Jan. 4, 1927. 1,613,381

J. A. CAMERON

WINDING MEANS

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Fig. 1

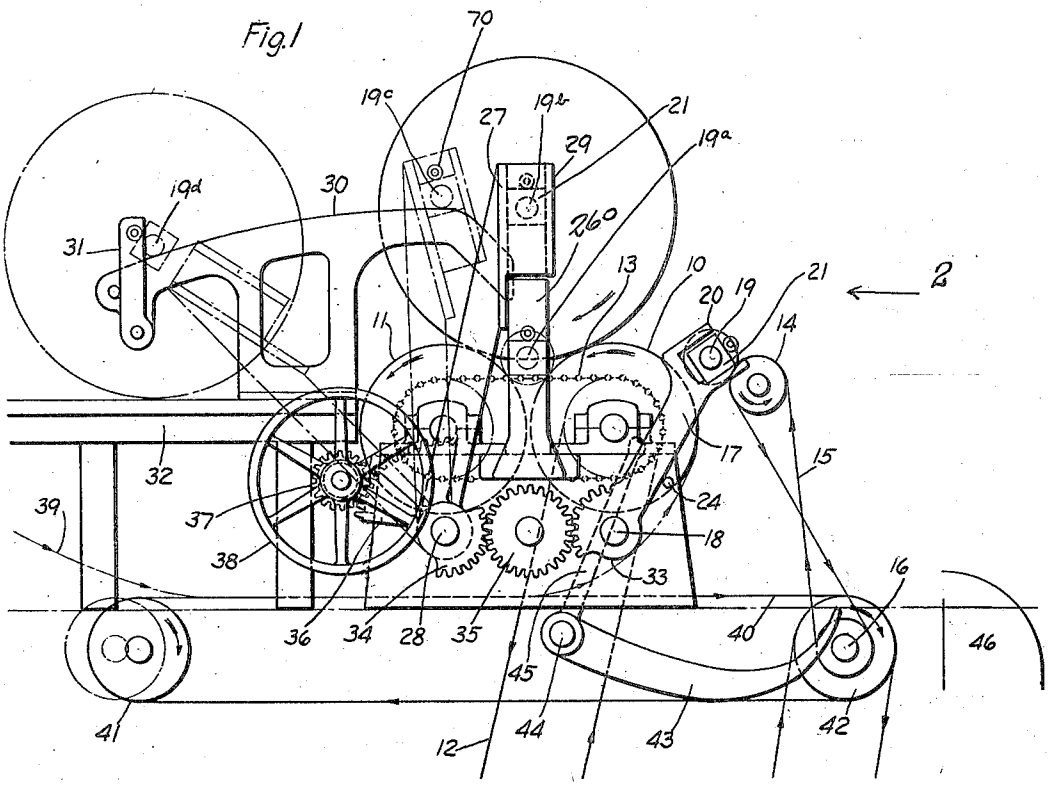
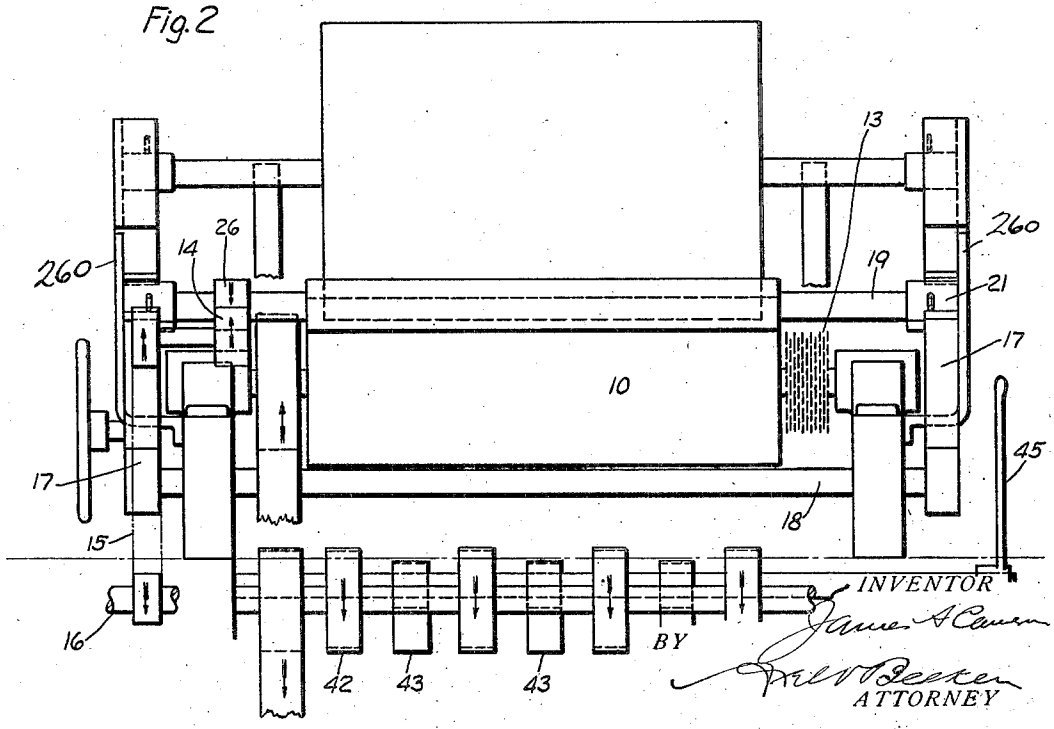


Fig. 2



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WINDING MEANS

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Fig.3

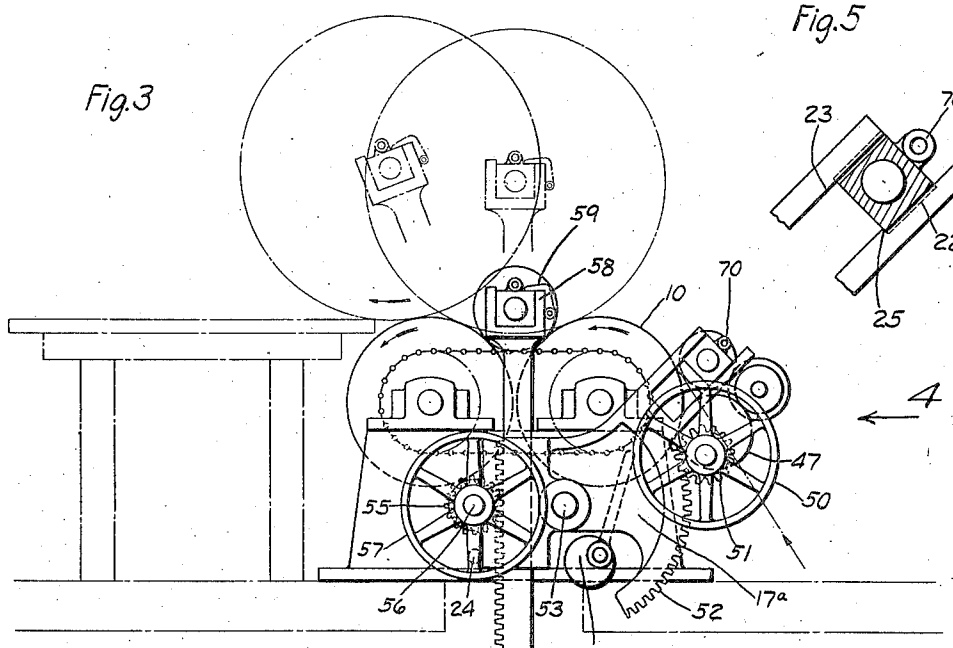
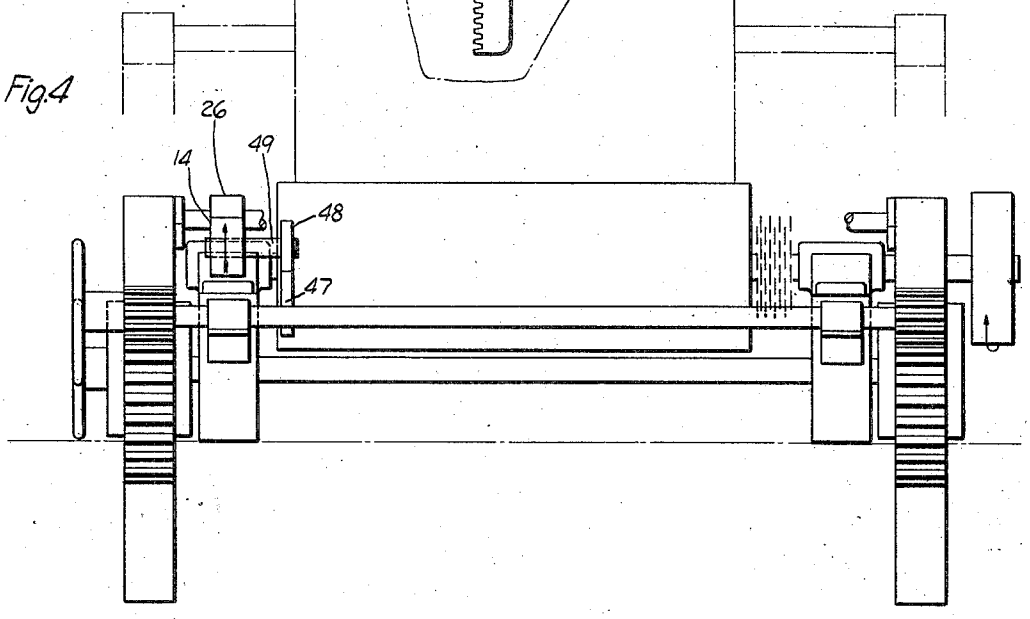


Fig.5

Fig.4



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WINDING MEANS

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Fig. 6

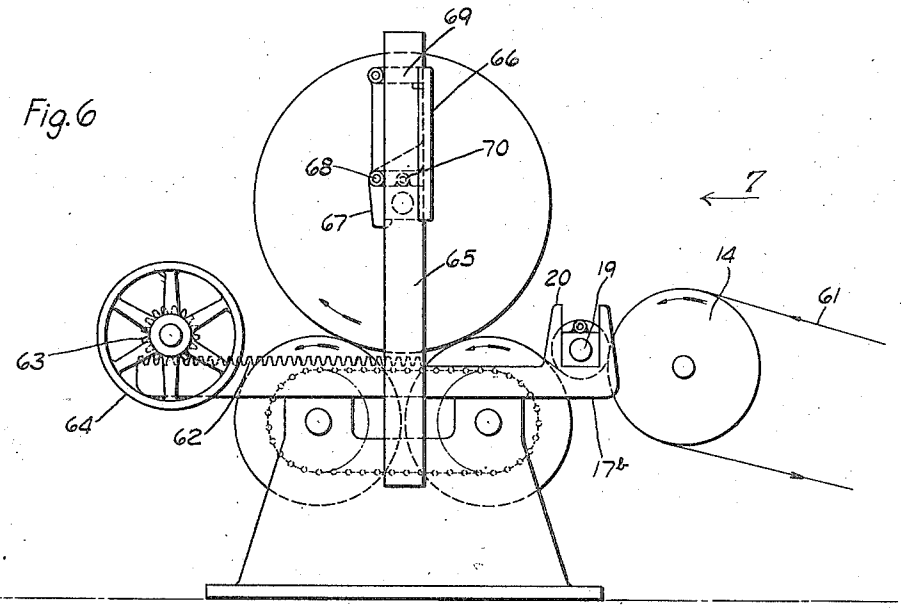
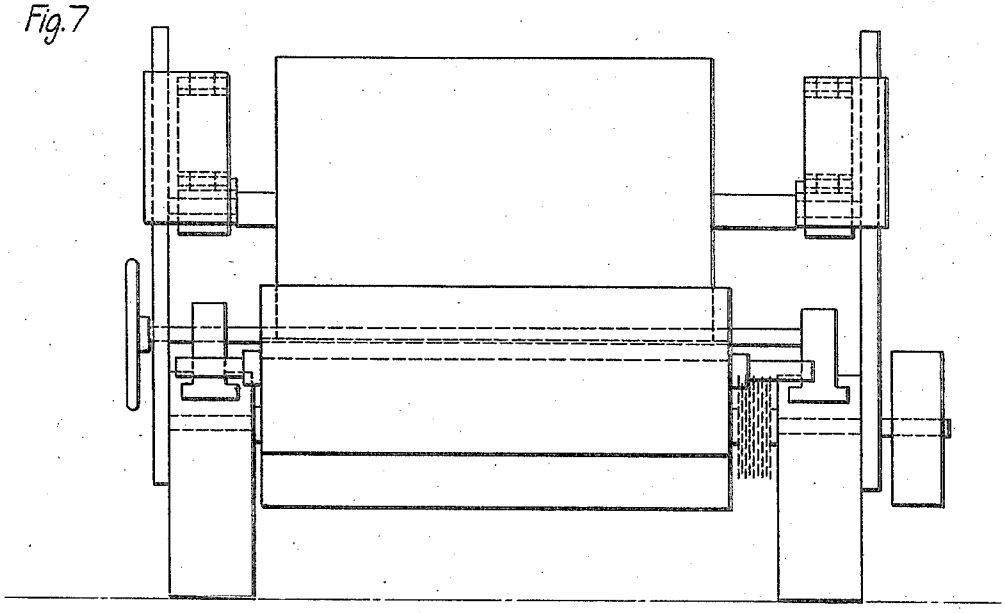


Fig. 7



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WINDING MEANS

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Fig.8

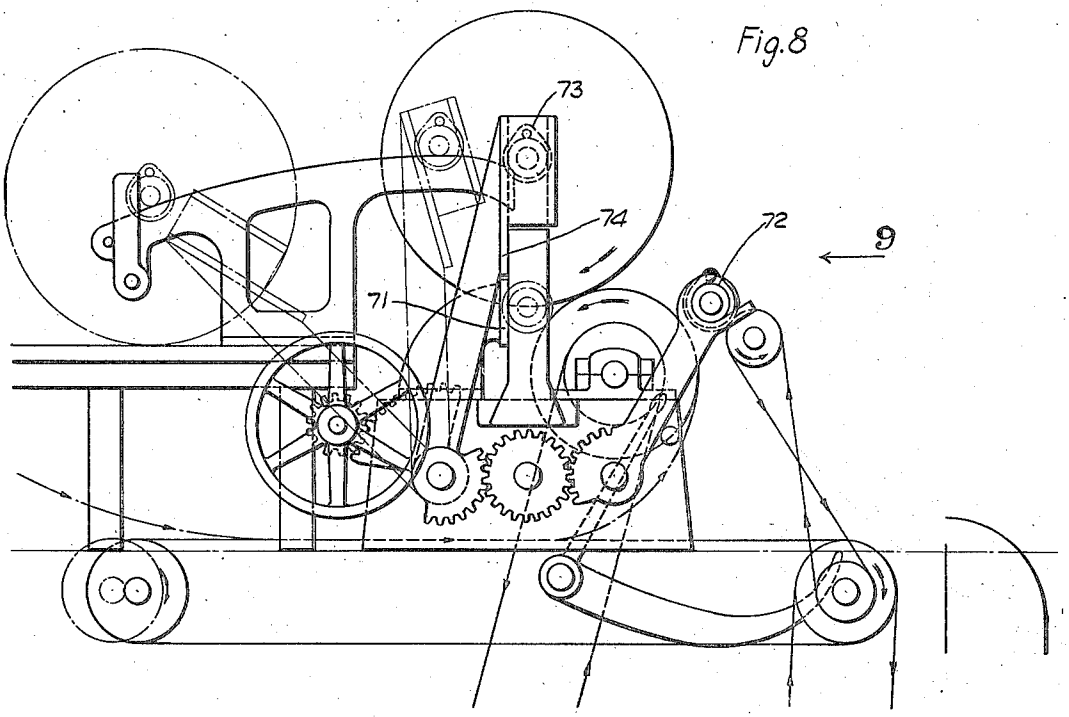
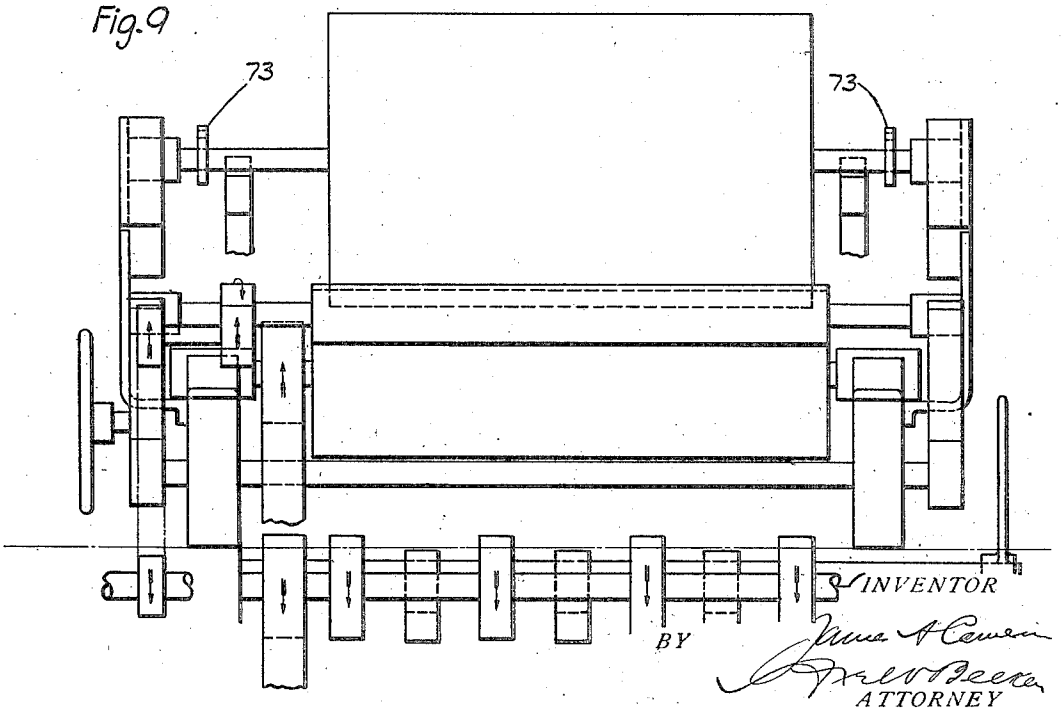


Fig.9



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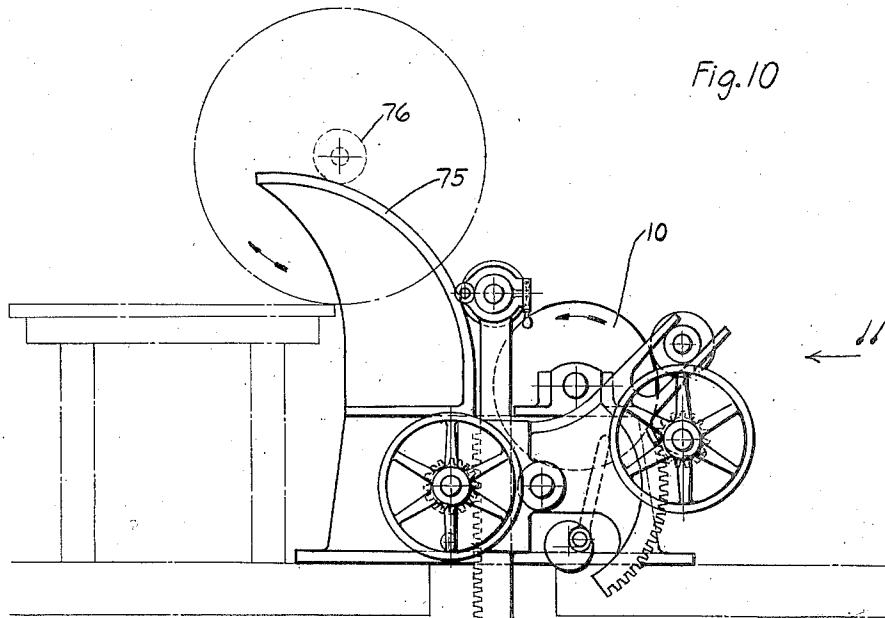
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WINDING MEANS

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Fig. 10



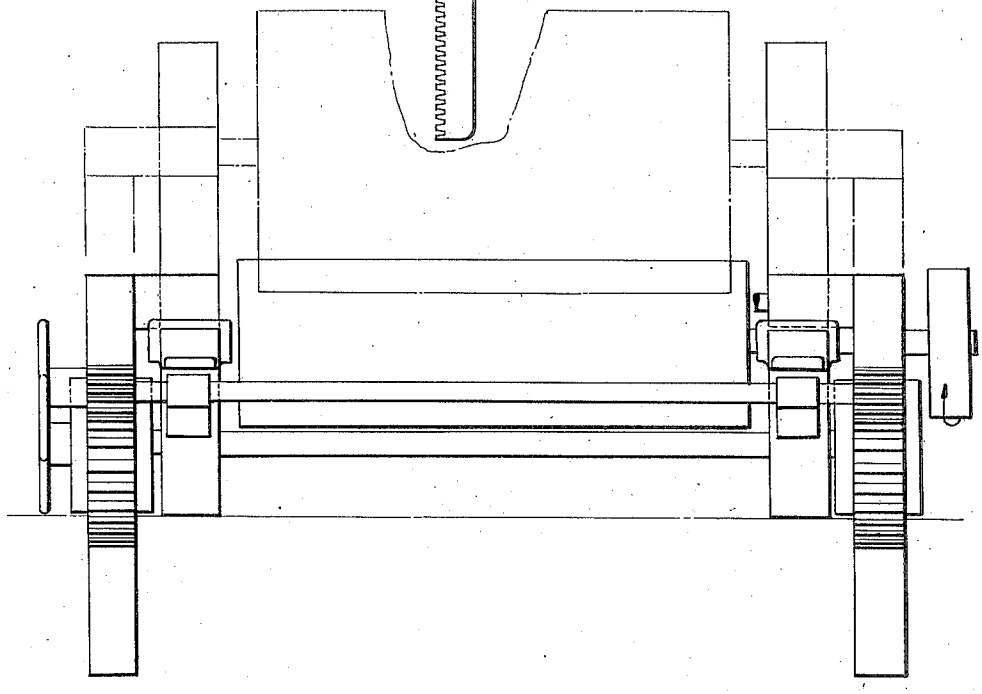


Fig. 11

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WINDING MEANS

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Fig.12

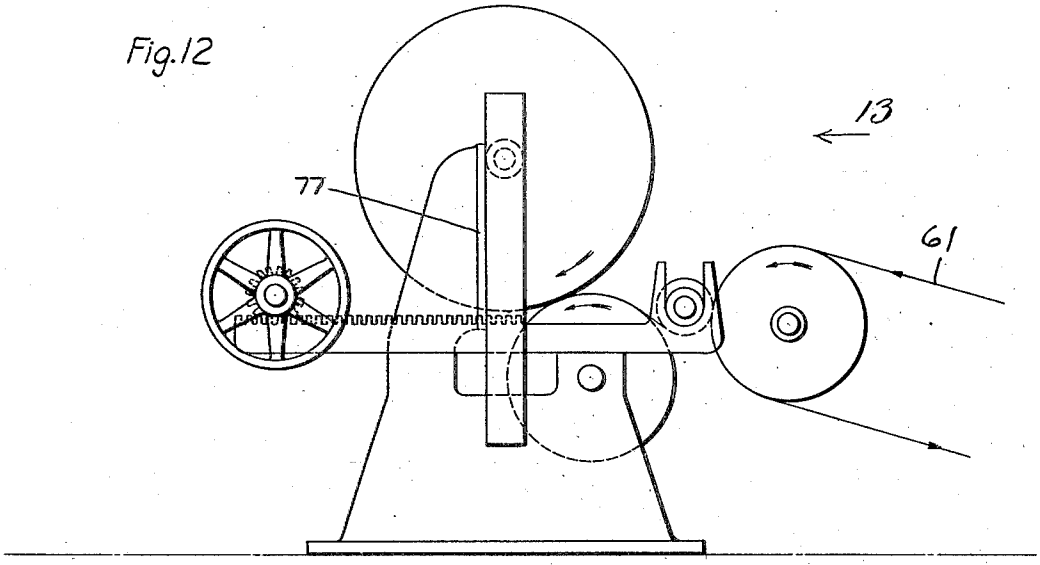
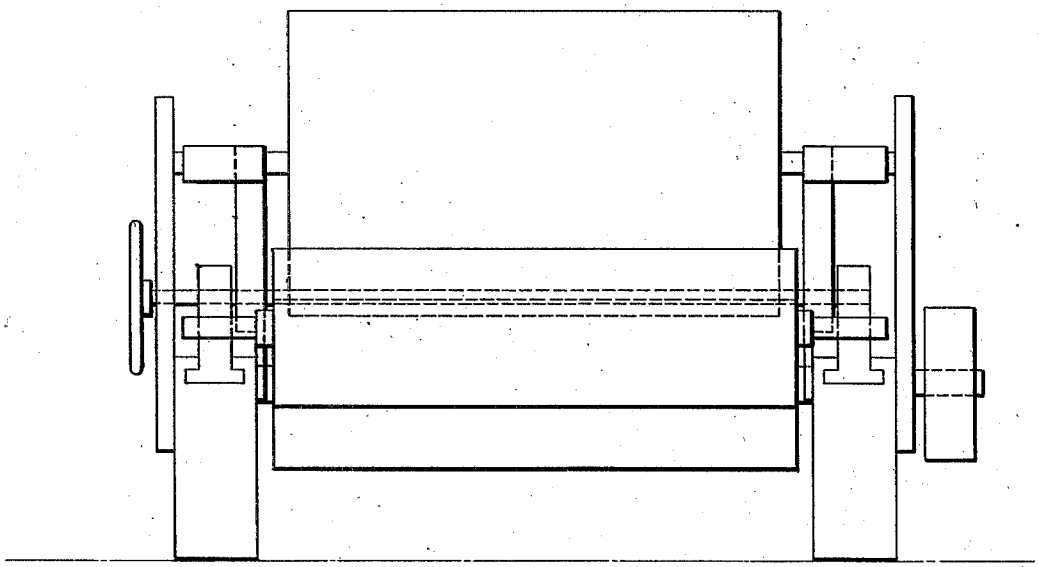


Fig.13



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Patented Jan. 4, 1927. 1,613,381

UNITED STATES PATENT OFFICE.

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WINDING MEANS.

Application filed July 6, 1925. Serial No. 41,495.

This invention relates generally to winding machines; and has more particularly reference to a reeling means associated with a paper-making or other machine from which a web of the flexible material flows uninterruptedly.

The manufacture of paper is a continuous process and one of the problems encountered is to wind the paper that issues from the machine on successive reels or shafts substantially without interruption.

The main object and feature of this invention is to substitute a new reel or winding shaft for one that has been filled and to convey the shaft bearing the wound material out of the machine without interrupting the flow of paper or with a minimum amount of interruption.

In the accompanying drawings the invention is disclosed in several concrete and preferred forms in which:

Fig. 1 is a side elevation of a winding machine, somewhat diagrammatically shown, embodying one form of the invention.

Fig. 2 is a view looking in the direction of arrow 2 of Fig. 1.

Fig. 3 is a side elevation of a winding machine, somewhat diagrammatically shown, embodying another form of the invention.

Fig. 4 is a view looking in the direction of arrow 4 of Fig. 3.

Fig. 5 is a detail view, in section, of the bearing means for the winding shaft shown in Figs. 1 to 4 inclusive.

Fig. 6 is a side elevation of a winding machine, somewhat diagrammatically shown, embodying a third form of the invention.

Fig. 7 is a view looking in the direction of arrow 7 of Fig. 6.

Fig. 8 is a side elevation of a winding machine, somewhat diagrammatically shown, embodying a modification of the form of the invention shown in Fig. 1.

Fig. 9 is a view looking in the direction of arrow 9 of Fig. 8.

Fig. 10 is a side elevation of a winding machine somewhat diagrammatically shown, embodying a modification of the form of the invention shown in Fig. 3.

Fig. 11 is a view looking in the direction of arrow 11 of Fig. 10.

Fig. 12 is a side elevation of a winding machine somewhat diagrammatically shown, embodying a modification of the form of the invention shown in Fig. 6.

Fig. 13 is a view looking in the direction of arrow 13 of Fig. 12.

Referring first to Figs. 1, 2 and 5, suitable winding means are there disclosed taking the form of a drum 10 with which is preferably associated an abutment member in the form of a second drum 11, the two drums being spaced apart and rotatable in the same direction. Only one drum, however, need be positively driven, as by means of belt 12, but, if desired, both drums may be driven by a silent chain 13 or otherwise. It is preferable to use two drums arranged after a fashion of a two-drum surface-winding machine because the paper is more easily controlled and may be handled with greater certainty than if one drum only is employed.

Whatever form the winding means may take, and it may be obviously be varied widely, an auxiliary winding means is provided, here taking the form of a roll 14 driven in any suitable way as by means of a belt 15 and pulleys from a shaft 16.

A suitable support, here consisting of two arms 17 mounted on shaft 18, is provided for the reception of winding shaft 19.

Arms 17 have inclined open bearing sockets 20 for the reception of blocks 21 carried by winding shaft 19; and the blocks are preferably of smaller dimensions than the width of the sockets so that they will slide either on surface 22 or on surface 23 but not on both. The paper is threaded between drum 10 and winding shaft 19 and wrapped around the latter. At this time said winding shaft 19 is not in contact with drum 10 because of the position of arm 17 against stop 24 which causes block 21 to rest against surface 22 and this surface has a stop 25 (Fig. 5) that prevents the blocks from sliding all the way down into the open bearing. Preferably, roll 14 does not extend all the way across to engage the surface of winding shaft 19 but merely engages a roll or pulley 26 mounted on 19. In a sense, therefore, shaft 19 constitutes a center wind shaft; and, preferably, roll 14 and therefore winding shaft 19, is driven with an overspeed; that is—faster than the web is supplied so as to take up any slack that may accumulate when starting the winding operation on a new winding shaft. Belt 15 is preferably a light belt, capable of slipping on its pulleys, and the fact that the belt is driven, keeps shaft 19

from tearing the paper as might happen if it were a dead weight.

After sufficient paper has been accumulated in the winding shaft, arms 17 are swung to the left (Fig. 1) thereby bringing the paper into contact with drum 10 and finally into the valley between drums 10 and 11 as indicated at 19^a. Said shaft 19 in its bodily passage over drum 10 rises in bearings and, as the position of arms 17 is reversed, blocks 21 come against surface 23 thereby permitting said shaft to descend to the bottom of open bearings 20 when the shaft passes over the high point of drum 10. When the shaft descends into the valley between the drums, it is kept from endwise movement by shaft-abutment members 260 stationary on the framework; and it will be understood that the bodily movement of the shaft over drum 10 takes place without breaking the web. Eventually, the material in building up will cause blocks 21 to rise out of bearings 20, after which support 17 may be returned to its initial position.

In addition to the above described or other means, suitable means, as a transfer device, are provided to remove the finished roll from drums 10 and 11. As shown in Figs. 1 and 2 these means take the following form: 27 indicates two arms mounted on shaft 28 and these arms are provided with upright guides 29 for the reception of blocks 21, the action being that said arms are brought into the full line position shown in Fig. 1; and, as the material accumulates on shaft 19^a it rises, and with it blocks 21, these blocks entering the upright guides until the winding shaft attains, we will say, position 19^b. The roll is now ready for removal and the web is severed transversely and wrapped around a new winding shaft 19 in arms 17, these arms having meanwhile been moved back into the position adjacent roll 14. Arms 27 are now moved to the left (Fig. 1), thereby moving the finished roll to a receiving support constituting here of tracks and a platform. In carrying out this action the ends of the winding shaft engage curved tracks 30 as indicated at 19^c; and, as the arms continue the tilting movement, blocks 21 gradually slip out of guides 29 until the winding shaft attains the position 19^d when it encounters latch 31. The parts are so related that the finished roll which is at this time a spinning mass is supported wholly by the winding shaft on the tracks until it comes to a state of rest when the latch may be removed and the finished roll dropped on a platform or table 32 from whence it is subsequently removed.

The means for actuating the supports or arms 17 and 27 may vary widely but, preferably, the parts are intergeared in the following manner: supports 17 and 27 carry gear sectors 33 and 34 that mesh with a pinion 35; and support 27 also has a gear sector 36 that meshes with a pinion 37 actuated by handwheel 38. When handwheel 38 is actuated, the supports are moved in unison and it will be seen that in the form here disclosed the arrangement is such that two winding shafts never engage drum 10 at the same time. When, therefore, support 27 moves a finished roll out of the machine, support 17 moves the initially wound roll into the machine; and, when support 27 is brought back above the valley of the two drums, support 17 moves back adjacent roll 14 so that a new winding shaft can be inserted to rest on surface 22. Thus the paper is initially wound on a shaft independently of the main winding means and the winding operation is continued by the main winding means.

The web may be threaded between 10 and 19 by hand but preferably the following expedient, which is quite independent of the previously described means, is employed. The web 39, coming from the paper-making machine or other source of supply, is carried beneath the winding means and is preferably placed on moving belt 40, taking the form of tapes passing over pulleys 41 and 42. 43 indicates a plurality of fingers pivoted at 44 and extending between the tapes. When handle 45 is moved to the left in Fig. 1, fingers 43 are raised and with them the web which is thereby placed on drum 10. If desired, an opening 46 may be arranged adjacent the free end of fingers 43 leading to the cellar and through this opening waste web is carried by tapes 40.

In Figs. 3 and 4 is shown a modified form of the invention. Here roll 14, that drives the winding shaft initially before engagement with the drum, is itself driven by friction from drum 10 by the following means: 47 is a friction pulley, bearing against the surface of drum 10, which in turn, drives pulley 48 on countershaft 49 and this countershaft carries pulley 14 that engages pulley 26 on winding shaft 19. In this form of the invention, support, or arms, 17^a is actuated by means of handwheel 50 having pinion 51 engaging gear sector 52, thereby turning the support on center 53. The second support 27^a is here in the form of rack bars 54 slidably mounted in support 17^a. Rack bars 54 may be moved up or down in support 17^a by means of pinion 55 on shaft 56 that carries handwheel 57, said shaft being carried in support 17^a. Rack bars 54 carry bearings 58 that may be provided with a latch 59 to hold blocks 21 in position. When an initially wound roll has been formed on the winding shaft and has been transferred to a position in the valley between the drums by movement of support 17^a, said support 17^a is returned to its

initial position in contact with stop 24 and this brings rack bars 54 and bearing 58 in line with the winding shaft in the valley between the drums. At this time, said rack bars 54 have been lowered in support 17 by means of pinion 55 and they are now, by the same means, raised until bearings 58 embrace blocks 22 when latch 59 is locked in position. The material now builds up on the winding shaft and, as the material rises, bearing 58 and rack bars 54 are pulled upward by said material. When winding of the roll is finished, it is preferably removed and a new roll brought into position by stages in the following manner: After the web has been severed transversely and started around a new winding shaft, support 17^a is tilted by means of rack 52 and pinion 51 thereby bringing the completed roll out of the valley between the drums and entirely onto drum 11, the initially wound roll on the new winding shaft coming in contact with drum 10. The tilting movement of support 17^a is now arrested by rack bars 54 coming in contact with adjustable stops 60. Handwheel 57 is now turned to raise bars 54 sufficiently to enable the wound material on the finished roll to clear drum 11 when further tilting movement of 17^a takes place after stops 60 have been adjusted to admit of such movement. The finished roll will now be above platform 32 but not in contact therewith and the new winding roll will have advanced over the surface of drum 10. When the completed roll ceases spinning, stops 60 are adjusted once more and the finished roll is deposited on platform 32 and the new winding roll is brought into the valley between the drums. If desired, brakes (not shown) may be applied to the finished roll to reduce the time necessary to bring it to a state of rest. Handwheel 57 is now operated to lower racks 54, and the new winding roll having built up sufficiently to raise blocks 21 out of jaws 20, support 17^a may now be swung back thereby bringing it against stops 24 and bringing the racks beneath and in line with the winding shaft that is in the valley between the drums. When this position has been reached the racks are again elevated to bring bearings 58 in contact with blocks 21.

In Figs. 6 and 7 is shown a second modification of the invention in which support 17^b assumes the form of horizontally movable members having open bearings that initially support the winding shaft adjacent roll 14 from which it is initially driven as in the other forms. Roll 14 may receive power in any way as by means of belt 61 Support 17^b is provided with racks 62, actuated by pinion 63 and handwheel 64, said support being slidably mounted in the framework. When a certain amount of paper has been accumulated on the winding shaft, support 17^b is moved to the left in Fig. 6 thereby bringing the partially wound roll into engagement with drum 10 and then with both drums in the valley therebetween, the ends of the winding shaft being confined by vertical guides 65. When the paper has built up sufficiently to raise blocks 21 out of the jaws of support 17^b, the latter may be returned to its initial position. 66 indicates slides on guides 65, these slides having jaws 67 movable about center 68: and it will be understood that, when latch 69 is raised, jaws 67 may be moved outwardly to bring them beneath blocks 21 after which said jaws are locked in position by latch 69. As the roll of paper increases in diameter, slides 66 move upwardly on guides 65 until a sufficient amount of material has been accumulated when the web is severed and started around a new winding shaft adjacent roll 14. The finished roll may now be removed in any suitable way, as by means of a crane engaging eyes 70 of blocks 21. In all forms of the invention, blocks 21 preferably have eyes 70 so that a crane may be brought into action to take the roll at any point in the winding operation should it be found desirable to do so.

In Figs. 8 and 9 is shown a modification of the invention of Figs. 1 and 2. In this instance, the abutment 71 is in the form of two stationary members instead of a drum, as 11, in Fig. 1. Also, instead of using square blocks, as 21 in Fig. 1, there are employed round bearings 72; and instead of eye 70 there are now employed hooks 73 on the winding shaft. The operation of this device is the same as that described in connection with the construction shown in Figs. 1 and 2 except that the accumulated material rests on one drum instead of two and the round bearings of the winding shaft come in contact with abutment members 71 and then with abutments 74 of support 27.

In Figs. 10 and 11 a modification of the construction shown in Figs. 3 and 4 is disclosed. Here the initial winding means is omitted altogether, the winding shaft being brought into contact with drum 10 for the initial winding operation and is then carried over into contact with both drum 10 and curved stationary abutment members 75 against which round bearings 76 roll as the material builds up.

In Figs. 12 and 13 a modification of the construction shown in Figs. 6 and 7 is shown. Here drum 11 is replaced by a stationary abutment 77 against which the round bearing on the winding shaft travels.

I claim:

1. A winding machine including: a winding shaft, a surface winding drum to wind material on the shaft, means for initially supporting said winding shaft out of contact with the drum, and driving means to

rotate said shaft while out of contact with the drum to initiate the winding operation by accumulating material on the shaft before engagement with the drum.

2. A winding machine including: a surface winding drum, a winding shaft, means for supporting said winding shaft out of contact with the drum, driving means to rotate said shaft while out of contact with the drum to initiate the winding operation by accumulating material on the shaft before engagement with the drum, and means for moving the winding shaft to bring the accumulated material thereon into engagement with the drum to thereby continue the winding operation.

3. A winding machine including: a winding shaft, two surface winding drums spaced apart and rotatable in the same direction to wind material on the shaft, means for initially supporting said winding shaft out of contact with the drums, and driving means to rotate said shaft while out of contact with the drums to initiate the winding operation by accumulating material on the shaft before engagement with the drums.

4. A winding machine including: a winding shaft, two surface winding drums spaced apart and rotatable in the same direction to wind material on the shaft, means for supporting said winding shaft out of contact with the drums, driving means to rotate said shaft while out of contact with the drums to initiate the winding operation by accumulating material on the shaft before engagement with the drums, and means for moving the winding shaft to bring the accumulated material thereon into engagement with the drums to thereby continue the winding operation.

5. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction to wind material on the shaft, means for supporting said winding shaft out of contact with the drums, driving means to rotate said shaft while out of contact with the drums to initiate the winding operation by accumulating material on the shaft before engagement with the drums, and means for moving the winding shaft to bring the accumulated material thereon into engagement first with one of the drums and then with both of the drums to continue the winding operation.

6. A winding machine including: a surface winding drum, an abutment, a support for a winding shaft to carry it into winding relation with the drum and abutment, a second support to receive a winding shaft that is in winding relation with the drum and abutment, and means for moving the second support to remove said winding shaft from winding relation with the drum and abutment.

7. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft to carry it into winding relation with the drums, a second support to receive a winding shaft that is in winding relation with the drums, and means for moving the second support to remove said winding shaft from winding relation with the drums.

8. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft, means for moving said support to bring the winding shaft into winding relation first with one of said drums and thereafter with both of said drums, a second support to receive a winding shaft that is in winding relation with the drums, and means for moving the second support to receive said winding shaft from winding relation with the drums.

9. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft, means for moving said support to bring the winding shaft over the surface of one drum with the accumulated material in contact therewith and then into winding relation between the drums, a second support to receive a winding shaft that is in winding relation with the drums, and means for moving said second support to bring the winding shaft away from the first drum by moving it over the surface of the second drum with the accumulated material in contact therewith.

10. A winding machine including: a surface winding drum, an abutment member, a support for a winding shaft to carry it into winding relation with the drum and abutment member, a second support to receive a winding shaft that is in winding relation with the drum and abutment members and to carry said shaft away from winding relation with said drum and abutment member, and means for simultaneously actuating both supports.

11. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft to carry it into winding relation with the drums, a second support to receive a winding shaft that is in winding relation with the drums and to remove it from winding relation with the drums, and means for simultaneously actuating both supports.

12. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft movable to bring the winding shaft into winding relation first with one of said drums and thereafter with both of said drums, a second support to receive a winding shaft that is in winding relation

with the drums and movale to remove the winding shaft from winding relation with the drums, and means for simultaneously actuating both supports.

13. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction, a support for a winding shaft movable to bring the shaft over the surface of one drum with the accumulated material in contact therewith, and then into winding relation between the drums, a second support to receive a winding shaft that is in winding relation with the drums and movable to bring a winding shaft away from the first drum by moving it over the surface of the second drum with the accumulated material in contact therewith.

14. A winding machine including: two surface winding drums spaced apart and rotatable in the same direction to wind material on a shaft, a winding shaft to be placed in winding relation with the drums in the valley there between, a receiving support for the winding shaft to sustain it with the material accumulated thereon out of engagement with the winding drums, and a transfer device to receive the winding shaft when in position between the drums, to carry it out of position between the drums and to eject it to the receiving support.

15. A winding machine including: surface winding means, a winding shaft to be placed in winding relation therewith, a receiving support for the winding shaft to sustain it with the material accumulated thereon out of engagement with the winding means, and a transfer device to carry the winding shaft over the surface winding means and to eject it to the receiving support.

Signed at New York, in the borough of Brooklyn county of Kings and state of New York, this 2nd day of July, 1925

JAMES A. CAMERON.