

C. T. HENDERSON.
WINDING MECHANISM.
APPLICATION FILED MAY 31, 1916.

1,266,942.

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Fig. 1.

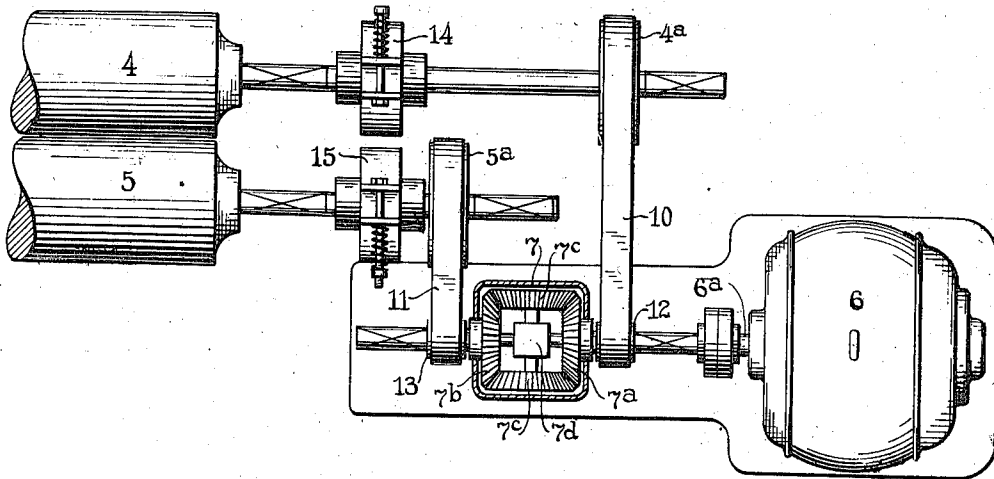


Fig. 2.

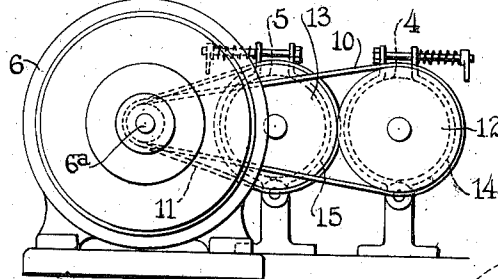
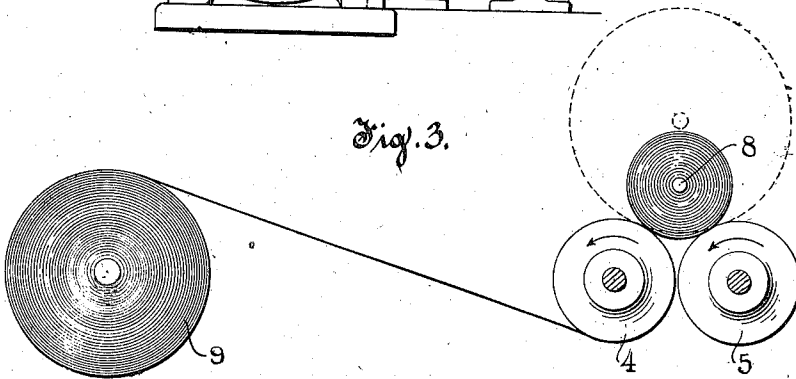


Fig. 3.



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WINDING MECHANISM.

1,266,942.

Specification of Letters Patent.

Patented May 21, 1918.

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To all whom it may concern:

Be it known that I, CLARK T. HENDERSON, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Winding Mechanisms, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing forming a part of this specification.

This invention relates to winding mechanisms, particularly applicable to paper mills for rewinding purposes but also susceptible of various other uses.

Heretofore rewinding has been accomplished by placing the mandrel upon which the paper is to be wound upon and between two rollers located closely together and revolved in the same direction, the paper supplied to the mandrel being passed around one of said rollers. This method of rewinding has been found very satisfactory, but owing to the varying weight and other conditions of the rewound roll it has been found necessary, or at least desirable, to vary the relative speeds of the two winding rollers and heretofore such speed regulation has been accomplished by adjustment of a mechanical speed changing device.

This invention has among its objects to provide automatic means for effecting rewinding according to the above described method.

A further object is to provide a winding mechanism of the character mentioned with means to effect variation in the relative speeds of the two rollers according to the weight of the rewound roll.

A still further object is to provide such an automatic winding mechanism with means to brake either roller to thereby retard the speed thereof and at the same time accentuate the speed of the roller not so braked.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates one embodiment of the invention which will now be described, it being understood that the structure illustrated is susceptible of various modifications falling within the scope of the appended claims.

In the drawing,

Figure 1 is a more or less schematic plan view of the mechanism;

Fig. 2 is an end view of Fig. 1; and,

Fig. 3 is a diagrammatic view exemplifying the method of rewinding.

The mechanism illustrated includes rollers 4 and 5, a driving motor 6 and driving connections between said motor and said rollers including a differential gear 7.

As exemplified in the diagrammatic view (Fig. 3) the rollers 4 and 5 are provided to support a mandrel 8 upon which is to be rewound the stock of a roll 9. The rollers 4 and 5 are arranged to be driven counter-clockwise to thereby rotate the mandrel 8 in a clockwise direction, the paper from roll 9 being passed to the mandrel 8 around the roller 4. Thus it will be observed that as the rollers 4 and 5 are rotated they will tend to transfer the paper from roll 9 to mandrel 8. Also, it will be observed that when the mandrel is light it will tend to follow the periphery of roller 4 and in so doing revolve away from roller 5 whereas, when the weight of the mandrel increases such tendency will be gradually eliminated. Thus to insure proper tensioning of the paper on the mandrel it is desired to initially drive the roller 5 at a greater peripheral speed than the roller 4 and to gradually equalize the speeds of the two rollers as the weight of the mandrel increases.

The mechanism shown in Figs. 2 and 3 provides for such speed adjustments automatically. The shafts of rollers 4 and 5 are respectively provided with pulleys 4^a and 5^a connected by belts 10 and 11 to pulleys 12 and 13 driven by members of the differential gear. The differential gear is of conventional form and includes two loose pinions 7^a and 7^b respectively connected to the pulleys 12 and 13. The pinions 7^a and 7^b mesh with intermediate pinions 7^c carried by a quill 7^d keyed or otherwise fixed to the shaft 6^a of the driving motor. Thus it will be observed that as the quill is revolved it will tend to revolve both pinions 7^a and 7^b in the same direction to thereby revolve the rollers 4 and 5 in the same direction.

Considering the operating conditions it will be observed that when the mechanism is started with a light mandrel, said mandrel will, as a result of its tendency to follow roller 4, impose a relatively greater load upon said roller than upon roller 5. In other words, the roller 4 will under such conditions meet a greater resistance than roller 5 and in consequence the differential drive will

effect a corresponding increase in the speed of roller 5 over that of roller 4, this being the result desired. On the other hand, as the weight of the mandrel increases in the progress of the rewinding operation with a resultant tendency of the mandrel to settle back on roller 5, the increased resistance thus offered to roller 5 will tend to effect equalization of the speeds of the two rollers through the differential gear. Thus in a word, the differential gear provides for offset initial speeds and gradual equalization of speeds as the rewound roll increases in size and weight, so that when the rewinding operation is completed the rollers 4 and 5 will operate at approximately the same speed.

The mechanism also includes adjustable band brakes 14 and 15 for the shafts of rollers 4 and 5 respectively and as will be apparent these brakes afford means for varying at will the speed ratio of the rollers established by the automatic means described, to thereby adapt the mechanism to varying working conditions. For example, by tightening the brake 14 the speed of roller 4 may be decreased and the speed of roller 5 thereby correspondingly increased while by tightening the brake 15 a reverse result may be obtained.

What I claim as new and desire to secure by Letters Patent is:

1. A winding mechanism including supporting rollers for a winding mandrel, said rollers being subjected at all times to a load substantially proportional to the amount of material on the mandrel and driving means for said rollers including means rendering the latter sensitive to variations in the load thereon for automatic and inversely proportional variations in their speeds.

2. In a winding mechanism, the combination with rollers to support a winding mandrel, of means to drive said rollers at different speeds for initial operation of the mandrel and to increase the speed of one of said rollers and decrease the speed of the

other of said rollers automatically thereafter.

3. In a winding mechanism, in combination, supporting rollers for a winding mandrel and driving connections therefor including a differential gear to vary the speed ratio of said rollers automatically.

4. In a winding mechanism, in combination, supporting rollers for a winding mandrel, power driving means for said rollers and differential driving connections between said means and said rollers to offset the speeds of said rollers for initial rewinding operation and thereafter tending to equalize the speeds of said rollers.

5. A winding mechanism including supporting rollers for a winding mandrel, driving means for said rollers including means rendering the latter sensitive to variations in the load thereon for automatic and inversely proportional variations in their speeds and means for varying the speed ratio of said rollers at will.

6. In a winding mechanism, in combination, rollers for supporting a winding mandrel, driving means for said rollers tending to establish a speed ratio therefor varying with the working conditions and independent adjustable braking means for said rollers.

7. In a winding mechanism, in combination, rollers for supporting a winding mandrel, means for driving said rollers differentially and means to brake said rollers selectively.

8. In a winding mechanism, in combination, rollers for supporting a winding mandrel, means for driving said rollers differentially and separately adjustable brakes for said rollers.

In witness whereof, I have hereunto subscribed my name.

CLARK T. HENDERSON.

Witnesses:

J. L. JOHNSON,
OSCAR A. KELLER.