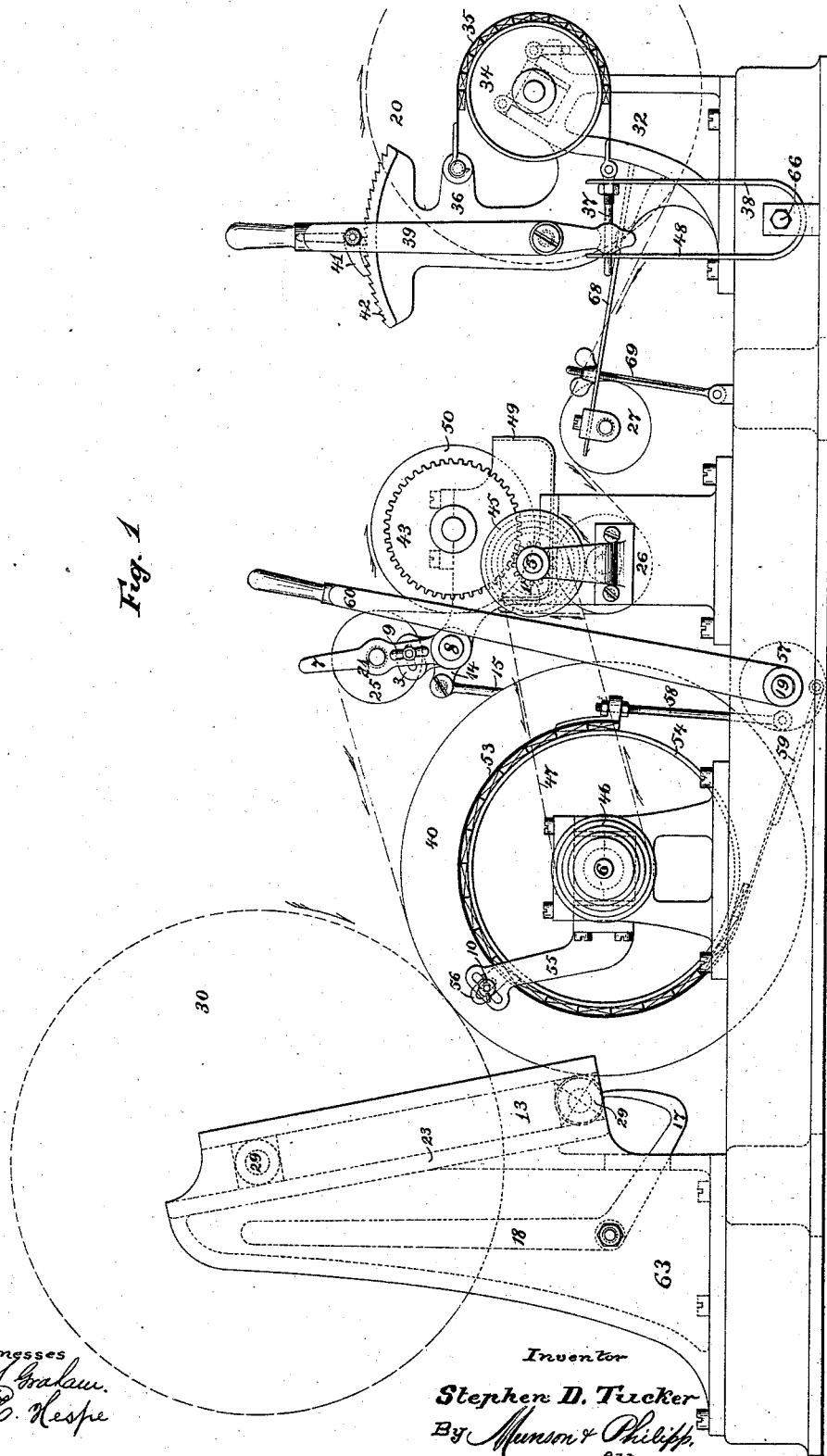


S. D. TUCKER.  
Paper-Damping Machine.  
No. 215,414. Patented May 13, 1879.

Fig. 1

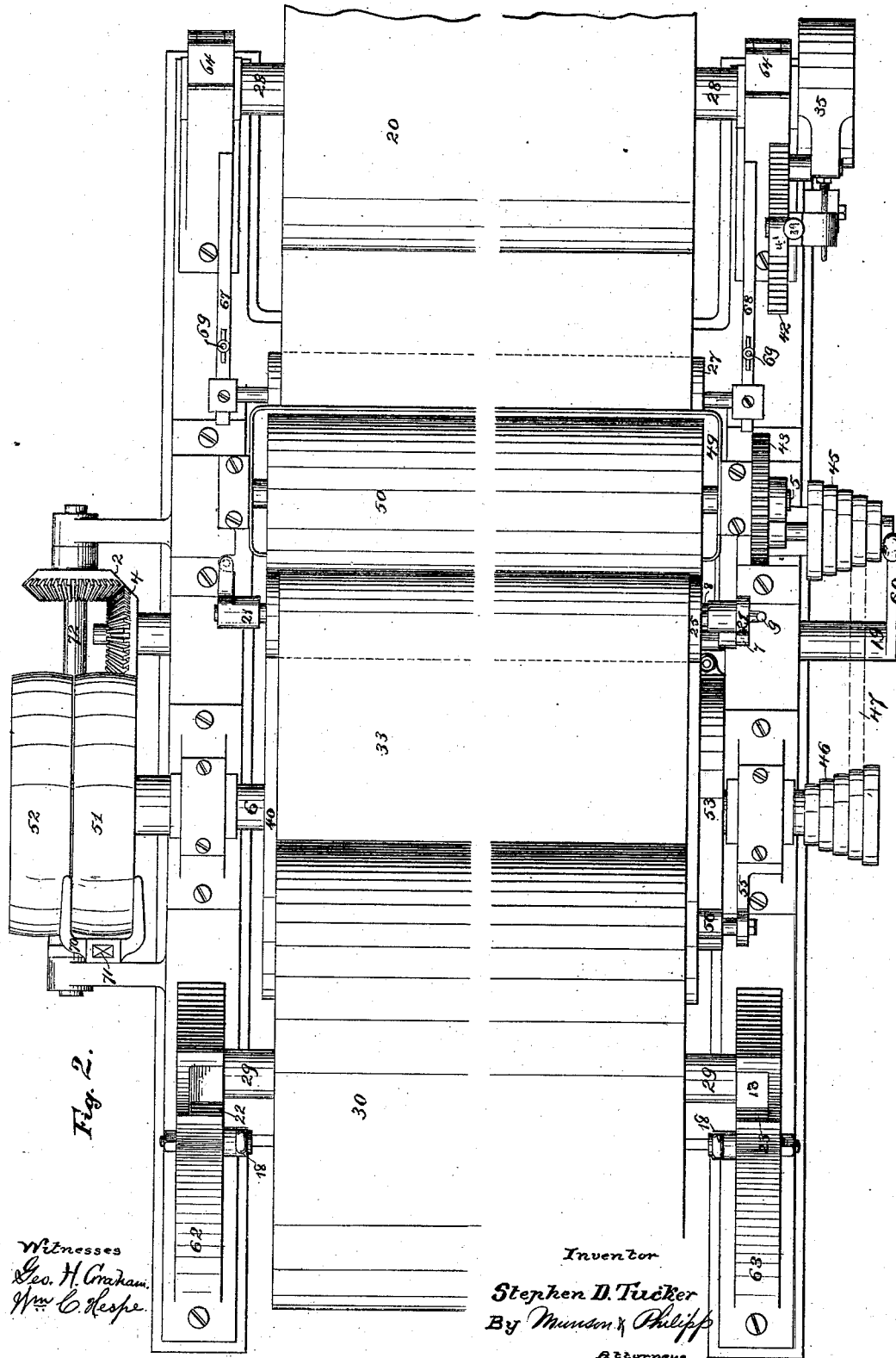


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4 Sheets—Sheet 2.

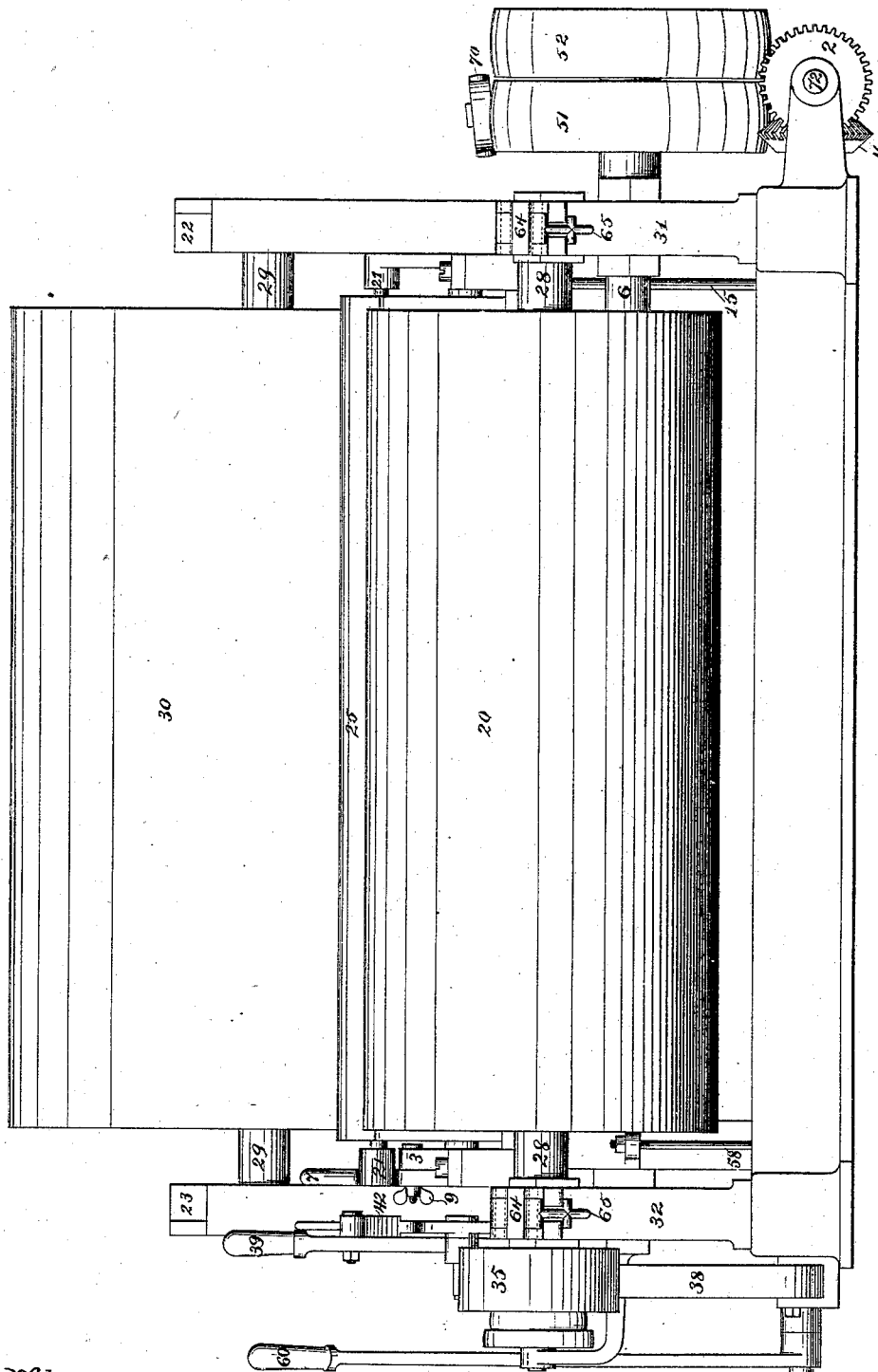


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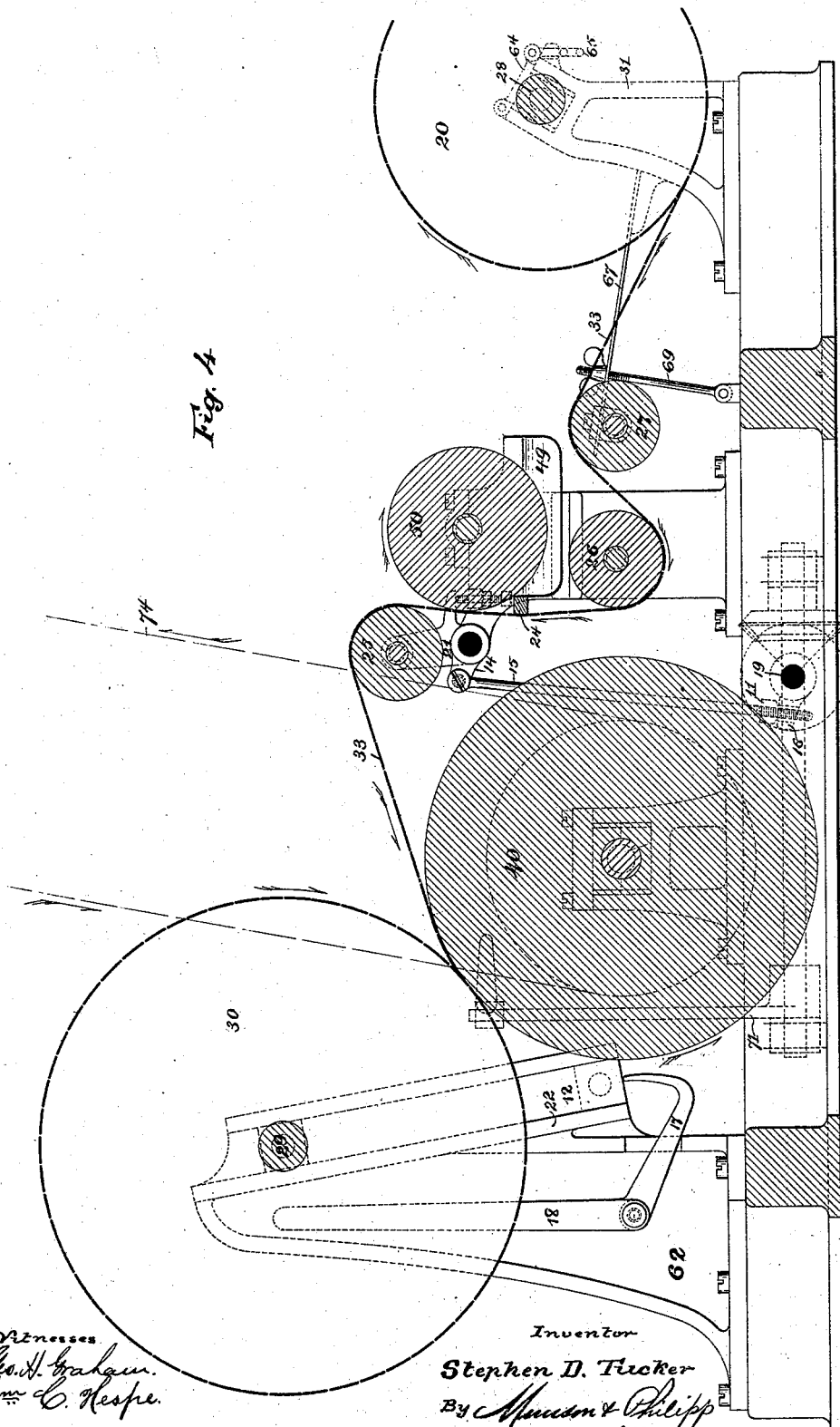
Fig. 3.



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# UNITED STATES PATENT OFFICE.

STEPHEN D. TUCKER, OF NEW YORK, N. Y.

## IMPROVEMENT IN PAPER-DAMPING MACHINES.

Specification forming part of Letters Patent No. **215,414**, dated May 13, 1879; application filed March 12, 1878.

### *To all whom it may concern:*

Be it known that I, STEPHEN D. TUCKER, of the city, county, and State of New York, have invented an Improvement in Damping-Machines, of which the following is a specification.

This invention relates to machines for damping or wetting fabrics in the web, and is especially adapted to the damping of such paper webs as are to be printed upon by the well-known perfecting or web-printing machine.

The principal feature of novelty in the present invention is found in the arrangement of the inclined guides for the shaft of the wet-paper roll with the driving-cylinder, whereby said roll, when small and light, receives sufficient pressure to produce tight winding by the downward traction of the winding-up cylinder, and as the said roll increases in size and weight, and is raised in said guides, the tractional pressure decreases and its static pressure increases, whereby the amount of pressure necessary to produce even and tight winding of the wet-roll is constantly maintained.

Other novel constructions of parts and combinations and arrangements of devices are, however, included in the invention, all of which are too fully hereinafter set forth to need preliminary description.

A machine embodying these improvements is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation; Fig. 2, a plan view; Fig. 3, an end elevation, and Fig. 4 a longitudinal sectional elevation.

As is understood in the use of damping-machines, the dry web of paper to be damped is in the form of a roll, the same being produced in the paper-mill, where the web is either wound upon a shaft, as 28, whose ends are fitted to receive journal boxes or bearings, and a pulley, as 34, or it is wound upon a hollow core which is adapted to receive such a shaft. Such a roll of dry paper is mounted in proper supports at one end of the machine, and is gradually unwound, dampened, and rewound upon a similar core on a shaft at the other end of the machine.

In the present instance, the supports for the shaft 28 of this dry-roll consist of two brack-

ets, 31 32, which rise from the bed-plate on opposite sides of the machine. They are provided at their upper ends with sockets adapted to receive the journal boxes or bearings of the shaft 28, and have hinged top plates 64, provided with locking-hasps 65, whereby they may be opened to receive, and closed to retain, the shaft 28 and its boxes or bearings.

The purpose of the pulley 34 is to furnish a medium for controlling the rotation of the dry-roll by means of a frictional device, which is provided with a flexible metal band, 35, which bears upon a considerable portion of the surface of this pulley 34.

This band 35 is attached at one end to a bracket, 36, and at the other to a bolt, 37, which is fast to one arm, 38, and plays loosely through the other arm, 48, of a U-shaped spring, which swings freely upon a pivot, 66, and the pressure it applies through the band 35 to the pulley 34 is regulated by means of a lever, 39, which is pivoted to the bracket 36, and bears at one end (through which the bolt 37 loosely passes) upon the spring-arm 48, and near its other end is provided with a pawl, 41, which, taking into a ratchet, 42, formed in the curved upper surface of said bracket, holds the position of the said lever, and regulates the yielding pressure applied by it to the spring, and through it to the friction-brake and dry-roll.

The damping apparatus consists of a wetting-roller, 50, whose shaft is mounted in brackets rising from the bed-plate, which roller runs in a water-fountain, 49. This wetting-roller is revolved through a toothed wheel, 43, on its shaft by means of a pinion, 1, on a shaft, 5, which latter also carries a cone-pulley, 45, driven by a belt, 47, from a cone-pulley, 46, mounted on one end of the driving-shaft 6. This gearing, it is to be observed, is such that the surface of the wetting-roller is moved at a much slower speed than that given to the web 33, and a varying speed of the wetting-roller is obtained.

The paper web 33 is led from the dry-roll 20 over a tension-roller, 27, which is supported at the ends of springs 67 68, and prevented from vibrating too freely by means of adjustable controlling-bolts 69 69. It is thence passed

under a leading-roller, 26, upward against a bearing-bar, 24, and over a leading-roller, 25, between which leading-roller 25 and bar 24 it is stretched against the surface of the wetting-roller 50. The office of the bearing-bar is to prevent the web from vibrating or fluttering against the surface of the wetting-roller, and thereby becoming unevenly dampened.

The quantity of water imparted by the wetting-roller to the web can be increased or diminished, as the quality of the paper may require, by increasing or diminishing the speed of said roller, and this is effected through the cone-pulleys 45 46, which drive it. The quantity of water imparted to the web by the wetting-roller can also be varied to a certain degree by causing the web to bear more or less upon the surface of said wetting-roller, and, to accomplish this, the upper leading-roller, 25, is arranged by means of the regulating-screw 9 so as to be adjustable in its position relative to the wetting-roller 50, and its shaft is journaled at either end in arms 21, which are fast upon the shaft 8; and the said roller is, by mechanism hereinafter to be described, brought at the proper time into the desired position of inclination with respect to the wetting-roller 50 and secured there by means of a slotted arm, 3, projecting from the side frame, in which plays the shank of the clamp-screw 9, which extends through one of the arms 21.

The driving-cylinder 40, over whose surface the web passes onto the winding-up shaft 29, which latter, together with the wet roll of paper accumulated upon its surface, is driven by frictional contact with said driving-cylinder, is mounted upon the driving-shaft 6, which is supplied with fast and loose belt-pulleys 51 52, as is common.

The wet-roll or winding-up shaft 29 may be furnished with a hollow core of wood or iron, as is common, and is supported in inclined guides 22 23, which are sustained on either side of the machine by brackets 62 63 rising from the bed-plate, and are placed at an angle less than forty-five degrees to a tangent to the circumference of the driving-cylinder at a point where the winding-up shaft (or core carried thereby) touches the latter. These guides are preferably provided with grooves 12 13, in which the ends of the winding-up shaft 29, or boxes mounted upon the same, are supported, the said shaft being thus rendered capable of rising and falling or sliding freely up and down therein. When placed therein, this shaft will descend until the surface of its core comes into contact with the periphery of the driving-cylinder 40, which is so placed that it permits the said core, when naked, to lie near the bottom ends of the grooves in the inclined guides, and thus be supported by the shaft 29, resting against the rear walls of said grooves, or directly against the guides 22 23, and the core against the periphery of said cylinder. This core is provided with any of the well-known means for fastening the leading end of the web to it, such as a clamping-rod; or it may be pasted

thereto; and in order that the two ends may rise evenly up the inclined guides, each bracket 62 63 is provided with a lifting-arm, 17, controlled by a lever, 18, which arms underlie the ends of the said shaft 29, and serve to raise either end thereof, as may be desired.

The necessity for thus gently pressing upward or aiding the rising motion of this winding-up shaft 29 will arise only at the beginning of the winding-up operation, and is caused by the paper being at times thicker at one side of the web than at the other, which will, of course, increase the diameter of the web-roll the faster at the thicker side. The effect of this will be to make one end of the shaft 29 rise faster in the guides than the other, and this will be aggravated by the wedge-shaped space which the wet-roll occupies at the commencement of the winding-up operation, and which will tend to make the web wind unevenly upon the roll. This is remedied by slightly raising the lowest end of the shaft until the wet-roll is a few inches in diameter, after which no further aid will be required.

In order to quickly modify or arrest the motion of this machine, the cross-shaft 19 is actuated by a hand-lever, 60, and communicates motion through bevel-wheels 2 4, to a rocking-shaft, 72, whereby the belt-shipper 70, at the end of a rock-arm, 71, is vibrated. The shaft 19 is also provided with a disk, 57, to which is attached, by means of rods 58 59, the ends of a friction-band, 53, which nearly encircles the periphery of a friction-pulley, 54, fast upon the driving-shaft 6. This band 53, which, like that 35, is preferably made of thin metal, and which may be shod with wooden strips, is supported in place near its middle portion by a lug, 56, which is fastened to a fixed arm, 55, by a clamp-screw, 10, the arm 55 and lug 56 both being slotted to secure a perfect adjustment.

The result of this arrangement is that when the lever 60 is moved to throw the driving-belt 74 partially or entirely off from the fast pulley 51, the disk 57 is rotated, to draw the band 53 tightly upon the pulley 54, and thus apply a frictional pressure thereto, which will modify or arrest the rotation of the shaft 6 and that of the driving-cylinder 40. These movements but partially made will cause the machine to run slowly, and its speed may thus be regulated when "pasters" are passing.

When the machine is fully stopped it is obvious that if the web of paper is allowed to remain in contact with the wetting-roller 50, it will soon become so charged with water at its point of bearing thereon as to either cause it to tear apart by its own weight or by the strain upon it when the machine is again started. The web may be carried away from said wetting-roller when the machine is stopped by unloosening the clamp-screw 9, and allowing the upper leading-roller, 25, to drop back from the wetting-roller by means of its own weight, whereby the web is removed from contact with said wetting-roller.

The shaft 8, which supports the upper leading-roller, 25, is provided with a rock-arm, 14, attached to a connecting-rod, 15, which is seated upon a rock-arm, 16, fast upon the rock-shaft 19, by means of which devices the movement of said rock-shaft 19 which releases the friction-band 53 ships the driving-belt onto the fast pulley 51 and starts driving-cylinder 40; also swings the leading-roller 25 into a position which carries the web 33 into contact with the wetting-roller, where it may be secured by the clamp-screw 9, as hereinbefore mentioned; but the position of this rod 15 is so regulated by means of the adjusting-nut 11 that the driving-cylinder will be set in motion and the web commence its run a little before it is carried into contact with the wetting-roller 50.

The operation of the machine is as follows: The dry-roll 20 having been placed in the supporting-brackets 31 32, and the frictional band 35 and the tension of its controlling spring-arms 38 48 properly regulated by adjusting the lever 39, the end of the web is led over the tension-roller 27, under the lower leading-roller, 26, against the bearing-bar 24, over the upper leading-roller, 25, in contact with the surface of the driving-cylinder 40, and properly secured to the core on the winding-up shaft 29. Motion is then applied to the driving-shaft 6 by partially shifting the belt 74 onto the fast pulley 51. As the machine begins to move and the belt is shipped entirely onto this pulley, the rock-arm 16 on the shaft 19 acts on the connecting-rod 15, and moves the leading-roller 25 into a position which brings the web into contact with the wetting-roller, where it is secured by the clamp-screw 9. At the commencement of the winding, when the wet-roll shaft and core lie at the bottom of the wedge-shaped space between the driving-cylinder 40 and the inclined guides, the weight of the shaft and core, supplemented by the downward traction of the cylinder, produces a pressure between the core and cylinder equal to many times the intrinsic weight of the shaft and core, and this is sufficient to cause the said shaft 29 to rotate, and thus wind the web tightly upon it. The web is thereby drawn from off the dry-roll, passed through the machine, (being properly dampened in said passage,) and rewound upon the core on the shaft 29 with the same speed as the surface of said driving-cylinder travels.

As the layers of paper multiply in number upon this winding-up shaft, and the diameter of the wet roll 30, whose exterior surface constantly rests upon the periphery of the driving-cylinder, increases, the said wet-roll will rise up the inclined guides which govern the position of its shaft 29, mounting higher and higher as its size and weight increase, and resting upon the periphery of the driving-cylinder 40 at a point constantly approaching nearer and nearer to a position vertically above the shaft 6 thereof, the result of which is that when the operation of winding up the web be-

gins the position of the winding-up shaft 29 is such that the downward traction of the driving-cylinder forces it into the narrow wedge-like space formed between the periphery of the said cylinder and the rear surface of the grooves 12 13, or against the inclined guides 21 22, thereby producing the surface-pressure necessary to cause it to take up the motion of and be rotated by the said driving-cylinder, and as the wet-roll increases in size mounts higher and higher in said inclined guides, and bears on said cylinder at a point nearer and nearer to a position vertically over the shaft 6, the pressure from traction decreases, and that due to the weight of the wet-roll increases, whereby a pressure sufficient to produce tight and even winding is exerted during the whole operation, whatever the size of the wet-roll may be.

The inclined guides, preferably formed by the grooves 12 13, as shown, might be simple bearers 22 23, upon the face of which the winding-up shaft 29, friction-rollers, or journal-boxes placed upon its ends slides, and which will thereby be supported in all of its positions, it being requisite that said guides or bearers shall be inclined in a tangential position with respect to the periphery of the driving-cylinder, whereby the winding-up shaft or wet-roll, whose position they govern, shall be pressed between said guides or bearers and the periphery of said driving-cylinder at the beginning of the winding-up operation, and constantly move rearwardly away from the cylinder as the winding-up operation continues and the wet-roll increases.

What is claimed is—

1. The combination of the driving-cylinder with guides for the winding-up shaft, which guides are at an angle less than forty-five degrees to a tangent to the circumference of the cylinder at a point where the winding-up shaft, or core carried thereby, touches the latter before any winding takes place, so that the paper will be wound tightly, all substantially as described.

2. The combination, with the dry-roll shaft and a frictional device adapted to control the unwinding of the web, of the driving-cylinder and guides for the winding-up shaft, which guides are placed at an angle less than forty-five degrees to a tangent to the circumference of the cylinder when the winding-up shaft, or core carried thereby, touches the latter, by the co-operation of which devices the web is properly unwound and evenly rewound while maintained under tension, substantially as described.

3. The combination, with the mechanism for shifting the driving-belt, of devices connecting the web-leading roller 25 therewith, whereby the driving-cylinder 40 is rotated, and the web set in motion before it is carried into contact with the wetting-cylinder, all substantially as described.

4. The combination, with the driving-cylinder 40, whereby the web is moved, of a web-

wetting roller geared to run at a slower speed than the said web is moved, substantially as described.

5. The combination, with the winding-up roller 29 and its inclined guides, of the starting-lever 17, substantially as described.

6. The combination of the friction-band 35, two-armed spring 38 48, and controlling-lever 39, substantially as described.

7. The combination, with the driving-shaft of the machine and the shaft of the wetting-

roller, of cone-pulleys, whereby the speed of the wetting-roller may be raised while that of the web remains unchanged, substantially as described.

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

STEPHEN D. TUCKER.

Witnesses:

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