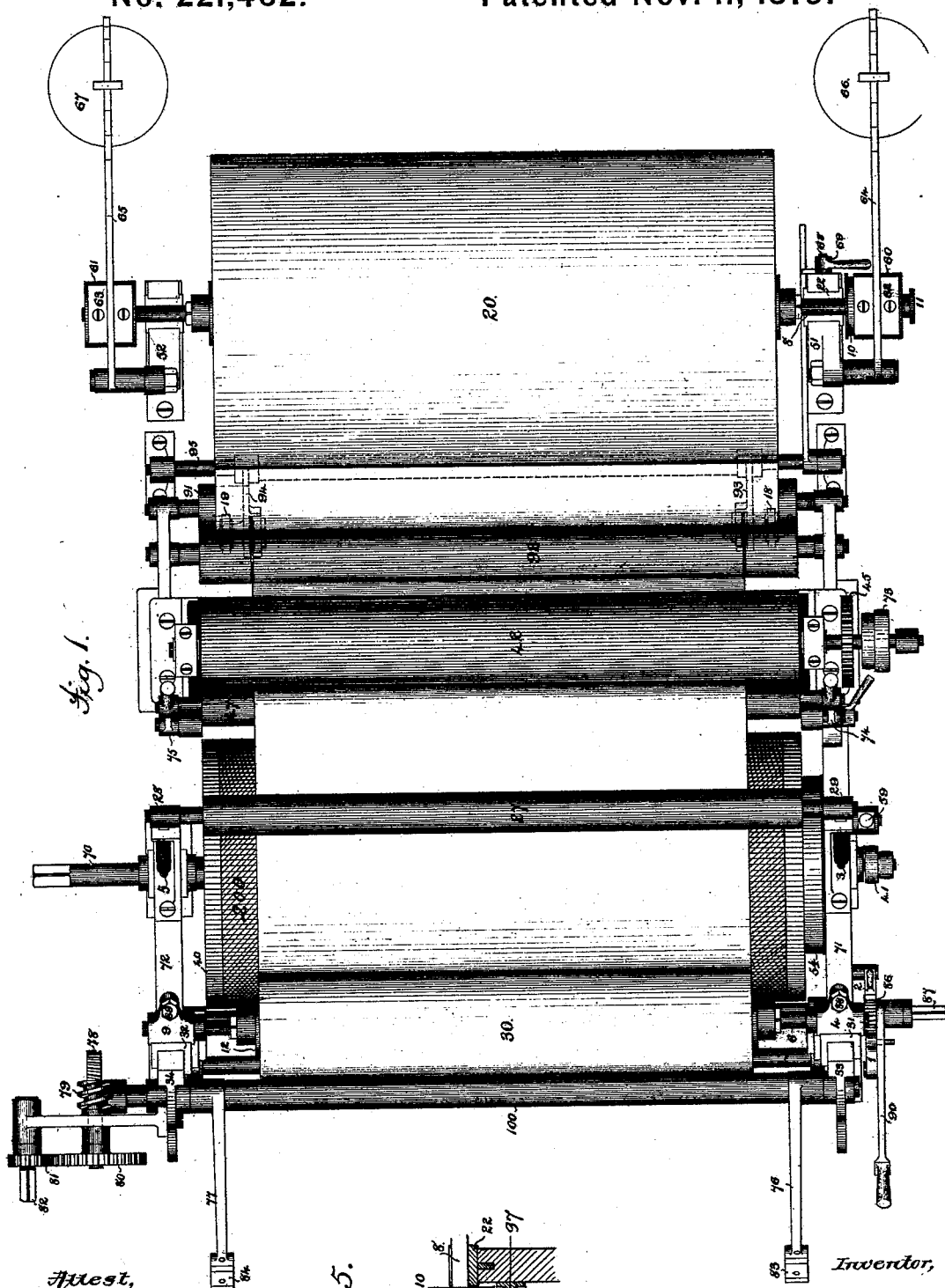


R. M. HOE.
Paper-Damping Machine.

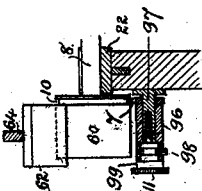
No. 221,462.

Patented Nov. 11, 1879.



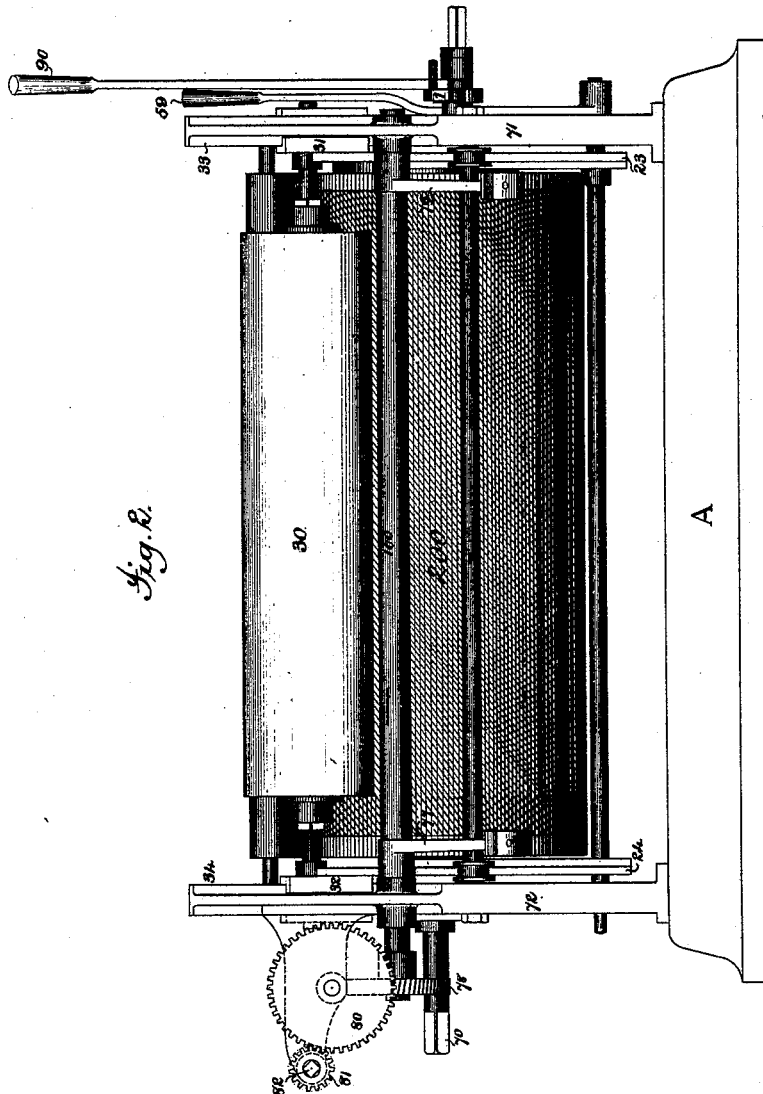
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Fig. 5.



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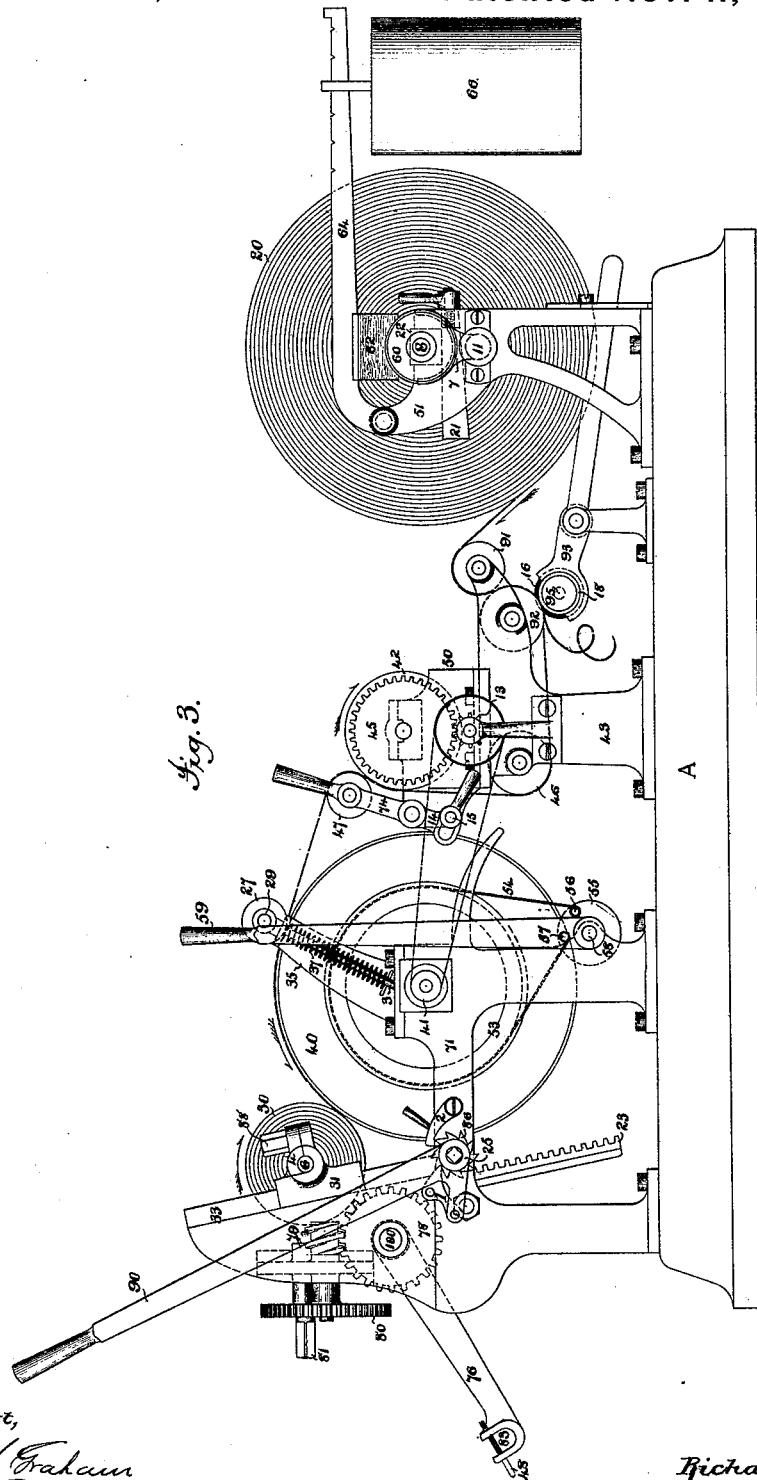
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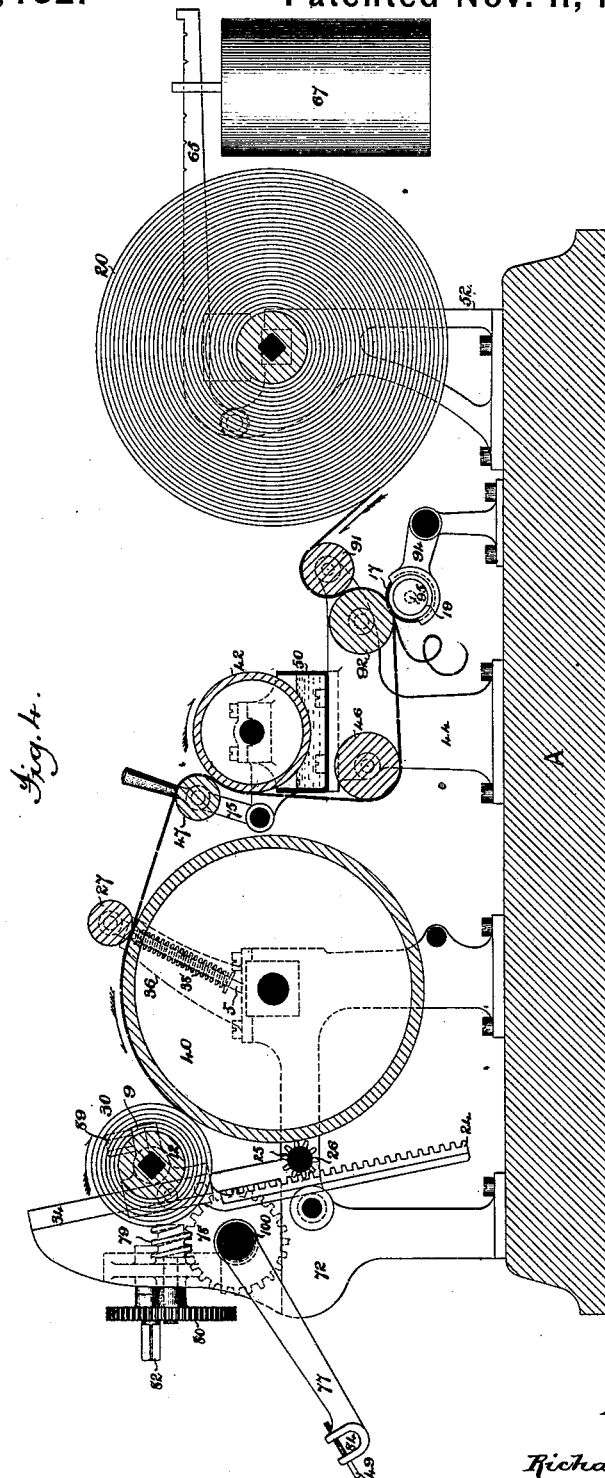
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UNITED STATES PATENT OFFICE.

RICHARD M. HOE, OF NEW YORK, N. Y.

IMPROVEMENT IN PAPER-DAMPING MACHINES.

Specification forming part of Letters Patent No. **221,462**, dated November 11, 1879; application filed March 3, 1879; patented in England, July 12, 1871, and June 12, 1876.

To all whom it may concern:

Be it known that I, RICHARD M. HOE, of the city, county, and State of New York, have invented certain new and useful Improvements in Paper-Damping Machines; and I do hereby declare that the following specification, in connection with the accompanying drawings, forms such a full, clear, and exact description of the same as will enable others skilled in the art to make and use my improvements.

In said drawings, Figure 1 represents a plan view of a machine embodying my improvements. Fig. 2 is an end view thereof. Fig. 3 is a side elevation of the same. Fig. 4 represents a longitudinal vertical section of said machine, and Fig. 5 is a detail view of one of the minor parts.

The invention relates to that class of damping machines in which the web of paper is mounted in the form of a dry-roll at one end, and wound up in the form of a wet-roll upon a core or shaft mounted in the opposite end of said machine, a suitable damping apparatus being interposed between said dry and wet rolls, so as to apply a suitable quantity of damping material to the passing web.

The invention consists in providing such a machine with mechanism for adjusting the shaft of the dry-roll; in an improved web-carrying mechanism; in an improved mechanism for raising the wet-roll, its core or shaft; in mechanism for removing the wet-roll out of the machine; and in details of construction and combinations of parts, all of which will be more particularly hereinafter set forth.

In order to a ready understanding and appreciation of the invention, the machine herein illustrated as embodying the same will first be fully explained.

The core-shaft 8 of the dry-roll 20 is mounted at the rear end of the machine in suitable bearings in brackets 51 52 rising from the bed-plate A. This shaft 8 projects beyond or outside of said brackets, and is furnished with brake-pulleys 60 61, upon which rest brake-blocks 62 63, that are pressed downward by weighted levers 64 65, the weights 66 67 of which are adjustable in the usual manner. Any other suitable friction device may, however, be employed to properly retard the rotative movement of the dry-roll 20.

The pulley 60 is grooved at its inner end, so as to provide a means for adjusting and holding the core-shaft 8 of the dry-roll in its proper relation longitudinally with respect to the mechanisms, which means consists of a guide-yoke, 7, that projects from a sleeve, 96, and enters the grooves 10 of said pulley 60. This sleeve slides to and from the frame of the machine on a stud, 97, projecting therefrom, which stud has a central threaded recess, in which turns a threaded pin, 11. This pin, having a groove in which a screw, 98, passing through one end of the sleeve 11 enters, and having a shoulder, 99, abutting against the outer end of the said sleeve, it follows that when said threaded pin is turned the sleeve will be moved outward or inward, carrying with it the core-shaft 8 of the dry-roll, which may thus be adjusted with respect to the winding-up mechanisms or other devices of the machine, and thereby insuring the proper travel of the web with respect to them.

It sometimes happens that the web, though its dry-roll may be properly aligned with the mechanisms that are to operate upon it, will, in consequence of inequalities in the paper or other causes, irregularly move forward as it is drawn to the mechanisms that are to operate upon it. This may be overcome by providing the core-shaft with means for raising one of its ends, which is done in this machine by a sliding wedge-shaped bearer, 21, that underlies the box 22 of said shaft, and is moved longitudinally to raise or lower said core-shaft 8 by its projecting threaded rod 68 and an adjusting-nut, 69, rotating thereon, and bearing against the bracket 51, in a recess of which said bearer slides. A slight raising or lowering of one end of the core-shaft will, as is readily apparent, cause the web to travel to one or the other side of the machine, as is required.

The winding-up apparatus consists of a wet-roll core-shaft, 6, which is mounted in sliding bearings 31 32, which slide upon and partially embrace the vertically-inclined bearers 33 34, by which construction the wet-roll-carrying shaft is held in position and yet is free to move with said roll up and down upon said bearers. These inclined bearers are fixed in such a position with regard to the surface of the driving-cylinder 40 that at the beginning of the operation of winding up the web upon the core 12,

(or its shaft 6, if the core is omitted,) at which time the wet-roll is small and light, said roll will be so drawn down and against the periphery of the driving-cylinder by the traction thereof as to receive sufficient pressure from said cylinder to produce tight and even winding; and as said roll increases in size and weight and is raised upon said bearers the frictional pressure decreases and its static pressure increases, the requisite amount of pressure being thus constantly provided to produce an even and tight winding up of the web in the form of a wet-roll. This structure is, however, of the invention of Stephen D. Tucker, and is only shown herein to illustrate features of my invention yet to be described.

In damping-machines provided with these inclined bearers for guiding the shaft of the wet-roll it has been found expedient to provide means for equalizing the upward movement of said shaft at the beginning of the winding operation, for the reason that, since the paper web is at times thicker at one side or edge than at the other, it will consequently wind faster at one side, and, of course, increase the diameter of the wet-roll at that end faster than at the other. The effect of this will be to make one end of the winding-up shaft rise faster than the other, and this defect will be aggravated by the wedge-shaped space which the said wet-roll occupies at the commencement of the winding-up operation, and which will tend to make the web run endwise upon the roll, which, if continued, would break the web. This the said Tucker remedied by providing the wet-roll shaft with lifting-levers, whereby either end, as desired, might be raised.

My machine is provided with an improved means for effecting this same result, which consists in providing the sliding bearings 31 32 with downwardly-projecting racks 23 24 that engage with pinions 26 carried by a transverse shaft, 25, which is journaled in the side frames and provided with any suitable means for rotating it. A slight upward movement of said sliding bearings and through them of the shaft 6, may thus be made at will.

The shaft 25, which, through the pinions 26 and the racks 23 24, is employed to raise the wet-roll, is provided at one end with a ratchet, 86, and pawl 2, to sustain the winding-up shaft of said roll in any vertical position to which it may be raised, and said shaft may be rotated to so raise said wet-roll by means of an ordinary crank applied to its squared end 87, or be provided with a pivoted lever, 90, carrying a pawl, 1, which engages the teeth of the ratchet-wheel 86, and partially rotates the same as said lever is vibrated.

The driving-cylinder 40 is hung in proper bearings in the side frames 71 72, and has its shaft extended at one end, 70, to receive the driving-pulleys, and at the other to carry a differential pulley, 41.

When the web breaks during the operation of damping, it is desirable to stop the cylinder 40 as soon as possible. To effect this, the

cylinder is provided with a brake-pulley, 53, at one end, over which runs a friction-band, 54, the ends of which are secured to studs 56 57, projecting from one side of a disk, 55, that is fast upon a shaft, 58, properly journaled, and furnished with a hand-lever, 59, for turning it. It is manifest that upon slightly vibrating the lever 59 to the right, the disk 55 will be so turned as to draw the band 54 tightly upon the pulley 53, and, the driving-belt being shifted to the loose pulley, thus arrest the rotative movement of the driving-cylinder.

Heretofore the static pressure of the wet-roll upon the driving-cylinder, aided by weights, has been depended upon to insure the proper rotation of said wet-roll and the consequent even and true winding of the web. It has been found by experience that the adhesion produced by the contact of the web with the plain surface of the driving-cylinder, unless the pressure is excessive, is not always sufficient to impart a movement to said web. This defective operation is overcome by clothing said cylinder with a textile fabric, as at 200, whereby the requisite amount of adhesion between the web and cylinder is created to insure the perfect winding of the web upon the wet-roll.

Another defect in the operation of paper-damping machines is caused by depending wholly upon the movement of the frictionally driven wet-roll, to draw the web from off the dry-roll and advance the same through the machine.

This is remedied by my invention which provides a spring-seated pressing-roller, 27, that bears with so much force upon the surface of the driving-cylinder as to securely nip the web between the two, and thus draw it through the machine without regard to the winding-up movement it receives from the wet-roll. This pressing-roller 27 runs in sliding boxes 28, 29, from which depend rods 3 5, that are guided in brackets 35 36, rising from the side frames 71 72, which rods 3 5 are encircled by springs 37 38, which bear against shoulders at the heads of the brackets 35 36, and upon stops fixed to the lower ends of said rods.

The damping apparatus consists of a water-reservoir, 50, partially filled with water, in which runs a wetting-cylinder, 42, that is mounted upon a shaft which runs in bearings provided in said reservoir, and this reservoir is secured to brackets 43 44 rising from the bed-plate A. This cylinder is driven by a toothed wheel, 45, that meshes with a pinion, 13, which is carried by a short shaft upon which is a differential pulley, 73, to which latter motion is communicated by a belt running over the differential pulley 41 on the shaft of the driving-cylinder 40. This gearing is such as to impart a very slow speed to the wetting-cylinder as compared with that which the driving-cylinder has, and consequently that at which the web is carried through the machine and caused to pass in contact with

the periphery of the wetting-cylinder, against which it is stretched by means of guiding-rollers 46 47. The upper one, 47, of these guiding-rollers is mounted in swinging arms 74 75 fast upon a shaft that is journaled in projecting parts of the reservoir 50, and provided with a depending arm, 14, slotted to embrace a clamp-screw, 15, by which the position of said arms and consequently that of the stretching-roller 47 is determined.

By loosening the clamp-screw the roller 47 may be swung away from the wetting-cylinder to remove the web from contact therewith when the machine is stopped, whereby the soaking of the paper web, which would cause it to break when the machine again started, is prevented.

No part of this arrangement of stretching-rollers 47 46 and the adjustment of the former is claimed by me, as the same is of the invention of S. D. Tucker.

It is sometimes desired to dampen the paper at the paper-mill before it is sent to the printing-office, and when this is the case the operation of trimming the edges of the web, which are quite ragged on leaving the paper-making machine, may be performed at the same time that the web is dampened, and the expense of performing that operation separately be avoided. Webs of paper are often made so wide that they have to be slit up into two and sometimes three narrower ones, according to the requirements of the different printing-offices.

These objects are effected by one branch of my invention, which consists in providing a wetting-machine with cutting devices for dividing the web as it passes from the dry-roll to the wet-roll. As here shown, these cutters are two in number, which are arranged to trim each edge; but it is apparent that central cutters for dividing a wide web into two or more narrow ones may be employed either with or without edge-cutters. These cutters are simple cutting-disks 16 17 running in contact with a suitable cutting-roller, over which the web is caused to travel, in the case illustrated the web being stretched over two rollers, 91 92, and the cutters being mounted upon a shaft, 95, carried in arms 93 94, which shaft 95 is provided with driving-wheels 18 19 that bear against the roller 92. Of course, these cutters may enter slots in said roller 92, as shown, or cut against a proper surface prepared for that purpose. They may also be driven by a positive motion and independently of the movements of the roller 92.

In order to throw these cutters out of operation, that the damping operation alone may be carried on, many arrangements for their adjustment may be devised. In the present instance the shaft 95 carrying the arms 93 94 is provided with a holding-lever, which, engaging with a ratchet-bar, secures said arms in a raised or lowered position, as may be desired.

This whole cutting arrangement may be located, of course, at any convenient point be-

tween the dry and wet rolls, and even so that the cutters may co-operate with the driving-cylinder.

By supplying a web-damping machine with cutters as has been described, the paper web is prepared in perfect order for use in a web-perfecting printing-machine.

So much of the machine as is necessary to an understanding of the operation of trimming, slitting, and damping a paper web having been explained, the same will now be described.

The end of the web from the dry-roll 20 is passed over the roller 91, under the roller 92, past the cutters 95, under the roller 46, over the roller 47, between the pressing-roller 27 and the surface of the driving-cylinder 40, and is fastened to the winding-up shaft 6 or a core, 12, carried thereon, the means of securing said web end thereon being a suitable cement or a mechanical device, as may be desired. The machine having been set in motion the wet-roll shaft or core thereon will pass against the periphery of the driving-cylinder sufficiently to insure its receiving a rotative motion by its adhesion of contact, and the web will be wound thereon.

The clamping-pressure of the roller 27 will cause the web to be nipped between its surface and that of the driving-cylinder 40, and thereby be surely drawn from off the dry-roll and trimmed at its edges and slit longitudinally, if desired, while passing the roller 92 and a cutter or cutters, 16 17, while the web, held in surface contact to the required extent with the wetting-cylinder 42, according to the position in which the roller 47 is fixed, will be properly coated upon one surface with a quantity of water, determined by the speed at which said cylinder 42 is revolved by the differential pulleys 73 and 41, and the driving-belt connecting them.

As the web, carrying upon its upper surface the water it has received from the wetting-cylinder 42 is wound up to form the wet roll 30, the wet surface of the web will, as it is lapped in layers in said roll, come into contact with the opposite side of the web, whereupon said web will, by capillary attraction, become evenly and thoroughly dampened.

As the operation is continued, the tension of the web is regulated by pressure on the brake-blocks 62 63, as required, and the wet-roll is assisted in its upward movement, if necessary, by the rotation of the shaft 25, as before explained. When the wet-roll has reached such dimensions that the sliding bearings 31 32, which carry its shaft 6, reach the limit of their upward movement upon the inclined bearers 33 34 the machine is stopped and said roll removed.

In machines prior to my invention it has been necessary to provide a lifting-crane or similar device for removing the heavy wet-roll of paper therefrom. The machine illustrated herein is provided with means for transferring the said wet-roll of paper from the machine to

the floor, which transferring apparatus may be applied to many other constructions of machines, and will now be described.

This transferring apparatus consists principally in swinging arms 76 77, that are mounted fast upon a shaft, 100, that is rotated in either direction by means of a worm-wheel, 78, on one end of it, which gears with a worm, 79, carried by a transverse shaft that may be rotated by any suitable means, as the toothed wheel 80, pinion 81, and crank-shaft 82. These swinging arms have their carrying-shaft 100 so placed, and are so positioned thereon, that they will swing upwardly past the ends of the wet-roll, and their ends be carried into the plane occupied by the winding-up shaft 6 in its vertical path of movement, and downwardly to a point low enough to permit the wet-roll when carried by them to rest upon the floor. The ends of these arms have sockets 83 84, capable of being opened to pass over the shaft 6 as the arms are swung into proper position, and closed to embrace said shaft, by means of pins 48 49.

When the wet-roll has reached its maximum size or is to be removed from the machine, it is raised by the lever, ratchet, pinions, and racks to the proper position, and the arms 76 77, after having their sockets opened by removing pins 48 49, are swung upwardly until they embrace said shaft 6. This done, the pins 48 49 are replaced and the caps 49, whereby the said shaft 6 has been held in the sliding bearings 31 32, are opened by taking out the screws 88 89 that secure them, whereupon the said shaft will be wholly supported by the arms 76 77, when the shaft 25 is rotated to carry the sliding bearings downward a short distance. A proper movement of the swinging arms 76 77 now made will carry the wet-roll bodily out of the machine and deposit the same upon the floor. It may then, after removing the pins 48 49, be rolled to any position for use.

The advantages of this transferring mechanism are too apparent to need enumeration, affording, as it does, in one and the same machine the means of removing the heavy wet-roll without injury thereto, and by the expense of slight power of a single attendant.

What is claimed is—

1. The combination, with the driving-cylinder of a damping-machine, of the pressing-roller 27, substantially as described.

2. The combination, with the swinging arms 76 77 and shaft 6, of the racks 23 24, and means for raising and lowering the same, all substantially as described.

3. The combination, with the driving-cylinder 40 and winding-up shaft 6, of the swinging arms 76 77, and means for swinging the same into a position to receive the said shaft in their embrace and to transfer the same with the roll of paper out of the machine, all substantially as described.

4. The combination, with the bearers 33 34 and guide-blocks 31 32 of the shaft 6, of the racks 23 24, pinion-carrying shaft 25, and means for rotating said shaft, all substantially as described.

5. The combination of the swinging arms 76 77 having ends capable of being passed over and locked to embrace the shaft 6 with said shaft, whereby the roll of paper wound upon said shaft may be transferred out of the machine, all substantially as described.

6. The combination of the shaft 8, its grooved pulley 60, a guide-yoke, and means for longitudinally reciprocating the same, substantially as described.

7. The combination, with the mechanisms of a damping-machine, whereby the web of paper is wound upon a shaft as 6 or core thereon, of a swinging transferring mechanism, whereby the roll of paper is removed from the machine, all substantially as described.

8. The combination, with the shaft 6 and swinging arms 76 77, of the shaft 100 and gearing for rotating said shaft, substantially as described.

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

RICHD. M. HOE.

Witnesses:

CHAS. W. CARPENTER,
FRANKLIN T. GROSS.