3 Sheets—Sheet 1.

H. CAVIN.

Paper-Damping Machine.

No. 215,321. Patented May 13, 1879.

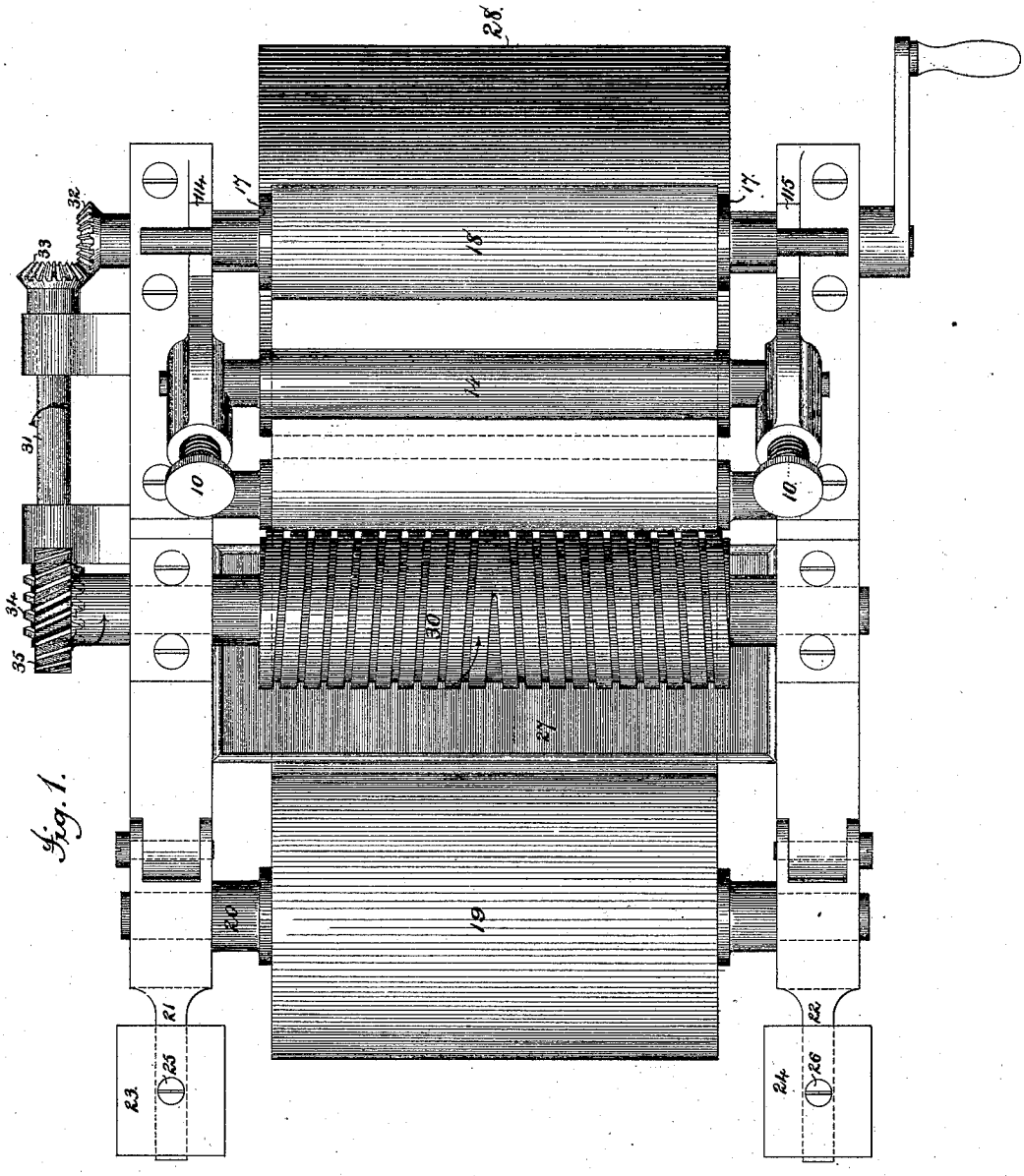

Fig. 1.

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3 Sheets—Sheet 2.

H. CAVIN.

Paper-Damping Machine.

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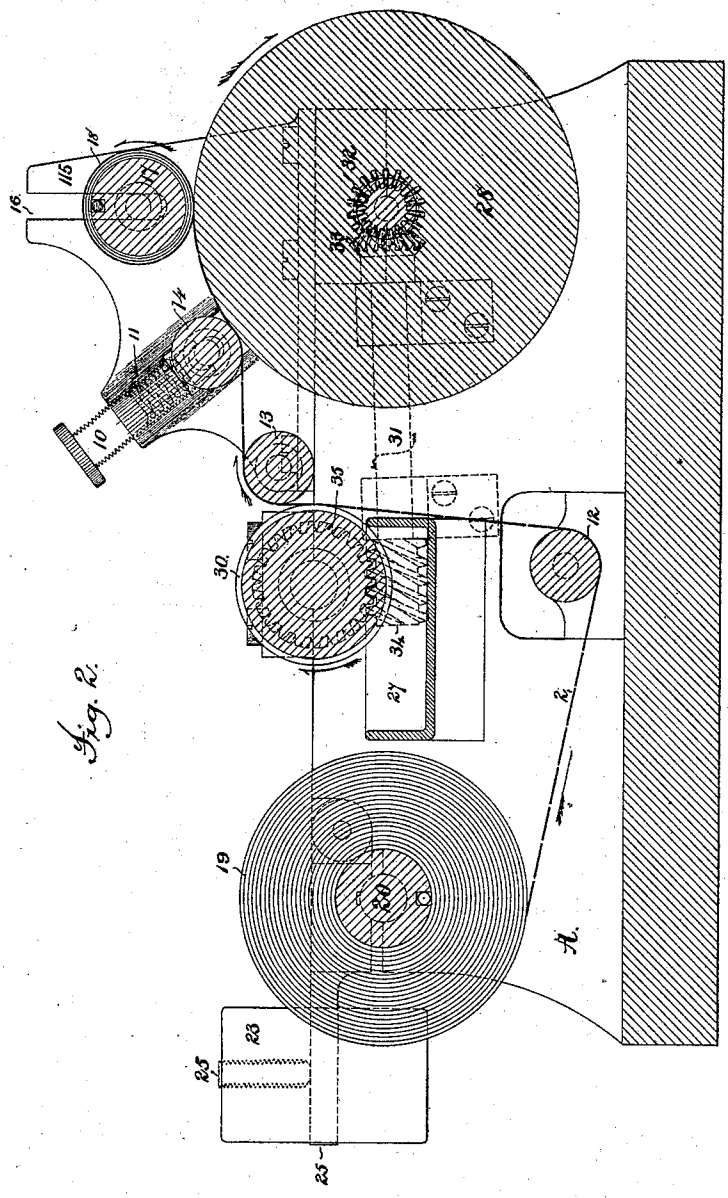

Fig. 2.

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3 Sheets—Sheet 3.

H. CAVIN.

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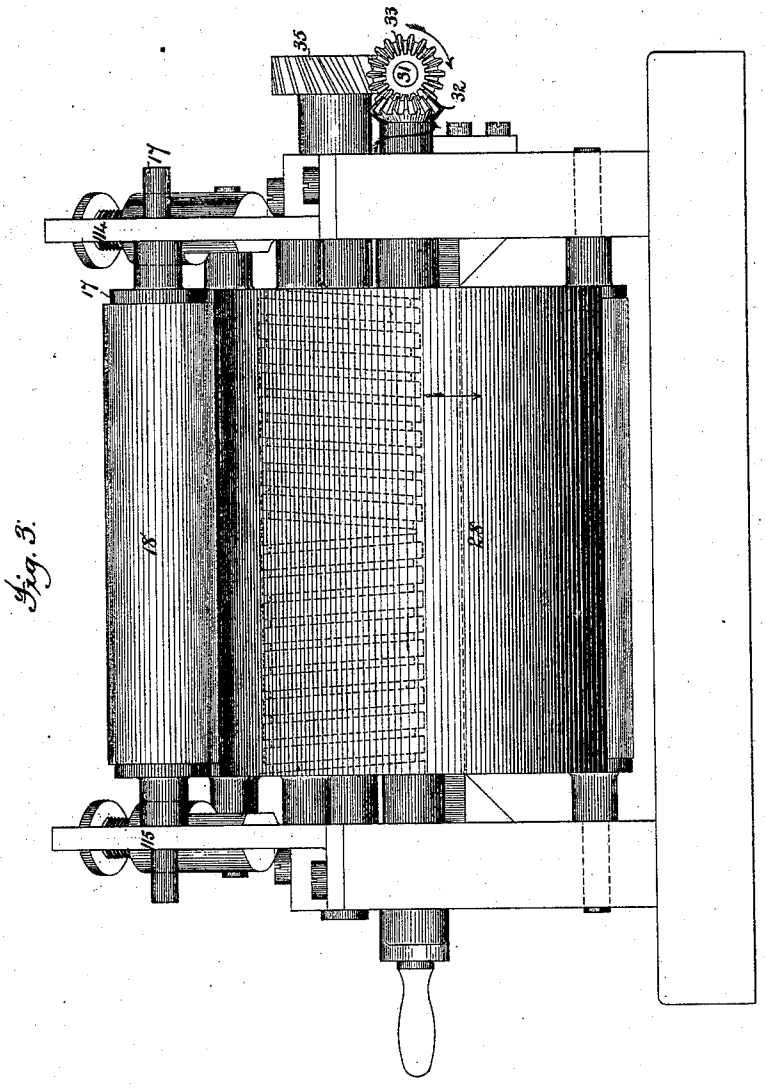

Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY CAVIN, OF NEW YORK, N. Y., ASSIGNOR TO R. HOE & CO., OF SAME PLACE.

IMPROVEMENT IN PAPER-DAMPING MACHINES.

Specification forming part of Letters Patent No. **215,321**, dated May 13, 1879; application filed February 17, 1879.

To all whom it may concern:

Be it known that I, HENRY CAVIN, of the city, county, and State of New York, have invented certain new and useful Improvements in Paper-Damping Machines, of which the following is a full, clear, and exact description, reference being had to the drawings which accompany this specification.

In said drawings, Figure 1 is a plan view, Fig. 2 a longitudinal sectional elevation, and Fig. 3 a rear end elevation, of a machine embodying my invention.

This invention constitutes an improvement in that class of paper-damping machines in which a web of paper wound up in the form of a dry-roll and mounted upon a shaft at one end of the machine is wound up in the form of a wet-roll upon a shaft at the other end of the machine, the said web being dampened by a suitable wetting apparatus in its passage from the dry-roll to the wet-roll.

This invention relates particularly to the damping apparatus of such machines; and consists in a circumferentially-grooved wetting-cylinder, the unremoved peripheral parts of which take up the water from a reservoir and apply it in a broken transverse line at the point of contact of the web therewith, whereby certain dry portions of the web are maintained longitudinally to insure its tensile strength in being drawn through the machine until it is wound upon the wet-roll, when such dry parts coming into contact with the wet parts absorb their moisture, and the said web becomes evenly and perfectly dampened throughout its whole extent. The said invention also comprehends modifications of the wetting-cylinder and combinations of parts, as will be more particularly hereinafter set forth.

To clearly understand this invention, a description of the construction of the illustrated machine embodying it will first be given.

The shaft 20 of the dry-roll 19 is mounted in suitable journals in a proper frame-work, as A, to which shaft is applied a regulating friction apparatus by means of any well-known device, such as the hinged levers 21 22, upon which are secured adjustable weights 23 24 by means of screws 25 26.

The wet-roll is formed by winding the web upon a suitable winding-up shaft, 17, the journals of which have their bearings in slots 16, provided in side brackets 114 115, constituting a part of the frame A, said slots being cut deep enough to permit the winding-up shaft to rest upon the driving-cylinder 28. The web 2, at the beginning of the operation, passes from the dry-roll around leading-rollers 12 13 and under a spring-seated pressure-roller 14, which holds it in contact with the driving-cylinder 28, and thence to the winding-up shaft 17, upon which, its end being secured in any common manner, it is wound up to form the wet-roll. The movement of the driving-cylinder 28, upon which the winding-up shaft 17 and the dampened paper web when accumulated upon it presses with a force equal to its weight plus the paper-web wound upon it, imparts rotation to the said winding-up shaft, and thus draws the web from the dry roll 19 through the machine, and causes it to be wound up on said shaft 17 in the form of a wet-roll. When the said operation is begun, or the wet-roll is of small dimensions, and consequently of moderate weight, the friction produced thereby upon the winding-up cylinder 28 is insufficient to cause the latter to drive the said shaft or wet-roll, and thus move the web. To insure a positive action at this time, as well as to cause a regular winding-up action at all times, a pressure-roller, 14, provided with springs 11, adjustable by thumb-screws 10, is provided, the operation of which is to positively press the web upon the said driving-cylinder, and thereby cause said web to be positively drawn through the machine. The wet-roll 18, being thus relieved from assisting in the operation of drawing the web from off the dry-roll and through the machine, is free to be rotated by its frictional contact with the driving-cylinder 28, and may thus be easily rotated to wind the web up on its surface. This pressure-roller thus applied is not, however, claimed to be of my invention.

The damping apparatus consists of a water-reservoir, 27, in which runs a wetting-cylinder, 30, having a spirally-grooved surface, in contact with the unremoved periphery of which the paper web is stretched by means of guiding-rollers 12 13. This wetting-cylinder is

driven by means of a counter-shaft, 31, geared at one end to a bevel-pinion, 32, on the shaft of the driving-cylinder 28 by means of bevel-pinion 33, and it carries at its opposite end a worm, 34, that gears with a worm-wheel, 35, on the shaft of said wetting-cylinder 30, the latter being thus driven at a very slow speed as compared with that of the driving-cylinder 28.

The spiral groove cut in the surface of the wetting-cylinder begins in the center thereof, and extends therefrom to the right and left in the manner of a right and left handed screw, the pitch of which spiral groove may be varied from that shown in the drawings, while its width may be greater or less than that shown without departing from my invention.

By providing the wetting-cylinder with a spiral groove a peripheral surface interrupted or broken transversely remains, which surface, as is obvious, alone will carry the water from the reservoir and deposit it upon the web running in contact with said cylinder.

It will therefore be readily appreciated that, though the wetting of the web is continued in nearly longitudinal lines, the same are also separated by lines of dry space; hence the web after passing the wetting-cylinder will not at any point be continuously dampened transversely. As it thus remains dry to a considerable extent longitudinally its tensile strength is maintained to such a degree as to enable it to be drawn forward by such force and under such tension as to insure its being wound up on its winding-up shaft in a compact and smooth roll.

When the dampened web is wound upon itself on the winding-up shaft it is apparent that its lines of damping will occupy such angles to its sides and such relations to each other in the superposed layers that they will so overlie and have cross-contact with each other and the dry parts of the web as to impart to the latter by capillary attraction a most thorough and even dampening of the entire web.

It will be at once apparent that if the grooves in the wetting-cylinder were concentric the remaining parts of its periphery would dampen the paper in parallel lines, which lines, overlying and registering with each other when the web is wound up, would imperfectly dampen the remaining dry parts; yet if the grooves were narrow the useful results of my invention would be accomplished. It is therefore to be understood that such a grooving of the wetting-cylinder is within the scope of my invention.

If the spiral groove in said wetting-cylinder simply runs from one end to the other, its angling edges, as the web runs much faster than the cylinder, would tend to carry the web constantly to one side, and thus cause the same to improperly wind upon the winding-up shaft or wet-roll; and even when said grooves are cut so as to run from the center equally to the right and left, if the web, in passing in contact with said cylinder, runs in the direction in which the grooves converge, they will have a tendency to draw the web toward the center, and thus form plaits or creases in it; but if, on the contrary, the web runs in the direction in which the grooves diverge, as illustrated—no matter which direction the cylinder revolves, as its motion is so very slow in comparison with the motion of the web—the grooves will act to spread or smooth the web from the center toward each edge, as has long been practiced in cloth-winding machines.

It is well known in this art that various qualities of printing-paper are in common use, and that the paper furnished to and used for the same work frequently varies in quality.

As some qualities of paper require a greater quantity of water to dampen them than do others, it is expedient to furnish the machine either with change-gearing or with differential pulleys, so that the speed of the wetting-cylinder with relation to the driving-cylinder may be varied to control the amount of water that the wetting-cylinder shall carry to the web. This, however, is not claimed by me, as it is the invention of S. D. Tucker.

This machine is to be understood as furnished with such gearing as is common in wetting-machines, whereby the wetting-cylinder may be revolved at the requisite speed to impart the necessary amount of water to the web according to the quality of the paper composing it. This speed may be readily determined by slight experience, if the fact be taken into consideration that where the unremoved portions of the periphery of the wetting-cylinder are narrow a greater speed of said cylinder will be required to deposit a given quantity of water upon the web than where said unremoved portions are wider.

Any means for carrying the paper web through the machine and winding the same up in a wet-roll may, of course, be substituted for those shown herein without departing from my invention.

What is claimed is—

1. A wetting-cylinder for paper-damping machines provided with a circumferentially-grooved periphery, substantially as described.

2. A wetting-cylinder for paper-dampening machines, the spirally-cut groove in whose periphery begins in the center and runs to the right and left, whereby the paper is properly dampened and smoothed or evened laterally, substantially as described.

3. The combination, with the dry-roll shaft, the winding-up shaft for the wet-roll, and a means for unwinding the web from the one and winding it up on the other, of a circumferentially-grooved wetting-cylinder and water-reservoir, all substantially as described.

4. The combination, with the driving-cylinder and winding-up shaft, of a circumferentially-grooved wetting-cylinder, driven at a less speed than the former, substantially as described.

5. The combination, with means for carry-

ing the web in contact with the grooved wetting-cylinder in the direction in which said grooves diverge or incline outward, of means for revolving said cylinder at a slower speed than the said web moves, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY CAVIN.

Witnesses:
CHAS. W. CARPENTER,
A. S. BURLINGHAM.