

Oct. 6, 1931.

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PAPER WINDING APPARATUS

Filed Sept. 14, 1928

3 Sheets-Sheet 1

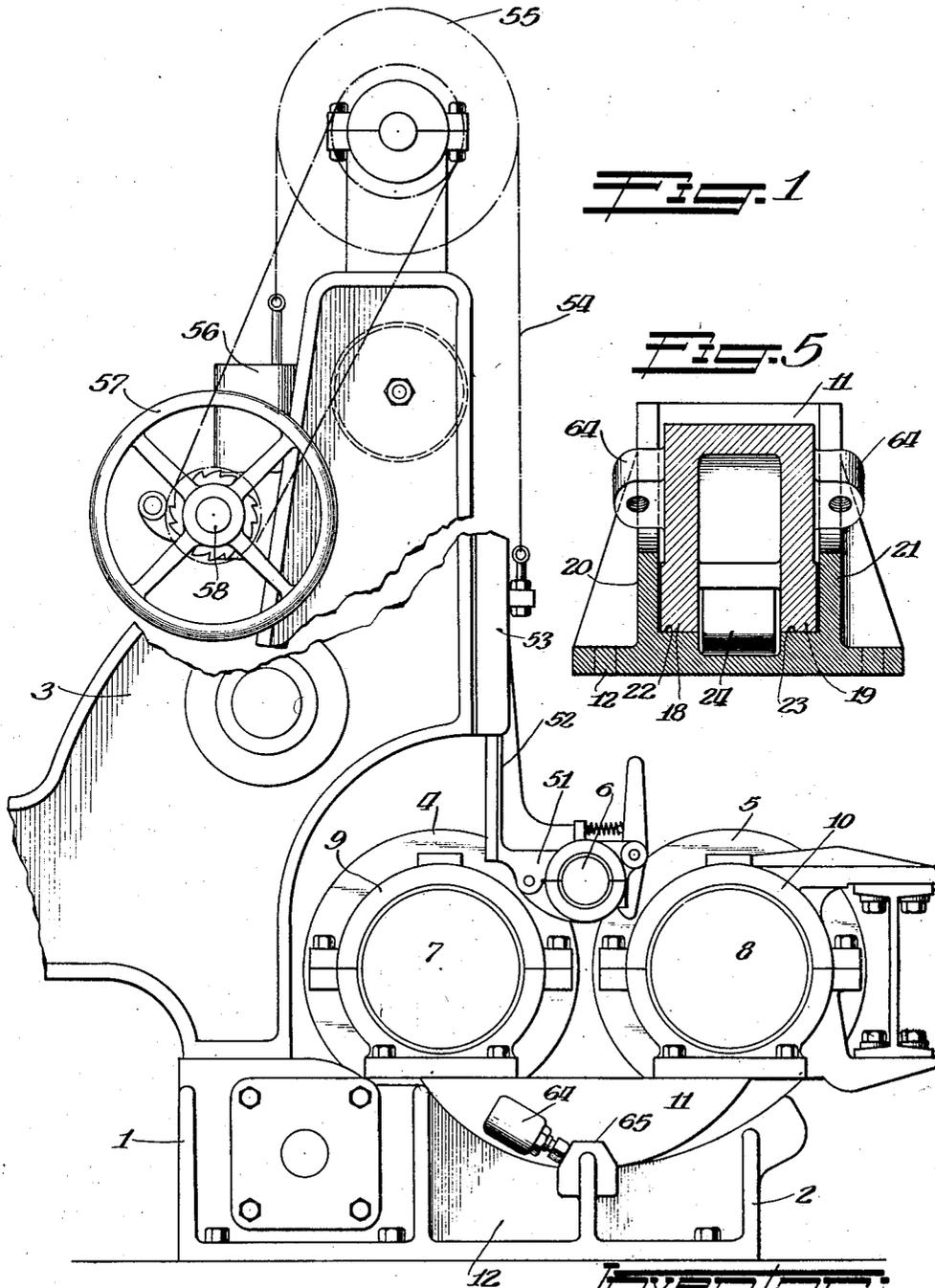


FIG. 1

FIG. 5

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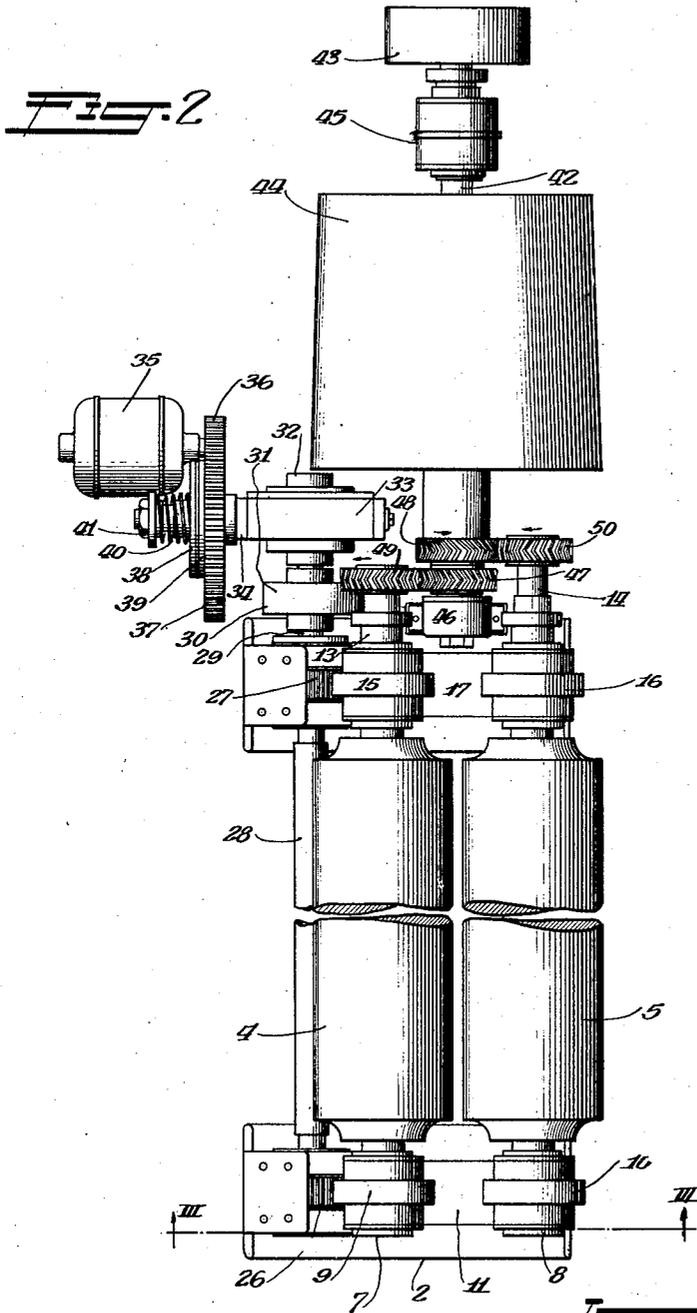
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

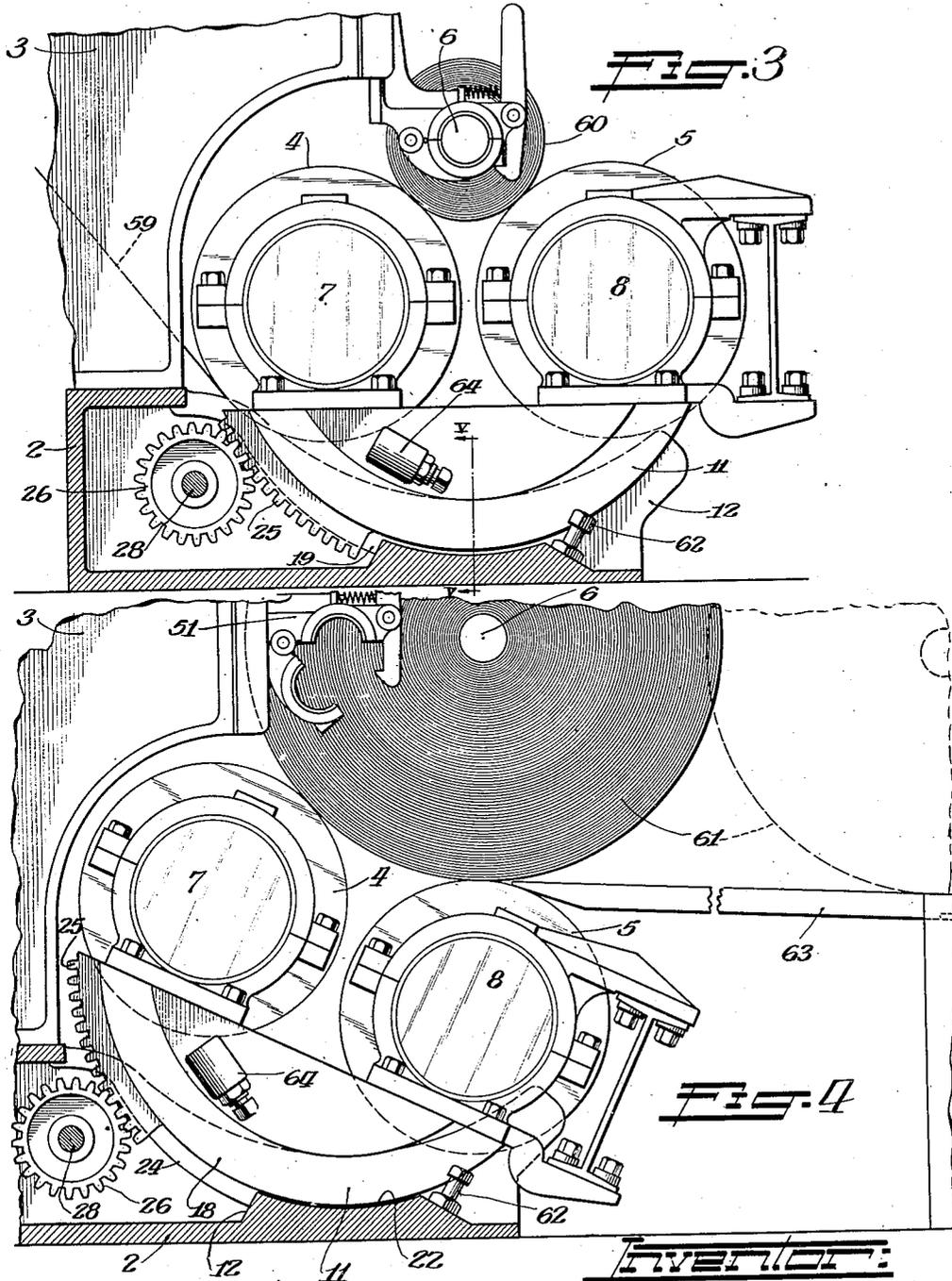


FIG. 3

FIG. 4

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UNITED STATES PATENT OFFICE

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PAPER WINDING APPARATUS

Application filed September 14, 1923. Serial No. 306,013.

This invention relates to a paper winding apparatus for winding reels of paper or for rewinding paper into different size rolls.

In paper winding apparatus of the type to which my invention belongs one of the difficulties lies in the removal of the reels of wound paper from the machine. In present day paper making apparatus, the reels of paper as made on the modern paper machines are often as wide as 20 ft. The reels, therefore, are exceedingly heavy and difficult to handle except by mechanical means. So far, these mechanical means generally take the form of over-head tackle for engaging the ends of the winding shaft and lifting the reel bodily from one position to another. By reason of the great weight of the wound reels of paper, the winding shafts must necessarily be made extra heavy to provide against bending when the reel is lifted from its ends.

The present invention has for its object to provide mechanical means for discharging the wound reel of paper from the winding apparatus while at the same time supporting the reel throughout its length, whereby no undue strain is placed upon the winding shaft and accordingly a lighter shaft, or even one of aluminum, may be employed.

A further object of this invention is to provide simple mechanical means for facilitating the discharge of reels of paper from paper winding apparatus.

Other and further important objects of this invention will be apparent from the disclosures of the following description and the accompanying drawings:

On the drawings:

Figure 1 is a broken side elevational view of a paper winding apparatus embodying the principles of my invention;

Figure 2 is a top plan view of the same with parts removed;

Figure 3 is an enlarged sectional view taken substantially on line III—III of Figure 2;

Figure 4 is a sectional view similar to Figure 3 showing the operation; and

Figure 5 is a fragmentary enlarged sectional view taken on line V—V of Figure 3 with parts omitted.

The reference numeral 1 indicates as a whole a supporting frame of a paper winding apparatus comprising a base 2 and a pair of upright side members 3. As is customary in this type of winding apparatus, a pair of under drums 4 and 5 serve to wind the paper upon a winding shaft 6 cooperatively associated with said under drums. The present invention is directed more particularly to the arrangement and mounting of said under drums 4 and 5 to permit said drums to be tilted or rocked to thereby cause a wound roll of paper on said shaft 6 to be discharged over the surface of one of the under drums on to a receiving platform.

The front journals 7 and 8 of the drums 4 and 5, respectively, are rotatably mounted in split bearing brackets 9 and 10, respectively, which in turn are bolted or otherwise secured to a cradle 11. Said cradle 11, in turn, is mounted for rocking movement upon a cradle supporting frame 12 formed upon the front end of the base 2. At the rear, the under drums 4 and 5 are provided with extended journals 13 and 14, respectively, (Figure 2) supported in brackets 15 and 16, respectively, secured to a cradle 17, similar in construction to the front cradle 11. The front cradle 11, therefore, will be described only, it being understood that the two cradles are identical.

As best shown in Figures 3 and 5 said front cradle 11 is provided with lower, arcuate shaped spaced flanges 18 and 19 adapted to extend between spaced guides 20 and 21 formed on said cradle supporting frame 12. The lower arcuate shaped surfaces of said flanges 18 and 19 rest upon similar shaped bearing surfaces 22 and 23 formed on the cradle supporting frame 12. The centers of curvature of said arcuate surfaces all lie in an imaginary axis in the plane of the axes of said drums 4 and 5.

An arcuate shaped tongue 24 positioned between said depending flanges 18 and 19 and extending therebeyond is provided at its rear end with rack teeth 25 adapted to mesh with a pinion gear 26. Said pinion gear 26 and a second pinion gear 27 for the rear cradle 17 are both mounted upon a shaft 28 journaled in the supporting base 2. Said driven shaft 28 is provided with a rearward extension 29 on

which is mounted a clutch member 30, cooperatively associated with a second clutch member 31 mounted upon a stub shaft 32. The stub shaft 32 is driven through a worm and gear arrangement enclosed within a housing 33, from a counter shaft 34, which in turn is driven from a reversible motor 35 through a train of gears 36 and 37, and clutch discs 38 and 39. The gear 37 is loosely mounted upon the counter shaft 34 and the clutch disc 39 secured to the hub of said gear 37. The second clutch disc 38 is rotatable with the shaft 34 but movable longitudinally thereof and adapted to be pressed into engagement with the disc 39 by means of a heavy coiled spring 40, positioned between the disc 38 and a nut and washer 41 on the end of said counter shaft 34. This provision of the friction discs 38 and 39 allows sufficient slippage in the drive connection between the motor and the rack gears on the cradles 11 and 17 to prevent injury to the motor when further movement of the said cradles is impossible.

The main drive for the under drums 4 and 5 comprises a shaft 42 (Figure 2) adapted to be directly driven through a clutch connection 43 or to be driven by means of a belt through a conical pulley 44 mounted upon said shaft. The shaft 42 is mounted in bearings 45 and 46 and carries gears 47 and 48 adapted to mesh with gears 49 and 50, respectively, upon the extended rear ends 13 and 14 of the drums 4 and 5. In order that the gears 49 and 50 may move over the gears 47 and 48 during tilting of the drums 4 and 5, it is obvious that the axis of the shaft 42 must be coincident with the imaginary axis of curvature referred to above.

The winding shaft 6 is adapted to be supported at its ends in split bearing clamps 51 mounted upon the lower ends of vertically adjustable rods 52. Said rods 52 are adapted to slide in guideways 53 formed in the upright side frame members 3 and are connected in the usual standard manner by means of cords or cables 54 trained over pulleys 55 to counterweights 56. A hand wheel 57 mounted upon a shaft 58 serves to raise and lower the winding shaft 6.

When the winding machine is in operation a web of paper 59 (Figure 3) is threaded under the drum 4 and its end wrapped about the winding shaft 6. The under drums 4 and 5 are then set in motion and the web of paper wound upon a shaft 6 by surface contact with the revolving drums. A reel 60 of wound paper is thus formed which gradually grows in size until a full sized reel 61 (Figure 4) has been produced.

To remove the reel 61 from the winding drums, the bearing clamps 51 are disengaged from the ends of the winding shaft 6 and the motor 35 started up to effect a partial rotation of the cradle members 11 and 17 in their respective supporting frames. The under

drums 4 and 5 are thus tilted into the position shown, with the drum 4 in elevated position and the drum 5 in depressed position. Stop members 62 formed at the front of the cradle supporting frame 12 prevent the rocking of the cradle through too great an arc. The full reel of paper 61 is thus caused to roll over the surface of the drum 5 on to a supporting platform 63, as shown in dotted lines.

The drums 4 and 5 are brought back to normal position by reversing the direction of the motor 35. Stops 64 formed upon the ends of the cradles 11 and 17 are adapted to engage lugs 65 formed upon the supporting frames 12 to prevent movement of the cradles beyond normal position.

It will be understood that the winding apparatus of my invention is equally adaptable to winding material other than paper. The important features of my invention are the provision of means for rocking or tilting the under drums about a common longitudinal axis to facilitate the discharge of heavy reels of wound web material. Because of the fact that the heavy reels do not have to be lifted from their ends much lighter and cheaper winding shafts may be employed than heretofore without danger of their buckling.

My invention also saves a considerable amount of manual labor over the present forms of winding apparatus and eliminates the possibility of injury to the reels of paper through being dropped.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a web winding machine, a pair of under surface winding drums, a winding shaft cooperatively associated therewith and means for rocking said drums about a common longitudinal axis intermediate said drums to discharge said winding shaft.

2. In a paper winding machine, a pair of driven contact drums, a web winding shaft cooperatively associated therewith and power operated means for rocking said drums about a common longitudinal axis intermediate said drums to discharge a wound web on said shaft.

3. In a paper winding machine, a pair of driven under drums, a web winding shaft cooperatively associated therewith, cradles having supporting bearings for the ends of said drums, arcuate bearing surfaces supporting said cradles and means for rocking said cradles upon said bearing surfaces to discharge said winding shaft after the web has been wound thereon.

4. In a paper winding machine, a pair of driven under drums, a web winding shaft co-

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- operatively associated therewith, cradles having supporting bearings for the ends of said drums, arcuate bearing surfaces supporting said cradles and power operated means for rocking said cradles upon said bearing surfaces to discharge said winding shaft over the surface of one of said drums after the web has been wound thereon. 70
5. In a paper winding machine, a pair of rotatable under drums, common driving means therefor, supporting cradles for the ends of said drums having arcuate lower surfaces, concentric bearing surfaces beneath said cradle surfaces and means for rocking said cradles upon said bearing surfaces. 75
6. In a paper winding machine, a pair of rotatable under drums, common driving means therefor, a web winding shaft cooperatively associated with said under drums for winding a reel of paper, supporting cradles for the ends of said drums having arcuate lower surfaces, concentric bearing surfaces beneath said cradle surfaces and means for rocking said cradles upon said bearing surfaces to discharge said reel of paper. 80
7. In a paper winding machine, a pair of rotatable under drums, common driving means therefor, supporting cradles for the ends of said drums having arcuate lower surfaces, rack teeth formed on said arcuate surfaces, concentric bearing surfaces beneath said cradle surfaces and gears adapted to engage said rack teeth for rocking said cradles upon said bearing surfaces. 85
8. In a paper winding machine, a pair of rotatable under drums, common driving means therefor, a web winding shaft cooperatively associated with said under drums for winding a reel of paper, supporting cradles for the ends of said drums having arcuate lower surfaces, concentric bearing surfaces beneath said cradle surfaces, rack teeth formed on said cradle surfaces, gears engaging said rack teeth and means for rotating said gears to rock said cradles and thereby to discharge said reel of paper. 90
9. In a paper winding machine, a pair of rotatable under drums, a winding shaft cooperatively associated with said drums for winding a reel of paper by contact with said drum surfaces, cradles having bearings for the ends of said drums and having lower arcuate surfaces, supporting frames for said cradles and means for rocking said cradles in said supporting frames to tilt said drums relative to each other about a common longitudinal axis and thereby effect the discharge of a wound reel of paper over the surface of one of said drums. 95
10. In a paper winding machine, a pair of rotatable under drums, a winding shaft cooperatively associated with said drums for winding a reel of paper by contact with said drum surfaces, cradles having bearings for the ends of said drums and having lower arcuate surfaces, supporting frames for said cradles and rack and pinion means for rocking said cradles in said supporting frames to tilt said drums relative to each other about a common longitudinal axis and thereby effect the discharge of a wound reel of paper over the surface of one of said drums. 100
11. In a paper winding machine, a pair of rotatable under drums, a winding shaft cooperatively associated with said drums for winding a reel of paper by contact with said drum surfaces, cradles having bearings for the ends of said drums and having lower arcuate surfaces, arcuate shaped racks formed integral with said cradles, supports for said cradles having curved surfaces in contact with said cradles, pinions meshing with said racks, and power driven means actuating said pinions to tilt the cradles and thereby move the winding shaft from its operative position in the machine. 105
12. In a paper winding machine, a pair of driven contact drums, a web winding shaft cooperatively associated therewith, cradles having bearings for said drums and power operated means for rocking said cradles to elevate one of said drums and depress the other to discharge a wound web on said shaft. 110
- In testimony whereof I have hereunto subscribed my name at Beloit, Rock County, Wisconsin. 115
- EARL E. BERRY. 120
10. In a paper winding machine, a pair of rotatable under drums, a winding shaft cooperatively associated with said drums for winding a reel of paper by contact with said drum surfaces, cradles having bearings for the ends of said drums and having lower arcuate surfaces, supporting frames for said cradles and rack and pinion means for rocking said cradles in said supporting frames to tilt said drums relative to each other about a common longitudinal axis and thereby effect the discharge of a wound reel of paper over the surface of one of said drums. 125
11. In a paper winding machine, a pair of rotatable under drums, a winding shaft cooperatively associated with said drums for winding a reel of paper by contact with said drum surfaces, cradles having bearings for the ends of said drums and having lower arcuate surfaces, arcuate shaped racks formed integral with said cradles, supports for said cradles having curved surfaces in contact with said cradles, pinions meshing with said racks, and power driven means actuating said pinions to tilt the cradles and thereby move the winding shaft from its operative position in the machine. 130
12. In a paper winding machine, a pair of driven contact drums, a web winding shaft cooperatively associated therewith, cradles having bearings for said drums and power operated means for rocking said cradles to elevate one of said drums and depress the other to discharge a wound web on said shaft. 130