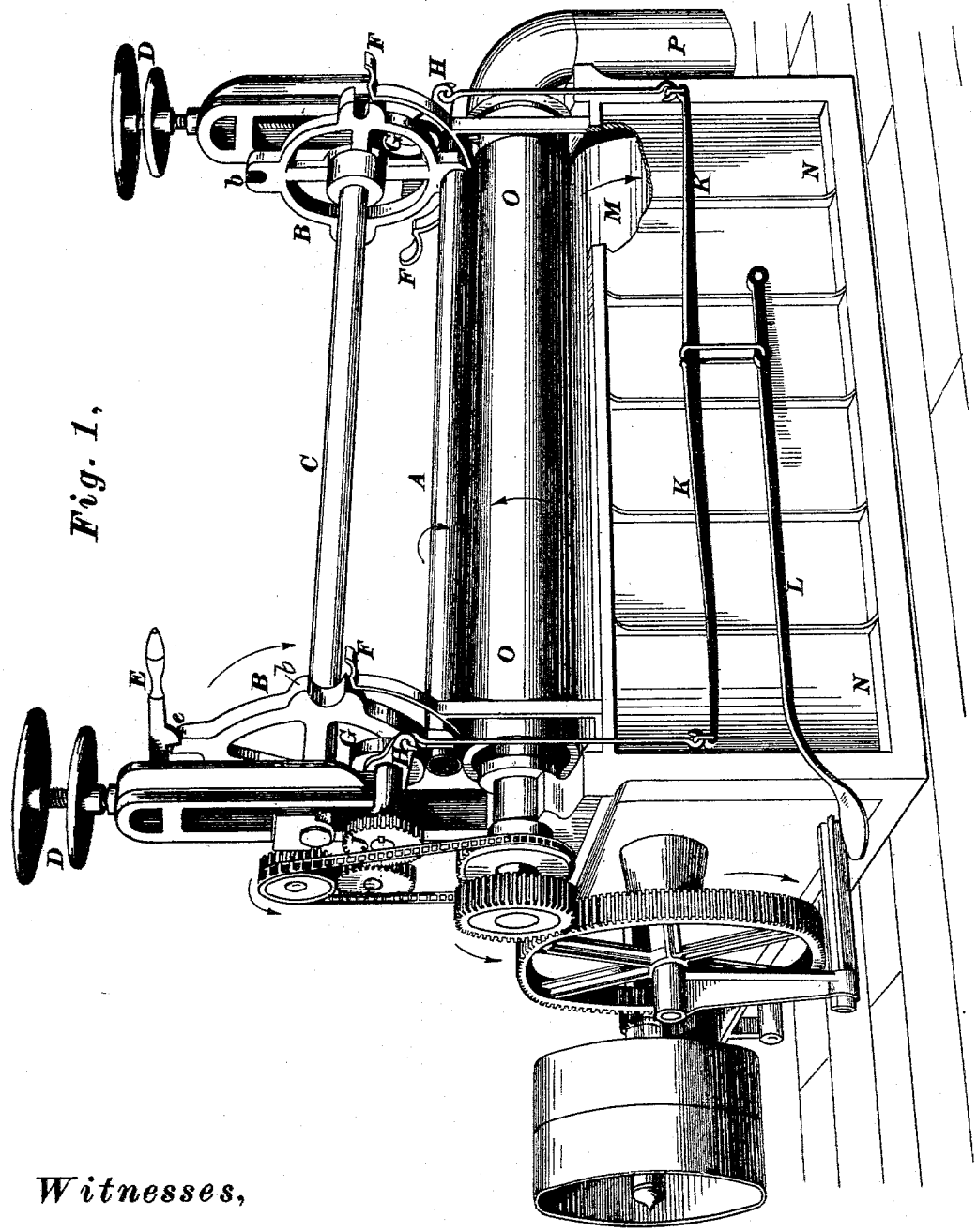

Fig. 1.

Witnesses,

C. H. Horton

L. C. Clark

Inventor,

Henry Fairbanks

(No Model.) 2 Sheets—Sheet 2.

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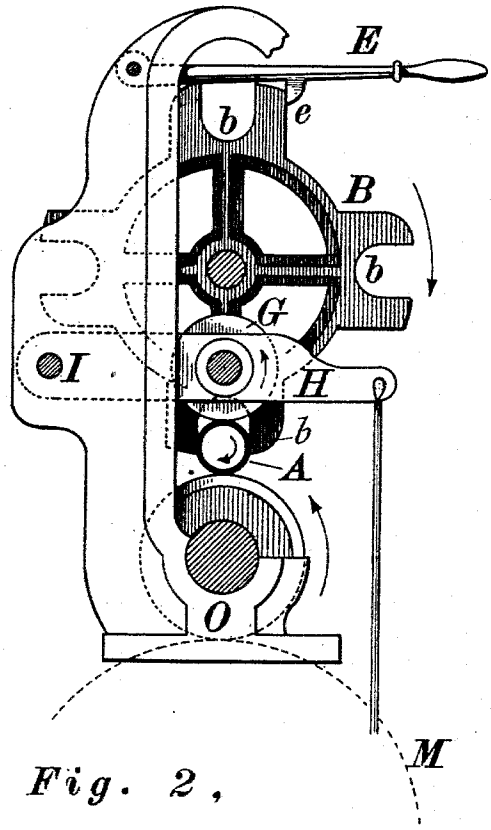

Fig. 2,

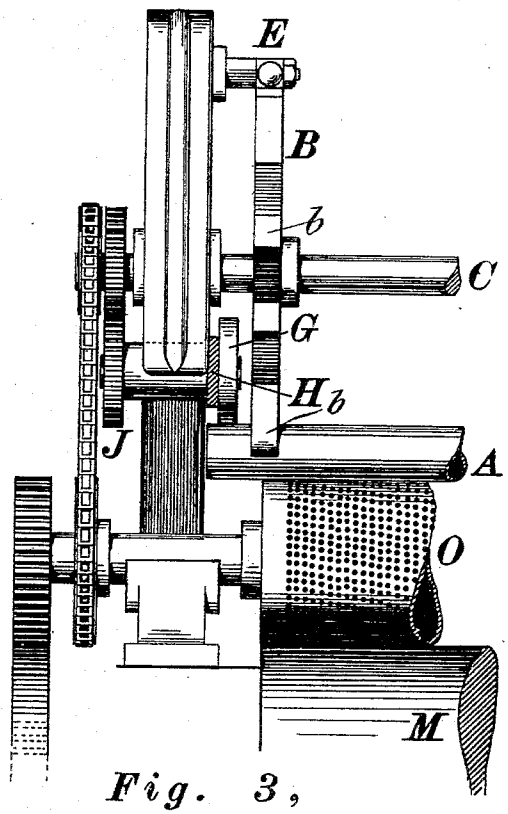

Fig. 3,

Witnesses,

R. H. Norton

L. C. Clark

Inventor,

Henry Fairbanks.

UNITED STATES PATENT OFFICE.

HENRY FAIRBANKS, OF ST. JOHNSBURY, VERMONT.

MACHINE FOR MAKING PULP PIPES AND PULP-COVERED ROLLS.

SPECIFICATION forming part of Letters Patent No. 583,898, dated June 8, 1897.

Application filed August 14, 1893. Serial No. 483,080. (No model.)

To all whom it may concern:

Be it known that I, HENRY FAIRBANKS, of St. Johnsbury, in the county of Caledonia and State of Vermont, have invented certain new and useful Improvements in Machines for Making Pulp Pipe and Pulp-Covered Rolls, of which the following, taken in connection with the accompanying drawings, is a specification.

My improvement relates to machines by which rolls are covered with wood or paper pulp by winding successive layers of the soft film upon them, which covering may be dried upon the roll or loosened and slid off to be used as tubing. In order that the pulp-layer may be laid evenly upon the forming-roll A, it is necessary that this roll be held against the pulp-bearing surface with a uniform yielding pressure and follow its motion without jar. Evidently it is a disadvantage if a heavy frame carrying the forming-roll must be moved with this roll to secure constant contact. To correct this, my improved machine has the revolving frame arranged simply to guide the motion of each forming-roll while receiving its layers of pulp, and provides a separate device for pressing it against the moving surface supplying pulp.

While it is well known that a large roll resting on a pulp-bearing surface is easily rotated by the motion of that surface and does not require that other means for moving it be provided, it is found that a small forming-roll is likely to be trigged by the pulp in front of it, and, instead of rolling smoothly upon it, tends to crowd back the moving layer. To correct this, in my improved machine motion is given to one or both of the rollers, by which the forming-roll is pressed against the pulp-bringing surface, so that this forming-roll is compelled to revolve between the two moving surfaces. If motion is thus given to only one roller, the other is arranged as a friction-roller.

My improved devices are applied in combination with the couch-roll, mold-cylinder, and pulp-vat of the vacuum wet machine, which forms a very dense pulp.

In the drawings, Figure 1 is a perspective view of the machine. Fig. 2 is an end view of the working parts with some cut away to show what they would hide, and Fig. 3 is a similar front view of these parts near one end of the machine.

Similar letters of reference are used for similar parts in all the figures.

M is the mold-cylinder, revolving in the pulp-vat N, and geared to it is the suction couch-roll O, exhausted through the pipe P. This couch-roll brings up the layer of wet pulp and removes the water as this layer winds upon the forming-roll A. This forming-roll, while free to move up and down, is kept in place sidewise by the forked arms of the revolving frames *b*, which frames turn upon the shaft C in bearings adjustable up and down by the screws and clamp-nuts turned by the hand-wheels D. The revolving frames while each roll is being covered are held from turning by the latch *e* on the hand-lever E, and the forming-roll, while free to move up and down in the forks *b b* of the arms, cannot leave its place upon the couch-roll until the revolving frame is released by lifting this latch. The curved guides F F assist in putting in each forming-roll and when covered hold it in position convenient for removal.

The forming-roll, when in place and free to move up and down in the forks of the revolving frame, is pressed down by rollers G G, which are either simple friction-rollers, in which case the end of the forming-roll may be reduced to a small bearing, or are driven by power at the same surface velocity as the couch-roll, so that the forming-roll rolls between this roller and the couch-roll and must revolve even when the pulp in front of it upon the couch-roll offers much resistance. This device is shown in the left-hand end of the machine in Fig. 1 and in detail in Figs. 2 and 3. Here the roller G is on one end of a short arbor running through a bearing-box which is carried by a lever H, which lever moves upon a stud I. The other end of this short arbor carries a gear-wheel which engages another moving upon the outer end of the stud I, to which motion is imparted through still another gear-wheel and a sprocket-chain from the couch-roll. Whether driven by power or not the rollers G G, having their bearings in the levers H H, press down upon

the forming-roll with a pressure equal at the two ends and easily controlled, as applied through the spring K and the foot-lever L.

When the machine is in use, the attendant lays a forming-roll in the forks of the revolving frames in front and on a level with the shaft carrying these frames, where it is held in place by the curved guides F F. He then lifts the latch *e* by the lever E, and as the frames make a quarter-turn the roll moves down and into contact with the revolving couch-roll, which carries it under the pressure friction-rollers. The attendant regulates this pressure according to the size of the roll and the density desired. The movement of the couch-roll causes the forming-roll to revolve under the friction-rollers, and if that forming-roll is large transfers smoothly to it the layer of pulp received from the mold-cylinder; but if this forming-roll is small in proportion to the thickness of the layer of pulp in front of it it may push the pulp before it instead of rolling upon it and taking it up. To meet this difficulty is the function of the mechanism driving one or both of the pressure-rollers. The forming-roll is pressed between surfaces moving in opposite directions with equal velocity and must revolve with them and successive layers of pulp are transferred smoothly to it. The couch-roll of the vacuum-machine at its line of contact with the forming-roll removes the water so rapidly that successive layers unite almost perfectly, and while the fibers are all laid in the direction to give most strength the laminated structure is not apparent, and the pulp is much more dense than if rolled from a felt and having the water merely pressed out. The roll having its covering formed in this way has a surface whether merely dried or dried and subjected to further treatment that adapts it to various uses in the arts.

If rolled with constant yielding pressure, the covering clings close to the form or core, and, being dried, forms a light strong roll for winding cloth, and, with proper treatment, a rustless roll for paper and cloth machinery. If, on the other hand, it is desired to remove the pulp-body a few turns with hard pressure loosens it, so that it will slip off and may be dried as pulp pipe and subjected to any suitable treatment fitting it for the particular use desired.

Having described thus minutely what I consider the best construction of the machine embodying my invention, I wish to have it understood that I do not limit my claims to these exact details of the whole machine, but may use parts of it and not the whole, so securing some of its advantages.

The use of the suction couch-roll is essential to making the pulp-covered rolls referred to; but a poorer quality of pipe may be made when the forming-roll takes its layer of pulp from any pulp-bearing porous surface. The guide forks or slots controlling the sidewise motion of the forming-roll may be made in some other way than as arms of revolving frames, but should be independent of the pressure devices.

I claim as my invention—

1. In a machine for making pulp pipe and pulp-covered rolls, the combination of a pulp-bearing porous surface, and means for spreading the pulp layer upon it, the removable forming-rolls A, the revolving frames B, B, carrying guide-forks *b*, *b*, adapted to receive the said forming-rolls, with the curved guides F, F, pressure-rollers G, G, the latch *e*, to keep each roll in position to receive its coating of pulp, the levers H, H, the equalizing-spring K, and the foot-lever L, to press the forming-rolls with controlled changeable force against the pulp-bearing surface, as specified.

2. In a machine for making pulp pipe and pulp-covered rolls, the combination of a pulp-bearing porous surface and means for spreading the pulp layer upon it with the removable forming-rolls A, the guide-forks *b*, *b*, adapted to receive the said forming-rolls, the pressure-rollers G, G, free to press upon these forming-rolls, and gearing connecting one of the said pressure-rollers with the moving parts of the machine, whereby this roller is positively driven at the same peripheral velocity as the pulp-bearing surface, and the free forming-roll is rolled between the two, as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of August, A. D. 1893.

HENRY FAIRBANKS.

Witnesses:
CHAS. H. HORTON,
J. C. CLARK.