No. 786,264.

PATENTED APR. 4, 1905.

H. W. BUTTERWORTH.

MERCERIZING MACHINE.

APPLICATION FILED OCT. 26, 1899.

2 SHEETS—SHEET 1.

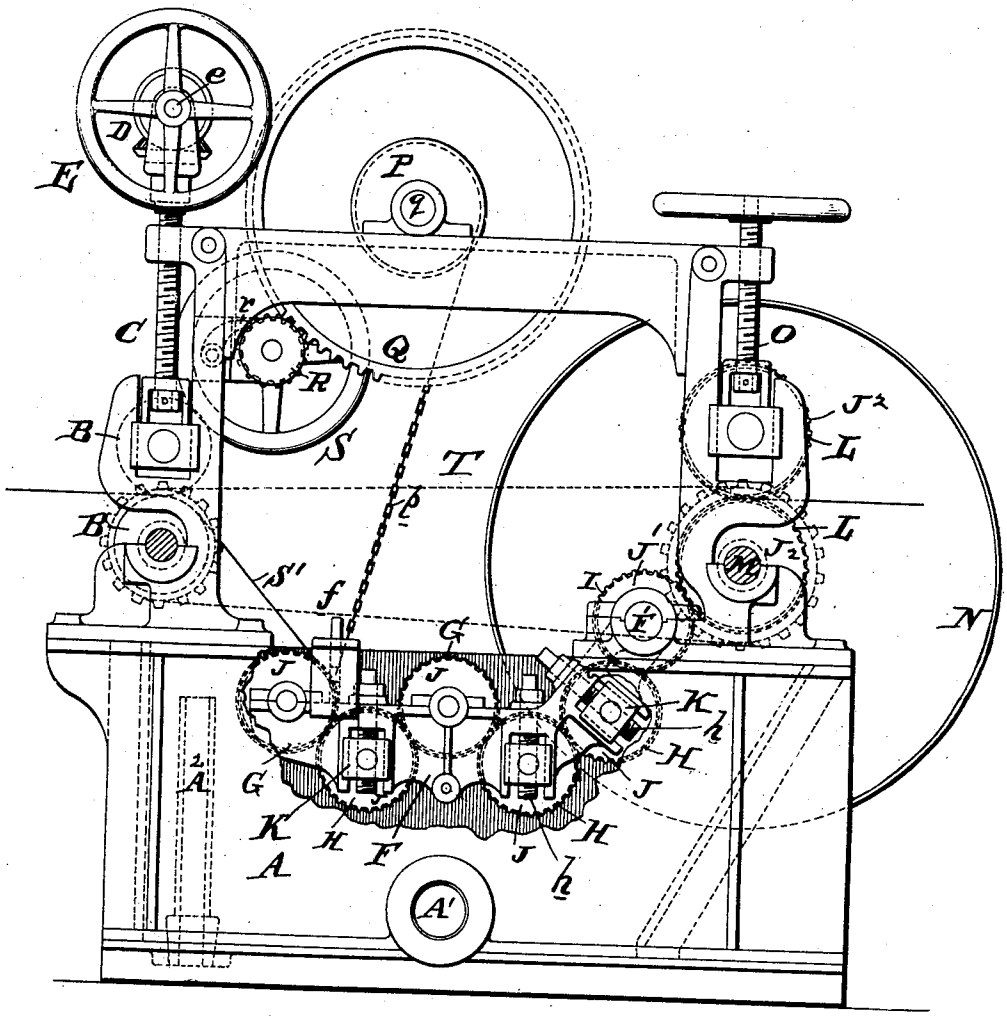


FIG. 1

Witnesses:
Henry Orth
R. M. Tally

Inventor:
H. W. Butterworth
By his Atty
R. M. Tally

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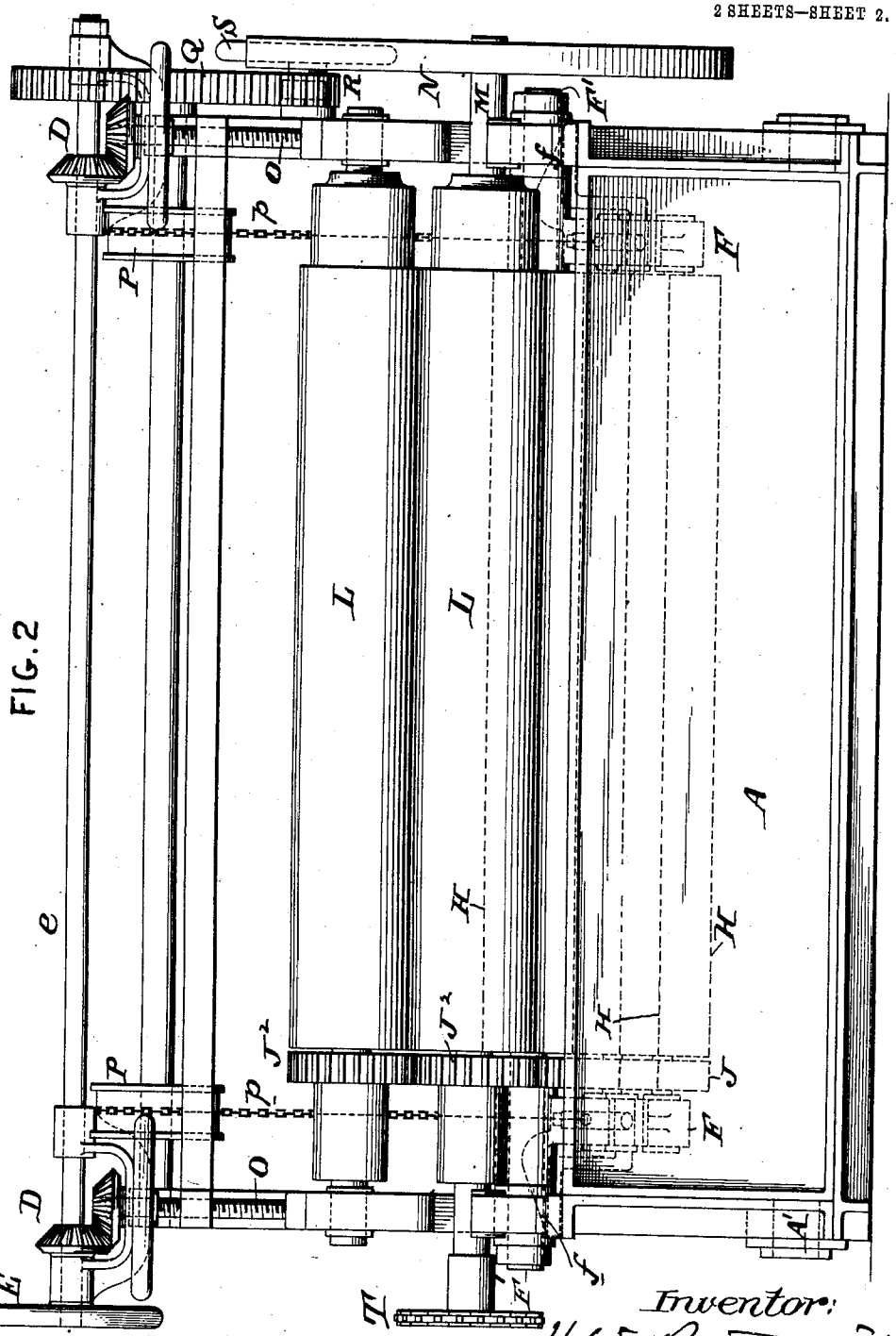


FIG. 2

Witnesses:
Henry Drury
R. M. Kelly.

Inventor:
H. W. Butterworth
By his attorney
W. Bakewell Jr.

No. 786,264. Patented April 4, 1905.

UNITED STATES PATENT OFFICE.

HARRY W. BUTTERWORTH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE H. W. BUTTERWORTH AND SONS COMPANY, A CORPORATION OF PENNSYLVANIA.

MERCERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,264, dated April 4, 1905.

Application filed October 26, 1899. Serial No. 734,797.

To all whom it may concern:

Be it known that I, HARRY W. BUTTERWORTH, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Mercerizing-Machines, of which the following is a specification.

My invention has reference to mercerizing-machines; and it consists of certain improvements set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to construct a mercerizing-machine which shall subject a continuous web of fabric to the action of the mercerizing fluid (usually caustic soda) in such a manner that it shall subject said fabric to the action of the caustic alkali while maintaining it in a positively-stretched and non-shrinkable condition and while being also subjected to a succession of squeezing or pressure actions, whereby the mercerizing fluid is positively forced through the woven fabric to uniformly impregnate it.

My invention also comprehends certain improvements in the details of the apparatus, which will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved mercerizing-machine with a portion of the tank torn away to show the interior mechanism, and Fig. 2 is the rear elevation of the same.

A is the tank or vat in which is contained the mercerizing liquid, consisting of caustic alkali. The tank may be provided with outlets A′ at the bottom, from or through which liquid may be passed either for filling the tank or for washing purposes. It may also be employed for temporarily drawing off the fluids where the same are to be used over again.

A^2 represents an overflow-pipe or tubular plug fitted to the waste pipe or outlet, whereby the contents of the vat may be permitted to run to waste or have its level limited to a definite height.

L L are a pair of squeeze-rolls and are geared together by a spur-gearing J^2. The upper of these rolls may be made adjustable by means of screws O to vary the pressure. The lower of the rolls L is fitted upon the main shaft M, which may be driven by a suitable gear, sprocket drive-chain, or band-pulley N, which may also act as a fly-wheel. These rolls L L are located over the rear end of the vat A, so that any of the mercerizing fluid which may be pressed from the fabric will find its way back into the tank. Arranged immediately in front of the lower roller L is a roller I, secured to a shaft F′ and geared to the power-shaft M by gearing J′ J^2.

F is a frame which is journaled upon the shaft F′ and is free to move upward in the vat A, its downward movement being limited by the laterally-projecting arms *f* coming in contact with the top of the vat A. This frame F may be raised or lowered by means of chains *p*, attached to drums P, carried upon a shaft *q*, which is rotated by means of a hand-wheel S through gearing R Q. A pawl *r*, attached to the main frame, may be used to lock the gear R, and thus limit the position of the frame F within the vat when not resting positively upon the arms *f*. By this adjustment the rollers carried by the frame F may be immersed to various depths in the alkali solution to modify the degree of treatment of the fabric.

Journaled in the frame F is a series of rollers G H G H H, adapted to roll in contact with each other to form a train. These rollers are geared together by means of spur-gears J, and consequently derive their power from the main shaft M through the intermediate gear J′ on the roller I. The several rollers are arranged in series, so that the fabric S passes over and under the rollers alternately in a manner to be maintained in a stretched condition and subjected to a series of successive pressures or squeezing actions in passing between them. The rollers H are supported in the frame F, with provision for

adjustment, the means being the adjustable box K, in which the rollers are journaled, made adjustable by means of screws *h*. By this means the distance and pressure between the rolls G and H and between the last two rolls H H of the series and also between the rollers H and I may be varied to suit the requirements and where the thickness of the fabric varies. The fabric in passing between these various rollers will be subjected to a series of successive squeezing actions while submerged in the liquid, and at intervals between the said squeezing actions it is exposed to the atmosphere, though this latter is not essential until the final removal of the fabric from the mercerizing liquid.

B B are two tension-rolls and are journaled in the front portion of the frame of the machine, pressure being applied to the upper roller by adjusting-screws C, which may be rotated by means of bevel-gears D, operated by a shaft *e*, turned by a hand-wheel E. These rollers B B grip the fabric and feed it regularly, so that the pulling of the fabric through the machine by the squeeze-rolls L L and the remaining train of rolls will insure the fabric running in a very tight condition while passing through the machine, thereby insuring it being free from all wrinkles or creases. As the fabric is kept in a very tight condition about the surface of the several pressure-rolls while in a mercerizing fluid, there is no possibility of it shrinking laterally while under the action of the alkali.

After the fabric has been mercerized by passing through the machine hereinbefore described it may pass to a washing-machine or, if desired, direct to a tentering-machine or be subjected to any of the usual methods of treatment for mercerized fabric.

While I prefer the construction shown, I do not confine myself to the minor details thereof, as they may be modified without departing from the essential features of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a mercerizing-machine, the combination of a vat, a pair of pressure-rolls for applying pressure to the fabric as it first enters the machine and a series of cylindrical pressure-rollers geared together and having their lines of contact at a point below the level of the mercerizing fluid in the vat and between which the fabric is drawn and with which it has continuous contact throughout the entire series, squeeze-rolls arranged at a higher level than the liquid in the vat for squeezing the excess of mercerizing fluid from the fabric before leaving the machine, means to vary the extent of pressure and distance between the pressure-rolls located in the vat, and a frame carrying said pressure-rolls and adjustably supported in the vat so as to be raised or lowered therein.

2. In a mercerizing-machine, the combination of a vat, a pair of pressure-rolls for applying pressure to the fabric as it first enters the machine, and a series of cylindrical pressure-rollers geared together and having their lines of contact at a point below the level of the mercerizing fluid in the vat and between which the fabric is drawn and with which it has continuous contact throughout the entire series, a frame adjustably connected with the vat and in which the pressure-rolls are journaled, means to adjust the position of the adjustable frame, power devices for positively rotating the series of rolls at the same surface speeds, and squeeze-rolls arranged at a higher level than the liquids in the vat for squeezing the excess of mercerizing fluid from the fabric before leaving the machine.

3. In a mercerizing-machine, the combination of a vat, a pair of pressure-rolls for applying pressure to the fabric as it first enters the machine, a series of cylindrical pressure-rollers geared together and having their lines of contact at a point below the level of the mercerizing fluid in the vat and between which the fabric is drawn and with which it has continuous contact throughout the entire series, a frame carrying the pressure-rollers and journaled to the vat adjacent to the squeeze-rolls, power devices connecting the several pressure and squeeze rolls to cause them to travel at the same surface speeds, and means to adjust the pivoted frame to vary the depth of the pressure-rolls in the fluid in the vat, and squeeze-rolls arranged at a higher level than the liquid in the vat for squeezing the excess of mercerizing fluid from the fabrics before leaving the machine.

4. In a mercerizing-machine, the combination of the vat, a series of cylindrical pressure-rolls geared together so as to move at the same surface speeds and in contact to form a series of pressure-points and with which the fabric has contact throughout the entire series, an adjustable frame carrying said pressure-rolls and raising and lowering them in the vat, squeeze-rollers at a higher elevation to act upon the fabric after its treatment in the liquid by the pressure-rolls to remove the excess of fluid, and tension devices for putting the web of fabric under tension immediately prior to its being received by the pressure-rolls.

5. In a mercerizing-machine, the combination of the vat, a series of cylindrical pressure-rolls geared together so as to move at the same surface speeds and in contact to form a series of pressure-points and with which the fabric has contact throughout the entire series, means to adjust the said pressure-rolls

to vary the extent of the pressure upon the fabric passing between them, an adjustable frame carrying said pressure-rolls and for raising and lowering them in the vat, squeeze-rollers at a higher elevation to act upon the fabric after its treatment in the liquid by the pressure-rolls to remove the excess of fluid, and tension devices for putting the web of fabric under the tension immediately prior to its being received by the pressure-rolls.

In testimony of which invention I hereunto set my hand.

HARRY W. BUTTERWORTH.

Witnesses:

J. W. KENWORTHY,

R. M. KELLY.