Jan. 31, 1956 J. E. GOODWILLIE 2,733,019

WINDER MACHINE

Filed Oct. 15, 1953 3 Sheets-Sheet 1

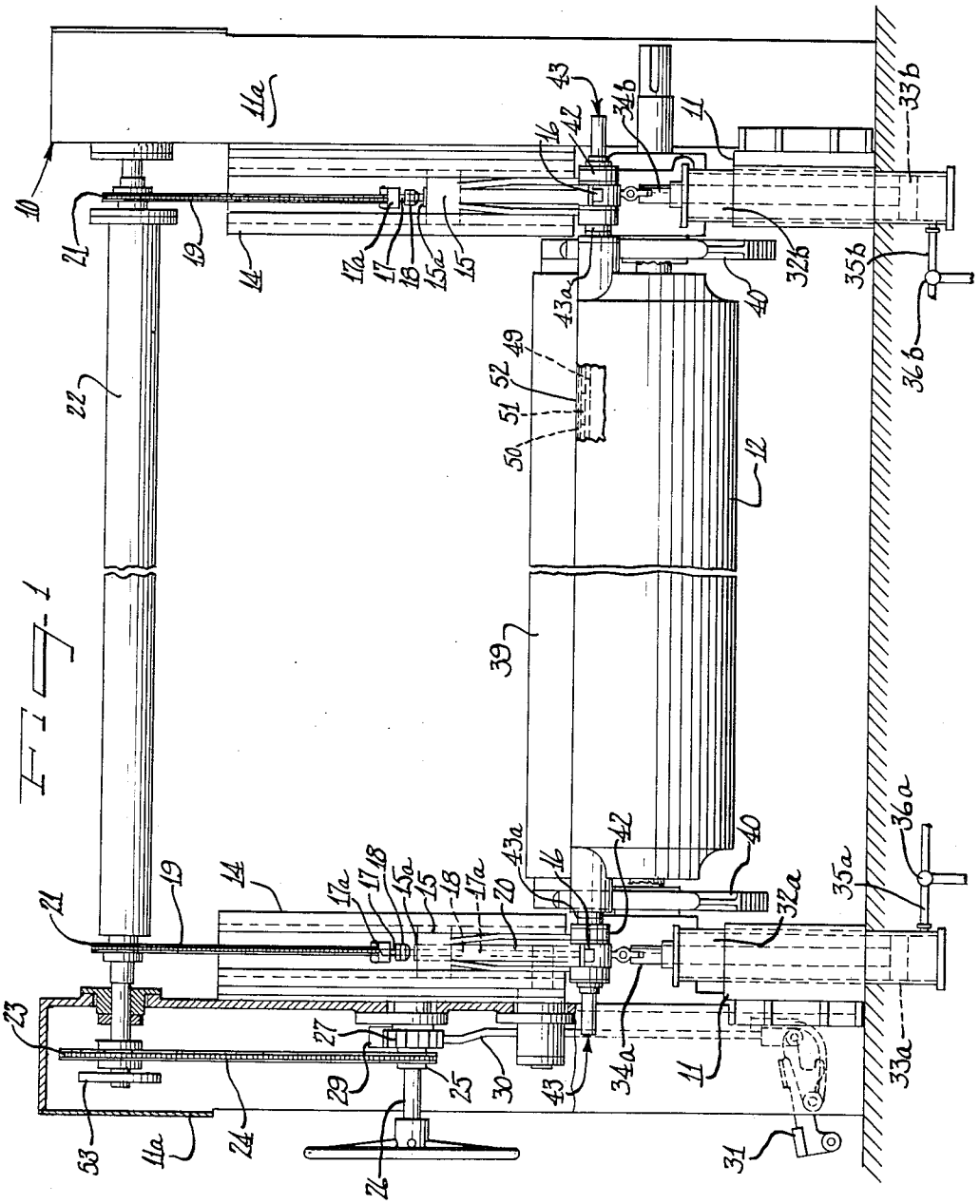


Fig. 1

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WINDER MACHINE

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Fig. 2

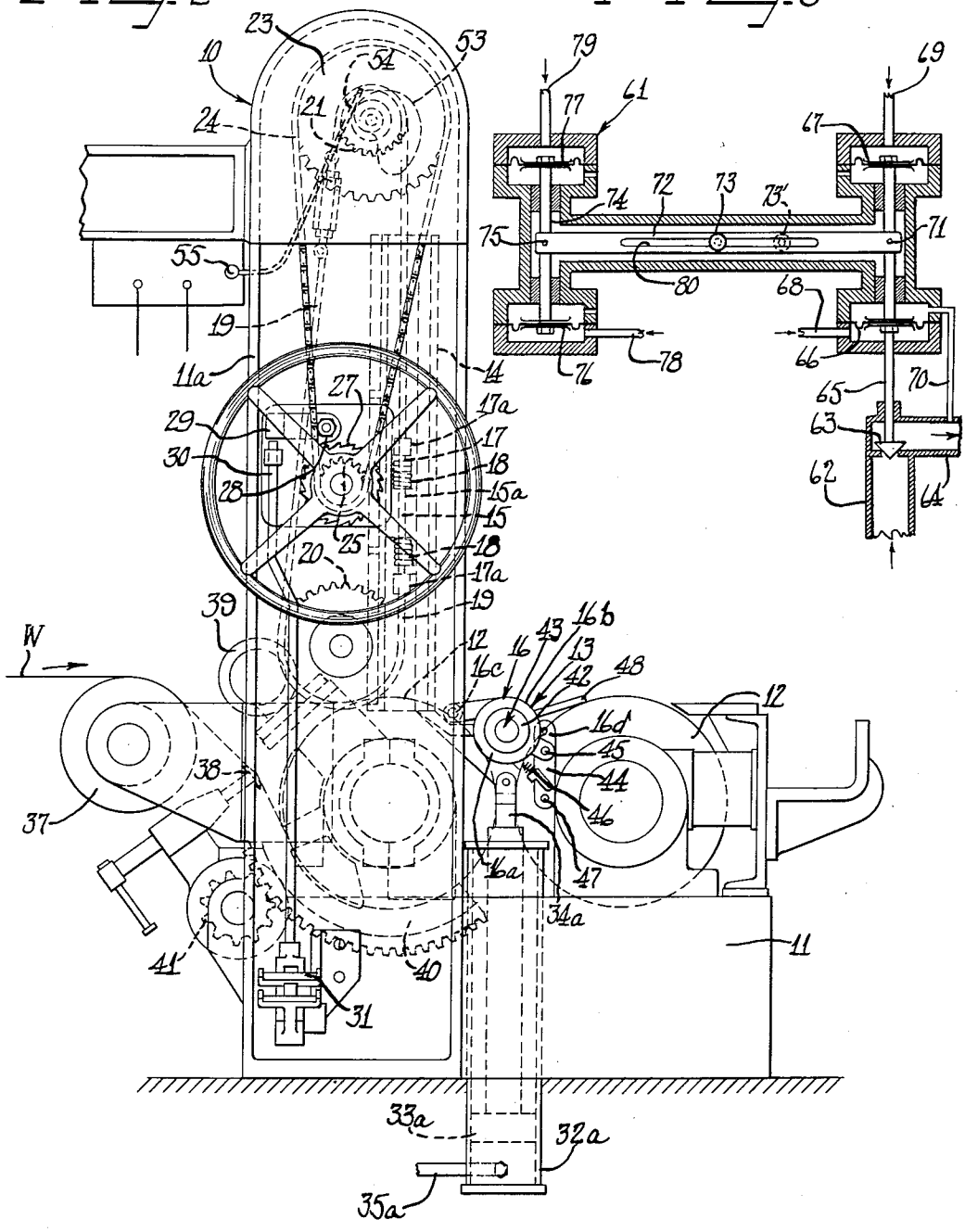


Fig. 3

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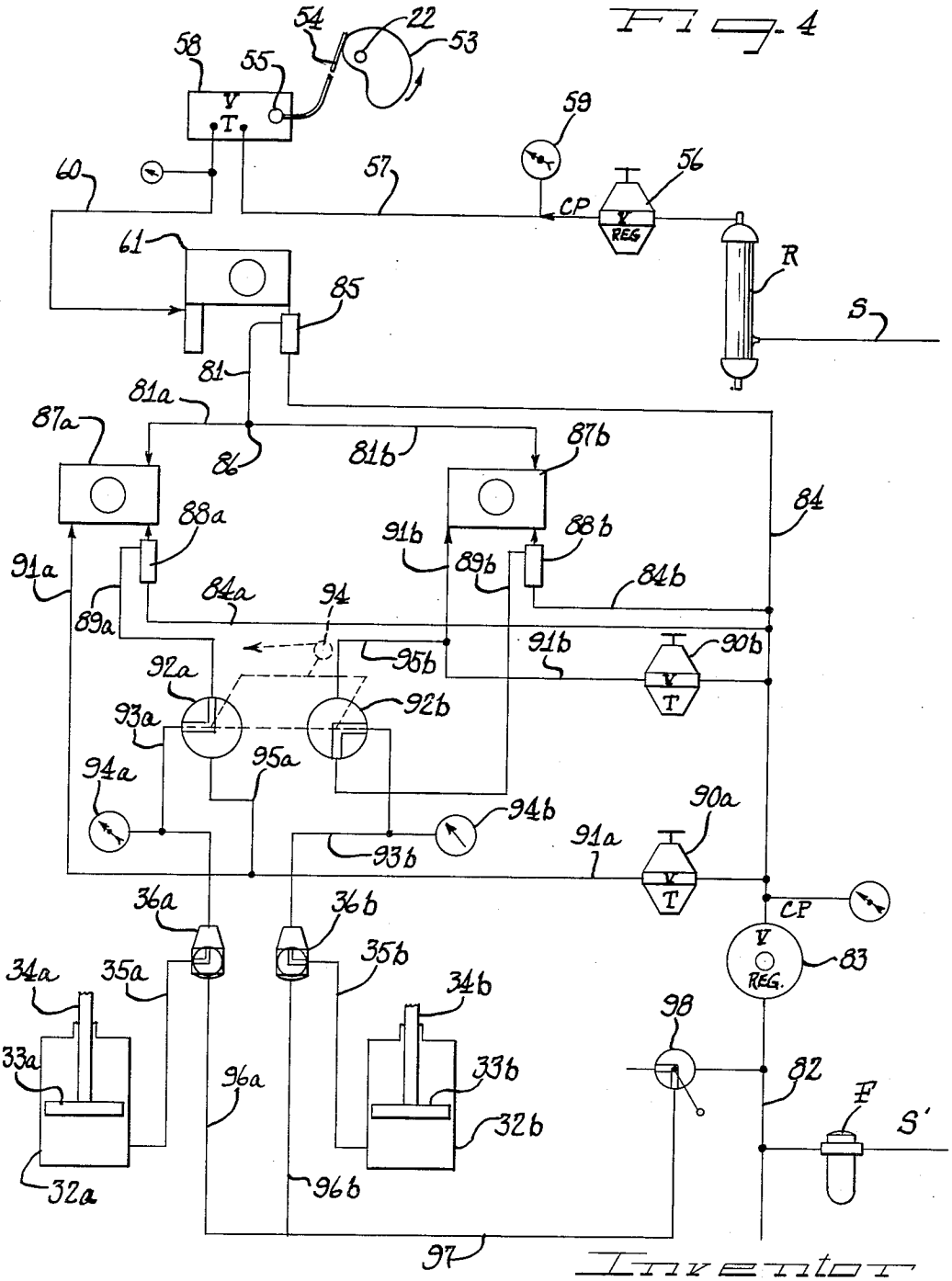
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WINDER MACHINE

Filed Oct. 15, 1953 3 Sheets-Sheet 3

FIG. 4



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2,733,019

WINDER MACHINE

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Application October 15, 1953, Serial No. 386,171

8 Claims. (Cl. 242—66)

This invention relates to a machine for winding web material, such as paper, to produce a roll of the desired hardness irrespective of the weight of the roll. In particular, the invention deals with a drum winder adapted to produce very soft rolls of paper, such as creped tissue paper, without being influenced by the weight of the roll being wound.

Drum winders characteristically produce wound rolls of web material which increase in hardness as the weight of the roll increases. Prior attempts to counterbalance the weight of the roll being wound have not been successful, particularly because of the difficulty of controlling the operation. Another difficulty which arose because the roll lifting force must be applied to the projecting end portions of the shaft on which the roll is being wound and, since this shaft must be of relatively small diameter in comparison with its length, deflection of the shaft and the roll occurred. As a result of this, the central portion of the roll was not benefited by such lifting, and uneven winding was obtained. This latter difficulty has now been cured by the use of certain anti-deflection roll assemblies, which are described and claimed in United States application Serial No. 233,657, owned by the assignee of this application, filed June 26, 1951, and since issued as U. S. Patent No. 2,654,546. Controlled lifting of the shaft has, however, presented an additional unsolved problem to the art.

According to this invention, a drum winder is equipped with fluid pressure operated jacks acting on the ends of the winder shaft to relieve some of the load of the roll being wound from the winder drums, and control means are provided for the fluid pressure operated jacks which respond to the continuously increasing weight of the roll being wound upon the shaft.

It is, therefore, an important object of the instant invention to provide an improved winder drum assembly.

A further object of the instant invention is to provide an improved winder drum assembly wherein improved control means continuously sensing the increase in roll size and weight actuate fluid pressure mechanism to continuously change the lifting forces acting upon the ends of the shaft.

It is a further object to provide, in a winder machine of the underdrum type, in combination, a winder drum, a winder shaft carrying a transverse load urging the shaft toward the drum, bearing means rotatably receiving the ends of the shaft, fluid pressure actuated means engaging the bearing means and urging the bearing means and shaft received thereby away from the drum, and means responsive to a predetermined function of the distance between the shaft and the drum in control of the fluid pressure actuated means tending to urge the shaft away from the drum.

Still another object of the instant invention is to provide improved mechanism for controlling the load supported by a pair of winder drums in a web drum winder while a web roll is continuously building up on a winder shaft cooperating with the winder drums to support the roll, which comprises a pair of fluid pressure actuated supports rotatably carrying opposite ends of the shaft, valve means in control of actuating fluid pressure supplied to said supports, a cam rotating in response to movement of the shaft away from the winder drums during roll build up, and follow-up mechanism engaging said cam and operating said valve means in response to a predetermined function of said movement.

Other features, objects and advantages of the present invention will become apparent to those skilled in the art from the following detailed disclosure thereof with reference to the annexed sheets of drawings which, by way of a preferred embodiment only, illustrate one winder machine according to this invention.

On the drawings:

Figure 1 is a broken front elevational view, with parts in vertical cross-section, of a winder machine according to this invention;

Figure 2 is an end elevational view of the machine of Figure 1;

Figure 3 is a detailed cross-sectional elevational view of a control valve used in the instant invention (and shown diagrammatically in Figure 4); and

Figure 4 is a diagrammatical view showing the control mechanism employed in the instant device.

As shown on the drawings:

As shown in Figures 1 and 2, the winder machine **10** of this invention includes side frames **11, 11** carrying bearing supports for rotatably mounting a pair of spaced horizontally aligned winder drums **12, 12** coacting to define a winder nip **13** therebetween, which is substantially vertically aligned. Upstanding end frame portions **11***a*, **11***a* carry vertical tracks **14, 14** in which are slidably mounted carriages **15, 15** each having a split bearing clamp **16** at the lower end thereof projecting into alignment with the winder nip **13** beyond the ends of the winder drums **12, 12**. The carriages **15, 15** have bosses **15***a*, **15***a* on the rear faces thereof slidably receiving mounting pins **17, 17**.

The pin **17** has heads **17***a*, **17***a* at opposite ends thereof and compression springs **18, 18** are disposed around the pin **17** between these heads **17***a*, **17***a* and the adjacent ends of the boss **15***a*. Each head **17***a* is pivotally connected at its outer end with the end of a sprocket chain **19** that is trained around a bottom sprocket **20** rotatably mounted on the frame portion **11***a* and a top sprocket **21** secured to a cross shaft **22** which is rotatably mounted on the end frame portions **11***a*. The shaft **22** is rotated by means of a sprocket **23** on one end thereof driven by a chain **24** which, in turn, is actuated from a sprocket **25** on a hand wheel operated shaft **26** carried by the end frame. The shaft **26** carries a ratchet **27** engaged by a pawl **28**. The pawl **28** can be disengaged from the ratchet by raising a lever **29**. The lever **29** is conveniently actuated by the end of the rod **30** which is raised and lowered from a foot pedal **31** pivoted on the bottom of the frame **11**. The hand wheel actuated shaft **26** is operative to rotate the cross shaft **22** in the direction for causing the sprocket **21** to drive the chains **19** for raising the carriages **15** in their tracks. The pawl **28** is effective to hold the shaft **22** against rotation in the opposite direction but can be released from the ratchet **27** so as to permit this opposite rotation. The springs **18** serve to form resilient supports for the carriages **15** on the sprocket chain **19**. The bearing clamps **16** carried by the carriages, therefore, have spring mountings on the lifting chains.

The frames **11, 11** also carry vertical jack cylinders **32***a* and **32***b* with pistons **33***a* and **33***b*, respectively, slidable therein and actuating piston rods **34***a* and **34***b*, respectively, which project out of the open tops thereof. The upper ends of the piston rods **34***a* and **34***b* are pivotally connected to the bearing clamps **16** on the carriages **15**,

A fluid (which may be a gas such as air or a liquid such as water) under pressure is admitted into the bottom ends of the jack cylinders **32***a* and **32***b* through the pipes **35***a* and **35***b*, respectively, fed from the valves **36***a* and **36***b* in a manner hereinafter described in detail, so that the pressure in each jack will be substantially the same. The fluid forces the pistons **33***a* and **33***b* upwardly in the cylinders to raise the piston rods **34***a* and **34***b* and thereby raise the bearing clamps **16, 16.**

A paper web W is fed to the nip **13** around the underside of one of the winder drums **12.** As shown in Figure 2, the web W is directed into the winder machine **10** around the top of a roll **37** and over an adjustable guide bar **38** which laps the web around the underside of the first winder drum **12.**

An ejector roll **39** for pushing a wound paper roll out of the nip **13** is carried on gear segments **40** at the ends of the first underdrum **12** and is swingable over the roll **12.** Pinion gears **41** in engagement with the arcuate gear segment **40** are effective to swing the roll **39** through the nip **13** to eject the wound roll.

The split bearing clamps **16, 16** surround the winder shaft bearings **42, 42** on the ends of the winder shaft **43.** As best shown in Figure 2, the bearing clamps **16** are split so as to be quickly engaged on the bearing portions of the shaft bearings **42.** Each bearing clamp **16** includes a fixed lower half portion **16***a* on the carriage **15** and a swingable top half portion **16***b* which is pivoted on a pin **16***c* carried by the carriage **15.** A keeper **16***d* on the free end of the swingable bearing portion **16***b* engages a latch or locking dog **44** which is pivoted on a pin **45** carried by the lower half **16***a* of the clamp. A spring **46** urges the latch **44** against the keeper **16***d* to lock the two halves **16***a* and **16***b* together. An operating handle **47** on the lower end of the latch **44,** however, is adapted to depress the spring **46** for releasing the latch **44** from the keeper **16***d.* A handle **48** is provided on the swingable section **16***b* to raise and lower the section for opening and closing the clamp.

As hereinbefore mentioned, the details of the anti-deflection roll assembly mounted on the shaft **43** form part of the invention disclosed and claimed in application Serial No. 233,657, filed June 26, 1951, now U. S. Patent No. 2,654,546, and as such do not form the subject matter of the instant invention. The instant invention is adapted for the use of any anti-deflection assembly for the shaft **43** and preferably that described in said U. S. Patent No. 2,654,546, wherein the bearings **42** have segmental spherical cap receiving portions which are adapted to tilt in the clamps **16, 16** to provide a self-aligning bearing connection, and the shaft **43** itself comprises a tubular axle **49** with stub shafts **43***a*, **43***a* at opposite ends mounting the bearings **42** and with a cylindrical shell **50** surrounding the tubular axle in spaced concentric relation mounted on the axle by a pair of rubber (or similar solid elastomeric material) mountings **51** adjacent to but inwardly spaced from the opposite ends of the shell **50,** so as to substantially prevent distortion or deflection of the shell **50** even though the tubular axle **49** portion is deflected slightly by a load. Also, a cardboard core **52** is usually slipped over the shell to actually receive the paper being wound thereabout.

In the operation of the winder machine **10** of this invention, the paper W is fed under the first underdrum **12** as explained hereinbefore and is directed upwardly into the nip **13.** A winder tube or core is suitably clamped in position on the shaft assembly **43.** As indicated at the location of the broken away portion of the winder drum **12** in Figure 1, the tubular axle **49** of the shaft assembly **43** has mounted thereon a concentric shell **50** resiliently carried on a rubber annulus **51** and a cardboard core **52** may be slid thereover. The winder shaft **43** has the end bearings **42** thereof mounted in the bearing clamp **16** and the carriages **15** are lowered sufficiently so that the winding tube **52** on the shaft **43** will rest in the nip in engagement with both the drums **12, 12. In order to lower the**

winder shaft **43,** fluid in the cylinders **32***a* and **32***b* is exhausted and the foot pedal **31** is depressed to permit the hand wheel to be swung in a direction for lowering the carriages **15, 15.** The leading end of the paper web is then threaded around the winding tube **52.** The leading end of the paper web is then clamped to the shell **50,** and the drums **12, 12** are driven to rotate the shaft assembly **42** so that a roll of paper builds up on the shaft assembly **43** in contact with the underdrums **12, 12.**

It will be understood that, as the roll increases in diameter, the winder shaft assembly **43** rises in the nip **13** and the weight of the roll increases, thereby increasing the pressure relationship between the paper and the winder drums **12, 12.** In order to relieve the weight of the roll from the winder drums **12, 12** so as to maintain a desired pressure relationship between the paper being wound and the winder drums **12, 12** air or other fluid under pressure is fed from the control unit, which will be described in detail in connection with Figures 3 and 4, through the pipes **35***a* and **35***b* to the cylinders **32***a* and **32***b* under the pistons **33***a* and **33***b*, respectively, for causing the piston rods **34***a* and **34***b* to raise the bearing clamps **16, 16.**

As the load of the roll being wound is transferred from the winder drums **12, 12** to the fluid pressure jacks **32***a* and **32***b*, the tubular axle portion **49** of the winder shaft assembly **43** will be deflected somewhat. This deflection will be appreciable as the weight of the roll increases and as more and more of the roll weight is borne by the jacks **32***a* and **32***b* acting through through the bearings at the ends of the shaft assembly **43.** However, the shell **50** on the tubular axle **49,** being supported inwardly from the ends thereof by the rubber collars **51, 51** will only deflect in such a way as to prevent any appreciable variation in pressure between the roll being wound and the winder drums along the length of the roll.

The difficulty heretofore encountered in connection with an arrangement of this type was that the operators would often have difficulty in making the necessary adjustments to constantly correct the amount of fluid pressure being used on the jacks **32***a* and **32***b*, so that a uniform pressure relationship between the roll being wound and the winder drums could be maintained during the entire windup operation. The instant invention provides a control arrangement which correlates the various functioning elements of this device and which is capable of continuously supplying the required fluid pressure to each of the jacks **32***a* and **32***b*. This device is shown diagrammatically in Figure 4.

As will be appreciated, as the roll builds up on the winder shaft **43,** the winder shaft **43** rises up on the nip **13.** The bearing clamps **16** will be lifted therewith and the carriages **15** will rise in their tracks, causing the chains **19** to rotate the shaft **22** in a counterclockwise direction. This shaft **22,** in turn, drives the chain **24** to rotate the ratchet **27** in a counterclockwise direction. The pawl **28** will not interfere with the counterclockwise rotation of the ratchet **27** and the carriages **15** can therefore rise in their tracks. In the instant device **10,** a cam **53** is also mounted on the shaft **22** at one extremity thereof, so that rotation of the shaft **22** also causes rotation of the cam **53,** and this rotation of the cam **53** takes place in response to movement of the winder shaft **43** away from the winder drums **12.** In fact, the position of the cam **53** depends upon the distance between the shaft **43** and the drums **12,** or the size of the roll on the shaft **43,** or even the position of the shaft **43** (with respect to the other elements in the device **10**).

The cam **53** has a cooperating follower or follow-up means **54** in the form of the arm **54** pivotally mounted at **55** and resiliently urged against the peripheral surface of the cam **53.**

As will be explained in detail hereinafter, the cam **53** and follower **54** form a part of the control mechanism which translates the distance between the shaft **43** and the drum **12** to roll size, then to roll weight and finally

to fluid pressure required for the jacks 32*a* and 32*b* to counteract a sufficient amount of the roll weight to maintain a predetermined pressure between the roll and the winder drum 12. The winder shaft 43 thus carries a transverse load in the form of the roll urging the shaft toward the drums 12; and the fluid pressure actuated jacks 32*a* and 32*b* coact with the shaft bearings 42 to urge the shaft 43 away from the drums 12, so that the jacks 32*a* and 32*b* cooperate with the drum 12 to carry the entire weight of the roll (as well as the weight of the shaft assembly 43). The actual relative positions of the shaft 43 and drums 12 are positions which are determined by the size of the roll being wound and these positions are substantially independent of the pressure between the roll and the drums 12 or the pressure exerted at the jacks 32*a* and 32*b* (unless such pressure were to exceed the total weight of the roll and shaft 43). The cam 53 and follower 54 (being suitably connected to the shaft 43 by follower mechanism such as the sprocket chain 19, the shaft 22, etc.) operate in response to a predetermined function of the positional relationship between the shaft 43 and the drums 12 to actuate the jacks 32*a* and 32*b* to the extent desired.

Referring again to Figure 4, it will be seen that air under pressure enters the control system through the supply line S and into a reservoir R. From the reservoir R the compressed air passes through a letdown valve 56 which maintains a predetermined air pressure in the line 57 leading to the control valve 58, as indicated by the air pressure gauge 59. The follow-up arm 54 controls the flow of air through the control valve 58 and, as the cam 53 rotates in the direction indicated by the arrow, it urges the follow-up arm 54 in the "open" direction at an increasing rate of speed per rate of angular rotation. In other words, as the distance between the shaft 43 and the winder arms 12 increases the cam 53 is rotated in the direction indicated by the arrow and such rotation takes place as a linear function of the movement of the shaft 43, but the periphery of the cam 53 is so designed that the follow-up arm 54 moves as a function of the square of this distance, so as to translate the distance between the shaft 43 and the drums 12 to roll size, or the cross-sectional area of the roll. The movement of the follow-up arm 54 controls the operation of the throttle valve 58, so that the valve 58 releases an air pressure signal that is a predetermined function of the roll size. This signal then passes through the valve exit line 60 and into a control valve 61 of the type known as a "totalizer."

Figure 3 shows a sectional view of a valve which may function as a "totalizer" in that it is capable of receiving an air signal and multiplying or dividing this signal by a given factor and/or adding to or subtracting from this signal. As will be seen from Figure 3, air is fed from a constant pressure source in the header 62 through a flow control valve, here shown as a needle valve 63 and into the actuating pressure or operating pressure line 64, whence it goes to the device to which it is to actuate. The stem 65 of the needle valve 63 is operatively connected to separate diaphragms 66 and 67. Air pressure through the inlet line 68 acts against the bottom of the diaphragm 66 and tends to open the valve 63; whereas air pressure through the inlet line 69 acts against the top of the diaphragm 67 and tends to close the valve 63. Also, it is preferable to employ a jumper 70 between the actuating air line 64 and the top side of the diaphragm 66. The jumper 70 will tend to maintain the valve 63 in closed position when no actuating air is being received by the totalizer 61. As an example of the operation, if air of ten pounds pressure is received through the inlet 69 and air of fifteen pounds pressure is received through the inlet 68 the diaphragms will cooperate so as to open the valve 63 to the extent that the air pressure released to the actuating air line 64 is five pounds. In other words, the air pressure released for operative purposes is the difference between the air signals received. In like manner, the air pressure released may be the total of the signals received, merely by introducing the signals into the totalizer at the proper side of a diaphragm.

It will also be noted that the valve stem 65 is pivotally connected at 71 to a lever arm 72 which has a pivot connection 73 midway between the ends of the arm 72. A second actuating rod 74 comparable to the extension of the valve stem 65 is attached to the opposite end of the lever arm 72 by the pivot 75; and this actuating rod 74 has a pair of diaphragms 76 and 77 attached thereto. Air entering into the inlet 78 beneath the diaphragm 76 urges the rod 74 upwardly and the valve stem 65 downwardly by virtue of the lever arm 72; and air entering into the inlet 79 on top of the diaphragm 77 urges the rod 74 down and the valve stem 65 up in the same manner, so as to open the valve 63.

It will thus be seen that with the pivot 73 positioned in the middle of the lever arm 72, an air signal of five pounds going through the inlet 68 and air signal of ten pounds going through the inlet 79 will result in the totaling of these two signals to obtain fifteen pounds pressure in the air signal going past the valve 63 into the actuating line 64.

Multiplication and division of air signals may be effected using the instant totalizer 61 by movement of the pivot 73 in one direction or another in the slot 80 and the lever arm 72. For example, if it is desired to multiply a given signal by three, then the pivot 73 may be shifted to the right to the position 73′ so as to effect a mechanical advantage at the lever of three to one for air entering the inlet 79. Thus arranged, the totalizer 61 operates to receive three pounds air pressure at the inlet 79 and to release nine pounds actuating air pressure in the line 64. The setting of the pivot 73 may be done manually in order to obtain the desired mechanical advantage (or disadvantage) in the lever 72; and thus set, the totalizer 61 constantly adds, subtracts, multiplies or divides the air signal or signals received.

Referring again to Figure 4, the air signal in the throttle valve exit line 60 which is received by the totalizer 61 represents the size of the roll (in cross-sectional area) but each of the jacks 32*a* and 32*b* will carry only approximately one-half of the total weight of the roll (which is a linear function of the cross-sectional area), so the totalizer 61 functions to divide the air signal received in half. This may be done by moving the pivot 73 to the left (in the drawing of Figure 3) so as to obtain a mechanical disadvantage of one to two for the air signal entering the inlet 79.

Referring again to Figure 4, the air signal received by the totalizer 61 is divided in two, so that actuating air leaves the totalizer 61 in the line 81 with one-half the air pressure of the air in the line 60. The totalizer 61 is connected to an air source S′ which feeds air under pressure through a filter F and into header 82, then through the constant pressure output valve 83 and into the main header 84. From the main header 84 the air passes through the control valve indicated at 85 for the totalizer 61. The header 84 compares to the source line 62 of Figure 3, the valve 85 compares to the valve 63 of Figure 3 and the actuating air outlet line 81 compares to the outlet line 64 of Figure 3. The outlet air line 81 splits into two lines 81*a* and 81*b* at the T 86, thereby initiating the division of controlling air to the two jacks 32*a* and 32*b*, respectively.

Tracing the "*a*" system the air in the inlet line 81*a* enters the totalizer 87*a* which effectively translates the incoming air signal from roll size to roll weight. Actually, the incoming air signal indicates only one-half of the total cross-sectional area of the roll and the totalizer 87*a* converts this to the weight of one-half of the roll, by multiplying the received air signal by a given factor, such as the factor 10, which will be determined on the basis of the type of paper and the compactness of the winding of the roll. It will thus be seen that the

source air comes from the main header 84 through the line 84*a* and to the control valve 88*a* for the totalizer 87*a*, whereat it is translated to the inlet air pressure from the line 81*a* times the predetermined factor for which the totalizer 87*a* is set. If set for the factor 10, then the air passing through the valve 88*a* and into the actuating air outlet 89*a* will have a pressure of ten times the air entering through the inlet 81*a*.

The totalizer 87*a* also carries out an additional function, namely, that of including an air signal which is representative of the weight of the winder shaft assembly 43 (or approximately one-half of the weight of this assembly). This is done by passing the compressed air from the header 84 through a throttle valve 90*a* which may be manually set to produce a given air signal in the outlet line 91*a* which is representative of one-half of the weight of the shaft assembly and the air signal in the line 91*a* is merely added to the product resulting from the multiplication of the air signal entering through the inlet line 81*a* by the weight factor. Referring to Figure 3, it will be seen that this may be accomplished by first setting the pivot 73 on the right side so as to obtain a mechanical advantage that is equal to the factor by which the air signal in the line 81*a* is to be multiplied. If this air signal is to be multiplied by ten then the pivot is moved to the right so as to obtain a mechanical advantage of ten to one in the lever 72 and the inlet air from the line 81*a* is directed into the inlet 79 (of Figure 3). The air signal in the throttle valve header 91*a* is, however, already based upon weight and it is necessary only to add this air signal, and this is accomplished by directing the air signal from the line 91*a* into the inlet 68 of Figure 3, so that the totalizer may accomplish simultaneously multiplication of one air signal and addition of another.

As previously indicated, the resulting air signal leaving the totalizer 87*a* is in the actuating air pressure line 89*a*; and the compressed air therein passes through the valve 92*a*, the line 93*a* with the gauge 94*a* therein, the valve 36*a* and the inlet line 35*a* for the jack 32*a*.

The corresponding parts in the "*b*" system of Figure 4 are given the same reference numerals followed by the letter "*b*" and these elements function in an identical manner. It will thus be seen that using the instant control device on "automatic" the cam 53 and the follower 54 operate to continuously adjust the control device in response to changes in the distance between the shaft 43 and the winder drum 12 so that the increased weight of the roll is constantly compensated for automatically. In addition, further adjustment may be employed using the throttle valves 90*a* and 90*b*. These valves are originally set to compensate for the share of the weight of the shaft assembly which the individual jack must carry, but if during windup, it appears that one side of the roll is being wound up more tightly than the other (for example, because of irregularities in the thickness of the paper) the manual throttle valves 90*a* and 90*b* may be employed to make an adjustment, so that the amount of air being fed through these throttle valves need not be the same.

It will be noted that the valves 92*a* and 92*b* are both set so as to afford direct communication between the lines 89*a*—93*a* and 89*b*—93*b*, respectively, for automatic control. When it is desired to put the instrument on "manual" control, the valves 92*a* and 92*b* are shifted, for example, by movement of the handle indicated symbolically at 94 to shift the handle 94 in the direction indicated by the arrow whereby the valves 92*a* and 92*b* are each rotated 90° in the direction indicated by the arrow. This results in cutting off the communication between the lines 89*a* and 93*a* and the lines 89*b* and 93*b*; and instead, communication at the valve 92*a* is established between the line 93*a* and a jumper 95*a* which connects directly into the exit line 91*a* of the throttle valve 90*a*. In this manner, the throttle valve 90*a* may be used as the sole control for feeding actuating air pressure through the lines 91*a*, 95*a*, the valve 92*a*, the lines 93*a* and 35*a* into the jack 32*a*. In like manner, the valve 92*b* is shifted by the same movement which shifts the valve 92*a* and communication is thus established between the line 91*b*, the jumper 95*b*, and the line 93*b* leading through the valve 36*b* and the line 35*b* into the jack 32*b*.

The valves 36*a* and 36*b* serve to vent the jack 32*a* and 32*b*, respectively through the lines 96*a* and 96*b*, respectively, the header 97 and the valve 98. To accomplish this, the valve 36*a* is rotated in a counterclockwise direction 90°, while the valve 98 is maintained in the position shown in the drawing; and the valve 36*b* is rotated in a clockwise direction 90° to accomplish the same thing.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A winder machine adapted to produce a wound roll of a controlled uniform degree of hardness irrespective of the weight thereof, which comprises a pair of under winder drums defining a vertical winding nip, upright parallel tracks on said machine adjacent the ends of the winder drums, a winder shaft extending along the length of said winding nip for receiving the roll being wound thereabout and cooperating with the winder drums to support the total weight of the roll, bearing means rotatably mounted on each end of the shaft and accommodating relative tilting of the shaft and slidably retained in the tracks, separate and independent fluid pressure actuated support means engaging the bearing means at opposite ends of the shaft for movement thereof in the tracks, means responsive to a predetermined function of the distance between the shaft and the winding nip connected to each of said support means for supplying actuating fluid pressure thereto and separate and apart independently controlled inlet means connected to each of said support means adapted to supply different amounts of additional actuating fluid pressure thereto.

2. A winder machine adapted to produce a wound roll of a controlled uniform degree of hardness irrespective of the weight thereof, which comprises a pair of under winder drums defining a vertical winding nip, upright parallel tracks on said machine adjacent the ends of the winder drums, a winder shaft extending along the length of said winding nip for receiving the roll being wound thereabout, bearing means rotatably mounted on each end of the shaft and slidably retained in the tracks, separate and independent fluid pressure actuated support means engaging the bearing means at opposite ends of the shaft for movement thereof in the tracks, said support means cooperating with the winder drums to support the total weight of the bearing means, shaft and roll, means responsive to a predetermined function of the roll size supplying actuating fluid pressure to each of said support means, and separate and apart inlet means each responsive to a predetermined function of the bearing and shaft weight connected to each of said support means supplying additional actuating fluid thereto.

3. A winder machine adapted to produce a wound roll of a controlled uniform degree of hardness irrespective of the weight thereof, which comprises a pair of under winder drums defining a vertical winding nip, upright parallel tracks on said machine adjacent the ends of the winder drums, a winder shaft extending along the length of said winding nip for receiving the roll being wound thereabout, bearing means rotatably mounted on each end of the shaft and slidably retained in the tracks, separate and independent fluid pressure actuated support means engaging the bearing means at opposite ends of the shaft for movement thereof in the tracks, cam and follow-up mechanism connected to said shaft translating the distance from the shaft to the winding nip to a fluid pressure signal indicating the roll size, control means receiving said signal and translating the same to actuating fluid pressure that is a predetermined function of the roll

size and supplying such actuating fluid pressure to each of said supports, and separate and apart inlet means each responsive to a predetermined function of the bearing and shaft weight connected to each of said support means supplying additional actuating fluid thereto.

4. A drum winder for web material, comprising a pair of under winder drums defining a vertical winding nip, upright parallel tracks on said machine adjacent the ends of the winder drums, a winder shaft extending along the length of said winding nip for receiving the roll being wound thereabout and cooperating with the winder drums to support the total weight of the roll, carriages slidable in said tracks, bearing clamps carried by said carriages adjacent the ends of said nip, upper and lower sprockets at opposite ends of each track, a lifting chain for each carriage trained around the adjacent upper and lower sprockets, locking means for selectively locking the upper sprockets against rotation in a direction permitting lowering of the carriages, a fluid pressure jack adjacent each end of the nip, a piston rod projecting from each jack acting on the adjacent bearing clamp to raise and lower the clamps relative to the nip, said winder shaft having bearings on the ends thereof receivable in said bearing clamps and accommodating relative tilting movement therebetween, a cam mounted for rotation with an upper sprocket, follow-up means engaging said cam, and valve means controlled by the follow-up means supplying actuating fluid pressure independently to each of said jacks for controlling the weight of the roll supported by said winder drums.

5. Mechanism for controlling the load supported by a pair of winder drums in a web drum winder while a web roll is continuously building up on a winder shaft cooperating with the winder drums to support the roll, which comprises bearing means rotatably carrying opposite ends of the shaft and movable therewith away from the winder drums during roll build up, fluid pressure actuated supports carrying said bearing means, a cam connected to said bearing means and rotating in response to movement of said bearing means, follow-up means operatively engaging said cam, a first control valve actuated by said follow-up means, said cam and follow-up means cooperating to translate bearing movement to a fluid pressure signal at the first control valve that is a predetermined function of the roll size, a second control valve responsive to the roll density receiving the first control valve signal and translating the same to a second signal that is a function of the roll weight, and fluid pressure inlet means for said supports being actuated by said second control valve.

6. Mechanism for actuating a pair of independent hydraulic jacks carrying opposite ends of a winder shaft having a web roll continuously building up on the shaft and partially supported by under winder drums, which

comprises a cam movable in response to movement of the shaft away from the drums, follow-up means operatively engaging the cam, a first control valve actuated by the follow-up means to translate movement of the cam to a first fluid pressure signal that is a predetermined function of the roll size, a second control valve responsive to the roll density receiving the first fluid pressure signal and translating the same to a second signal that is a function of the roll weight, and fluid pressure inlet means for the jacks receiving the second signal to urge the shaft away from the drums therewith.

7. Mechanism for actuating a pair of independent hydraulic jacks carrying opposite ends of a winder shaft having a web roll continuously building up on the shaft and partially supported by under winder drums, which comprises a cam movable in response to movement of the shaft away from the drums, follow-up means operatively engaging the cam, a first control valve actuated by the follow-up means to translate movement of the cam to a first fluid pressure signal that is a predetermined function of the roll size, separate fluid pressure inlet means for each jack, second control valve means receiving the first fluid pressure signal, translating the same to a pair of second fluid pressure signals each a function of approximately one-half the roll weight and conveying one of said second signals to each of said inlet means, and independent fluid pressure supply means for each of said jacks supply additional fluid pressure to each of said second signals.

8. Mechanism for actuating a pair of independent hydraulic jacks carrying opposite ends of a winder shaft having a web roll continuously building up on the shaft and partially supported by under winder drums, which comprises a cam movable in response to movement of the shaft away from the drums, follow-up means operatively engaging the cam, a first control valve actuated by the follow-up means to translate movement of the cam to a first fluid pressure signal that is a predetermined function of the roll size, separate fluid pressure inlet means for each jack, and second control valve means receiving the first fluid pressure signal, translating the same to a pair of second fluid pressure signals each a function of approximately one-half the roll weight and conveying one of said second signals to each of said inlet means.

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