

No. 667,879.

Patented Feb. 12, 1901.

V. G. HAZARD.
WINDING MACHINE.

(Application filed Aug. 11, 1899.)

2 Sheets—Sheet 1.

(No Model.)

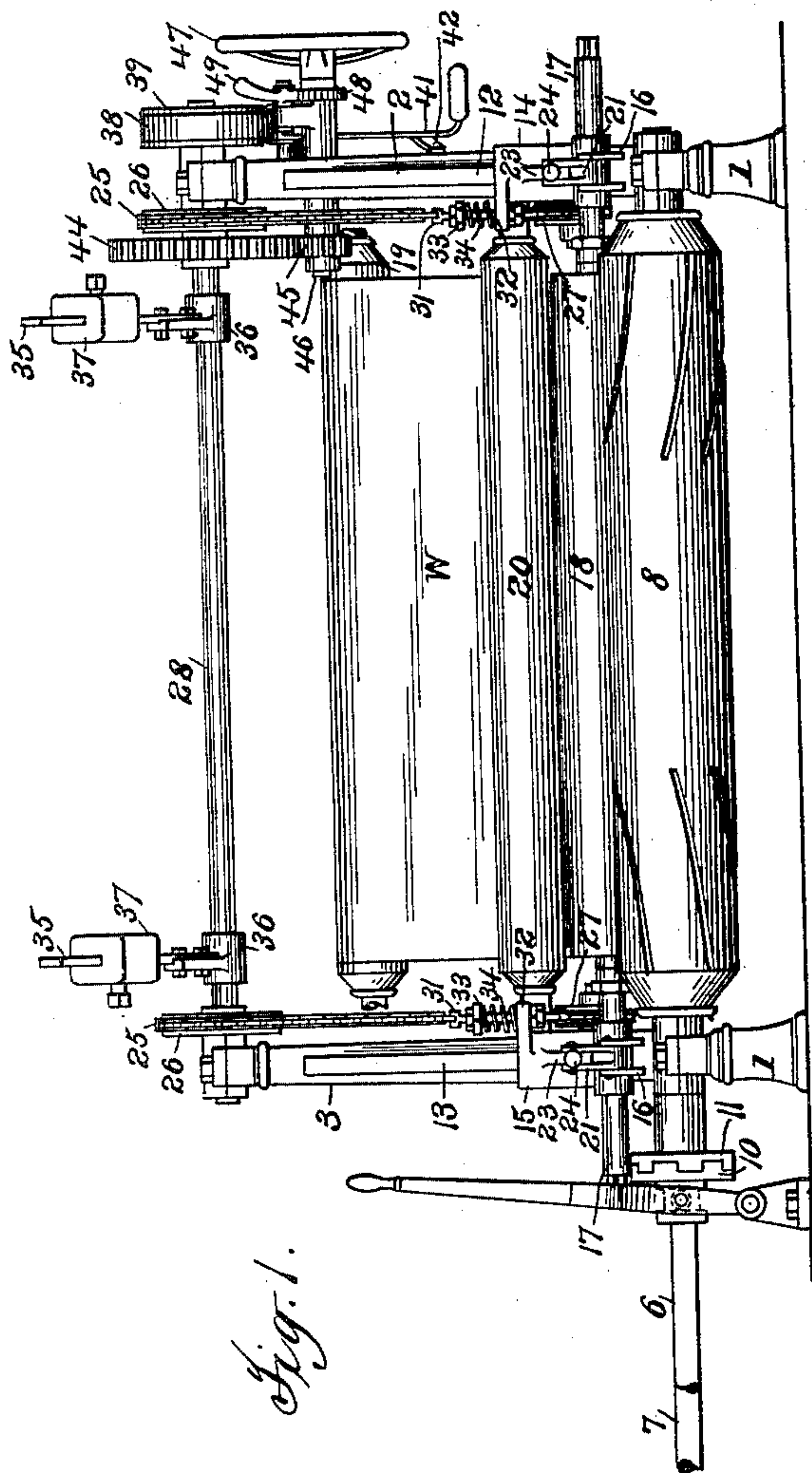


Fig. 1.

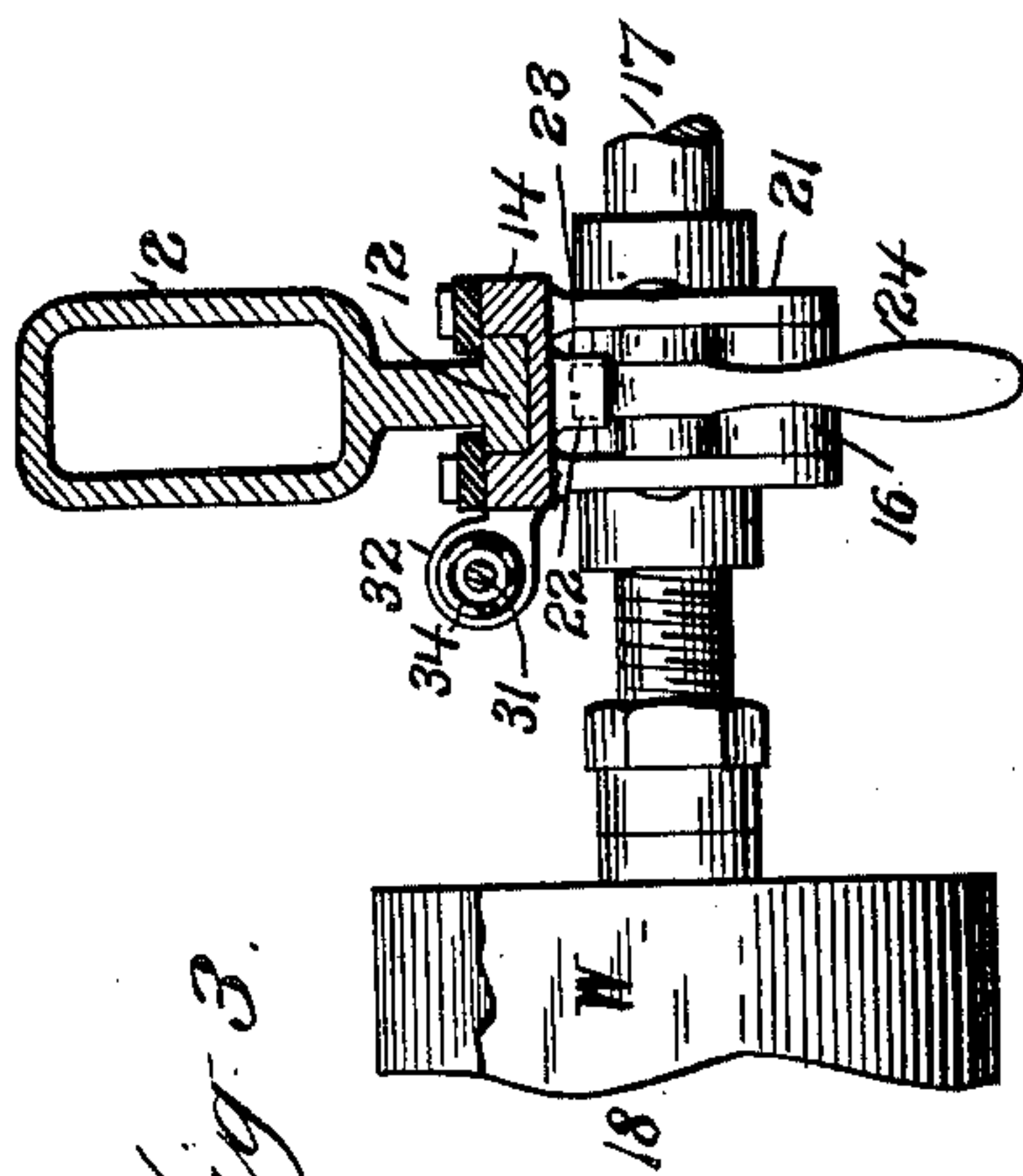


Fig. 3.

Attest:
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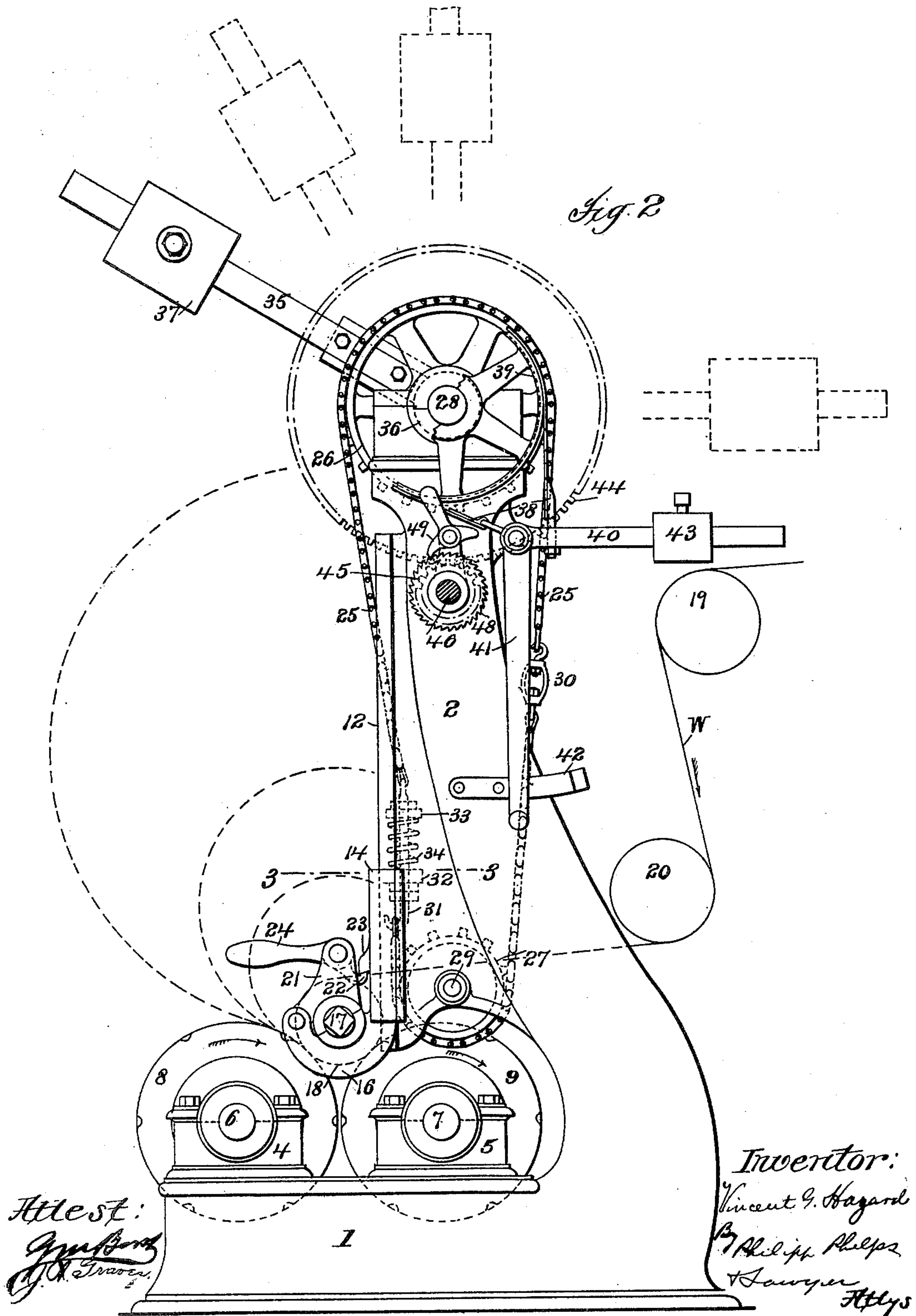
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2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

VINCENT G. HAZARD, OF WILMINGTON, DELAWARE.

WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,879, dated February 12, 1901.

Application filed August 11, 1899. Serial No. 726,861. (No model.)

To all whom it may concern:

Be it known that I, VINCENT G. HAZARD, a citizen of the United States, residing at Wilmington, county of New Castle, and State of Delaware, have invented certain new and useful Improvements in Winding-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in machines for winding continuous lengths of material—such, for example, as paper—into rolls.

The improvements of the present invention have reference particularly to winding-machines of that class known as “drum-winders,” in which there are employed in the winding operation a winding mechanism and a laterally-displaceable receiving-core rotated thereby, to which the material is secured and upon which it is wound as it is thus rotated, the core and its roll of material in such machines being supported yieldingly in engagement with the winding mechanism and displaced laterally accordingly as the roll of material enlarges and their displacement being resisted by the weight of the roll of material aided by resistance devices which force the roll of material against the winding mechanism. In such machines in order to secure uniform, compact, and smooth winding of the roll of material it is necessary that the resistance to lateral displacement of the roll of material should be maintained substantially uniform throughout the winding operation. As the roll of material enlarges, however, there is a corresponding increase in its weight and in resistance to such displacement, and in order to secure such uniform, compact, and smooth winding of the material this increase in weight of the roll of material must, as it occurs, be compensated for in some way.

It is the object of the present invention to accomplish this result; and to that end the invention consists, primarily, of means for offering to the roll of material as it enlarges a gradually-decreasing resistance during the first part of the winding operation and a gradually-increasing assistance during the latter part of the winding operation, such decreased resistance and increased assistance being graduated according to the increase in

weight of the roll of material. The means provided by the present invention for this purpose consists, preferably, of a weighted arm or arms projecting radially from a shaft which is rotated through suitable connections by the receiving-core as it and its roll of material are laterally displaced and which weighted arms when the shaft is so rotated move in the arc of a circle upwardly to a vertical or neutral position, thus offering gradually-decreasing resistance to rotation of the shaft and to lateral displacement of said receiving-core and its roll of material, and are then moved downwardly from vertical or neutral position, thus tending to rotate the shaft and offering a gradually-increasing assistance to displacement of the receiving-core and its roll of material. This mechanism of itself constitutes part of the present invention when used as above described or when used, as it may be, simply for the purpose of offering a gradually-decreasing resistance or gradually-increasing assistance to displacement of the receiving-core and its roll of material.

The present invention, broadly considered, is capable of application to machines for winding materials of different kinds; but as it has been designed with especial reference to machines for winding paper, and particularly paper as it leaves a paper-making machine, and as in such machines it has peculiar advantages it will for convenience be described in that connection.

In the accompanying drawings, Figure 1 is an end elevation of one form of paper-winding machine equipped with the present invention, part of the driving connections therefor being omitted. Fig. 2 is a side elevation of the same upon an enlarged scale and partly in section, and Fig. 3 is a section on the line 3 3 of Fig. 2.

Referring to said drawings, the frame of the machine consists of supports 1, provided with uprights 2 3. Mounted in journal-boxes 4 5 on the supports 1 is a pair of shafts 6 7, bearing winding rolls or drums 8 9, respectively, preferably of equal diameter, said shafts being connected with a suitable source of power (not shown) in such way as to be both driven in the same direction, as indicated by the arrows in Fig. 2, these rolls or drums being provided at their ends with in-

wardly-extending oblique peripheral recesses or grooves. Upon the shafts 6 7 are splined or otherwise suitably secured sliding clutch members 10, (only one being shown,) adapted to engage corresponding clutch members 11, (one of which is shown,) borne by the winding rolls or drums, and when so engaged to operatively connect said rolls or drums with the shafts 6 7, respectively. The uprights 2 3 are provided with vertical guides 12 13, respectively, upon which are mounted sliding carriages 14 15, respectively, each of said carriages being provided with a bracket 16 at its lower end, forming a journal-bearing for the reception of a shaft 17, bearing the sleeve or shell 18, constituting the receiving-core to which the web W of paper is secured and upon which it is wound into a roll, such core and its roll of material during the winding operation resting upon and being rotated by the winding-rolls 8 9. The shaft 17 is squared at its ends in the usual way for the reception of a wrench, so that after the end of the web of material is secured to the core 18 said shaft and core may be rotated by hand to wind a portion of the web on the core, and thus start the formation of the roll. The web W of paper is led into the winding-machine from a paper-making machine and on its way to the core 18 passes over and under guide-rolls 19 20, respectively. The journal-bearing 16 in each of the sliding carriages 14 15 is split, so as to provide a hinged upper portion 21, which may be swung open whenever it is desired to insert or remove a shaft 17 and core 18, such upper member being provided with a latch 22, adapted to engage a projection 23 on the sliding carriage, and thus lock said member in its closed position. The latch 22 is pivoted to the member 21 and is provided with a handle 24, by which it may be readily disengaged from the sliding carriage to permit said upper member being swung open.

Each of the sliding carriages 14 15 has connected to it a sprocket-chain 25, passing over a sprocket-wheel 26 and under a sprocket-wheel 27. The sprocket-wheels 26 are secured to a shaft 28, journaled in the upper ends of the uprights 2 3, while the sprocket-wheels 27 are journaled upon studs 29, secured in the lower ends of said uprights, studs being employed at this point in order that there may be no interference with the winding of the roll. Each of the sprocket-chains 25 is preferably made in two sections connected by a turnbuckle 30, by which the length of the chain may be adjusted, and also by a hook 31 on the end of one section engaging a loop on the end of the other section. Each sprocket-chain is yieldingly connected to its carriage by means of a lug 32 on the carriage, through which the shank of the hook 31 passes, said shank being screw-threaded above the lug 32 to receive an adjustable collar 33, between which and said lug is interposed a coiled spring 34.

It will be understood that as the winding

rolls or drums 8 9 are rotated in the direction of the arrows in Fig. 2 they will, by frictional engagement with the core 18 and the material previously wound thereon, rotate said core and wind the web of material W thereon, said core and roll of material, as the latter increases in diameter, being laterally displaced relatively to the winding rolls or drums, and the sliding carriages 14 15, in which the core 18 is supported, moved upwardly thereby, and through the sprocket-chains 25 26 in turn rotating the shaft 28.

The mechanism thus far described of itself constitutes no part of the present invention. Neither is the present invention, broadly considered, to be limited to such mechanism or to machines of the type described. The present invention, however, has certain advantages in machines of this type, and will, therefore, in some claims be claimed in combination therewith.

The preferred form of mechanism for securing uniformity in the resistance to lateral displacement of the receiving-core and its roll of material will now be described. This mechanism consists of a weighted arm or arms 35, secured to and projecting radially, or substantially so, from the shaft 28, two such arms being preferably employed, located approximately in line with the ends of the roll of material being wound. The arms 35 move with the shaft 28 in the arc of a circle, and during the first part of the winding operation resist rotation of said shaft, and consequently lateral displacement of the core 18, which they tend to force toward the winding rolls or drums 8 9, and during the latter part of the winding operation assist rotation of said shaft 28, and consequently lateral displacement of the core 18 and its roll of material. At starting the weighted arms 35 occupy substantially the position shown by full lines in Fig. 2, at which they exert their greatest resistance to or downward pressure upon the core 18 and its roll of material. As the winding operation proceeds the arms 35 move toward a vertical or neutral position, and their resistance to or downward pressure upon the core 18 and its roll of material is thus gradually decreased in accordance with the increase in weight of the roll of material until the arms arrive at their vertical or neutral position, when such resistance or pressure substantially ceases. The winding operation being continued, the arms 35, moving onward, gradually approach a horizontal position, and in so moving assist rotation of the shaft 28, and thus instead of resisting lateral displacement of the core and its roll of material furnish gradually-increasing assistance thereto and relieve the winding rolls or drums 8 9 of the increase, as the same occurs, in the weight of said roll of material.

The arms 35 are preferably secured to collars 36, rigidly secured to shaft 28, and are preferably weighted by means of weights 37, adjustable longitudinally of the arms, where-

by the resisting and assisting force of said arms may be regulated to suit different kinds of paper or different sizes of rolls.

In addition to the weighted arms 35 the machine is preferably provided with a friction-brake consisting of a strap 38, passing around a pulley 39, secured to shaft 28, one end thereof being secured to a fixed part of upright 2 and the other end to the weighted arm 40 of a bell-crank lever pivoted in said upright, the other arm 41 of which is adapted to be moved by hand out of and into engagement with a spring-catch 42 when it is desired to apply the brake to or release it from the shaft 28. The arm 40 is preferably weighted by means of a weight 43, adjustable longitudinally thereof, whereby the resistance of this brake mechanism to rotation of shaft 28 may be regulated. The shaft 28 is also provided with a gear 44, engaged by a pinion 43, the shaft 46 of which is provided with a hand-wheel 47, by which it may be rotated when, after the completion of a winding operation, it is desired to return shaft 28, arms 35, and sliding carriages 14 15 to initial position. The shaft 46 is also provided with a ratchet 48, adapted to be engaged by a pawl 49 when it is desired to lock the pinion 45 and shaft 28 against rotation by hand or to retain the sliding carriages in any desired position—as, for example, when introducing a new core 18 into the machine.

What I claim is—

1. The combination with a winding mechanism adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of means for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

2. The combination with a plurality of winding-rolls adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of means for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

3. The combination with a winding mechanism adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of a weight, movable to and beyond a substantially neutral position, for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

4. The combination with a plurality of winding-rolls adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of a weight, movable to and beyond a substantially neutral position, for offering gradually-decreasing resistance and

then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

5. The combination with a winding mechanism adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of a weighted arm or arms, movable in substantially the arc of a circle to and beyond a substantially neutral position, for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

6. The combination with a plurality of winding-rolls adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of a weighted arm or arms, movable in substantially the arc of a circle to and beyond a substantially neutral position, for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

7. The combination with a winding mechanism adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for said core, of a pivoted weighted arm or arms adapted, as the roll of material increases, to swing in substantially the arc of a circle, and connections between the pivoted end or ends of said arm or arms and the sliding support, substantially as described.

8. The combination with winding-rolls 8, 9 adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for said core, of a pivoted weighted arm or arms movable, as the roll of material increases, to swing in substantially the arc of a circle, and connections between the pivoted end or ends of said arm or arms and the sliding support, substantially as described.

9. The combination with a winding mechanism adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for said core, of a weighted arm or arms movable, as the roll of material increases, to and beyond vertical position, and connections between said arm or arms and the sliding support, substantially as described.

10. The combination with winding-rolls 8, 9 adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for said core, of a weighted arm or arms movable, as the roll of material increases, to and beyond vertical position, and connections between said arm or arms and the sliding support, substantially as described.

11. The combination with a winding mechanism adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for the core, of

shaft 28, weighted arm or arms 35 movable therewith in substantially the arc of a circle as the shaft is rotated, and connections between said sliding support and shaft, for rotating the latter, substantially as described.

12. The combination with winding rolls or drums 8, 9 adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for the core, of shaft 28, weighted arm or arms 35 movable therewith in substantially the arc of a circle, and connections between said sliding support and shaft for rotating the latter, substantially as described.

13. The combination with a winding mechanism adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for the core, of shaft 28, weighted arm or arms 35 movable therewith to and beyond vertical position, and connections between said sliding support and shaft, for rotating the latter, substantially as described.

14. The combination with winding rolls or drums 8, 9 adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for the core, of shaft 28, weighted arm or arms 35 movable therewith to and beyond vertical position, and connections between said sliding support and shaft, for rotating the latter, substantially as described.

15. The combination with a winding mechanism adapted to wind material into a roll upon a laterally-displaceable core, and a suitably-guided sliding support for the core, of an arm, as 35, provided with an adjustable weight 37, and connections between said arm and the sliding support for swinging said arm, substantially as described.

16. The combination with a winding mechanism adapted to wind material into a laterally-displaceable roll, and suitable means for guiding the roll of material as it is displaced, of means for offering gradually-increasing assistance to displacement of the roll of material as the latter enlarges, substantially as described.

17. The combination with a winding-roll and a receiving-core rotated thereby, one of said members being laterally displaceable relatively to the other as the roll of material upon the core enlarges, of means for offering gradually-decreasing resistance and then gradually-increasing assistance to displacement of the displaceable member as the roll of material enlarges, substantially as described.

18. The combination with a winding-roll and a receiving-core rotated thereby, one of said members being laterally displaceable relatively to the other as the roll of material upon the core enlarges, of means for offering gradually-increasing assistance to displacement of the displaceable member as the roll of material enlarges, substantially as described.

19. The combination with a winding-roll and a receiving-core rotated thereby, one of said members being laterally displaceable relatively to the other as the roll of material upon the core enlarges, of means for offering varying resistance and then varying assistance to displacement of the displaceable member as the roll of material enlarges, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

VINCENT G. HAZARD.

Witnesses:

THOS. H. SAVERY, Jr.,
THOS. H. SAVERY.