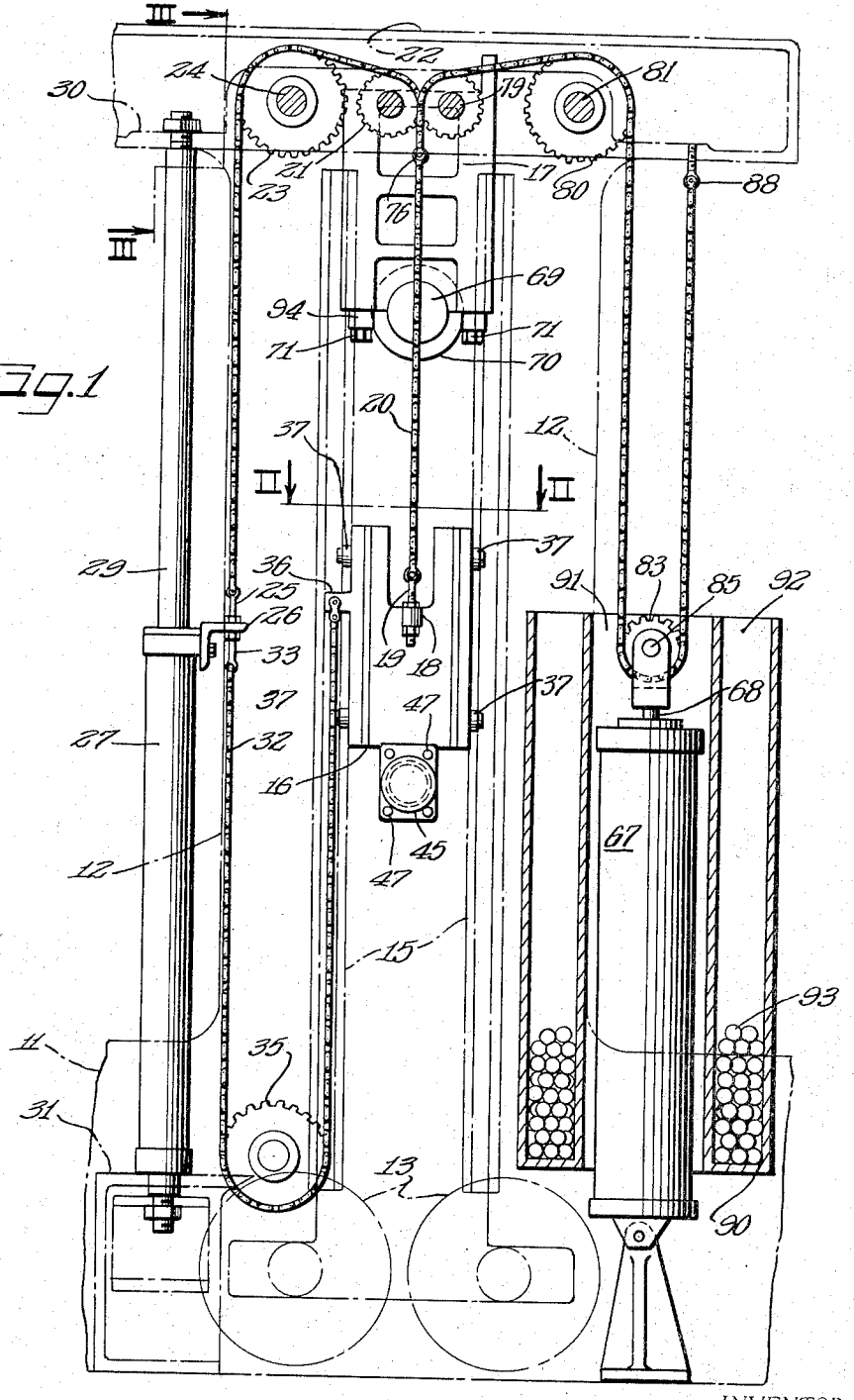
March 19, 1968 E. J. KLACZKIEWICZ 3,373,952

DRUM WINDER FOR PAPER AND THE LIKE

Filed Jan. 7, 1966 4 Sheets-Sheet 1

Fig. 1



INVENTOR.

Edward J. Klaczkiewicz

BY Hill, Sherman, Meroni, Gross & Simpson

ATTORNEYS

March 19, 1968 E. J. KLACZKIEWICZ 3,373,952

DRUM WINDER FOR PAPER AND THE LIKE

Filed Jan. 7, 1966 4 Sheets-Sheet 2

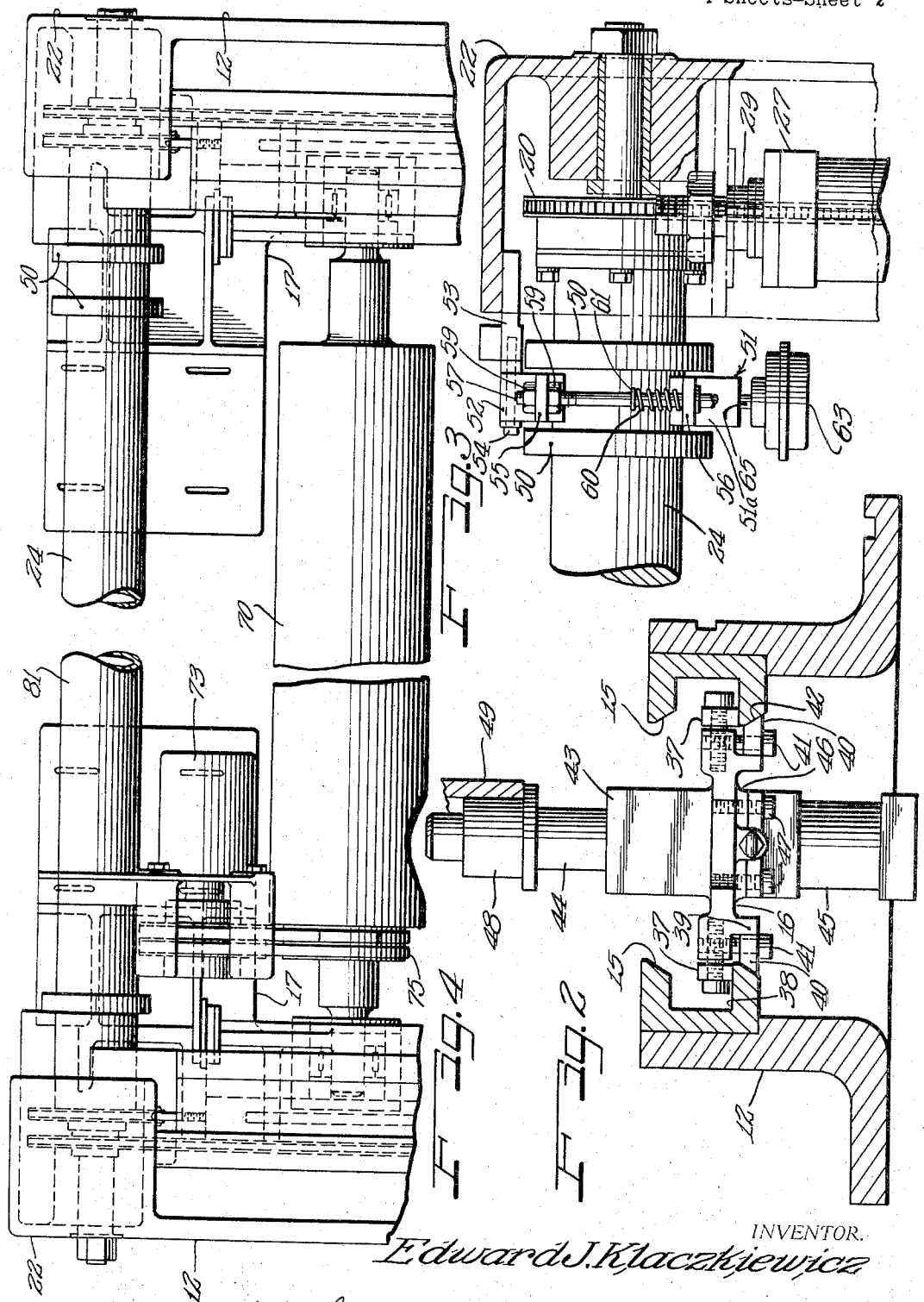


FIG. 3

FIG. 4

FIG. 2

INVENTOR.
Edward J. Klaczkiewicz

BY Hill, Sherman, Meroni, Gross & Simpson
ATTORNEYS

March 19, 1968 E. J. KLACZKIEWICZ 3,373,952

DRUM WINDER FOR PAPER AND THE LIKE

Filed Jan. 7, 1966 4 Sheets-Sheet 3

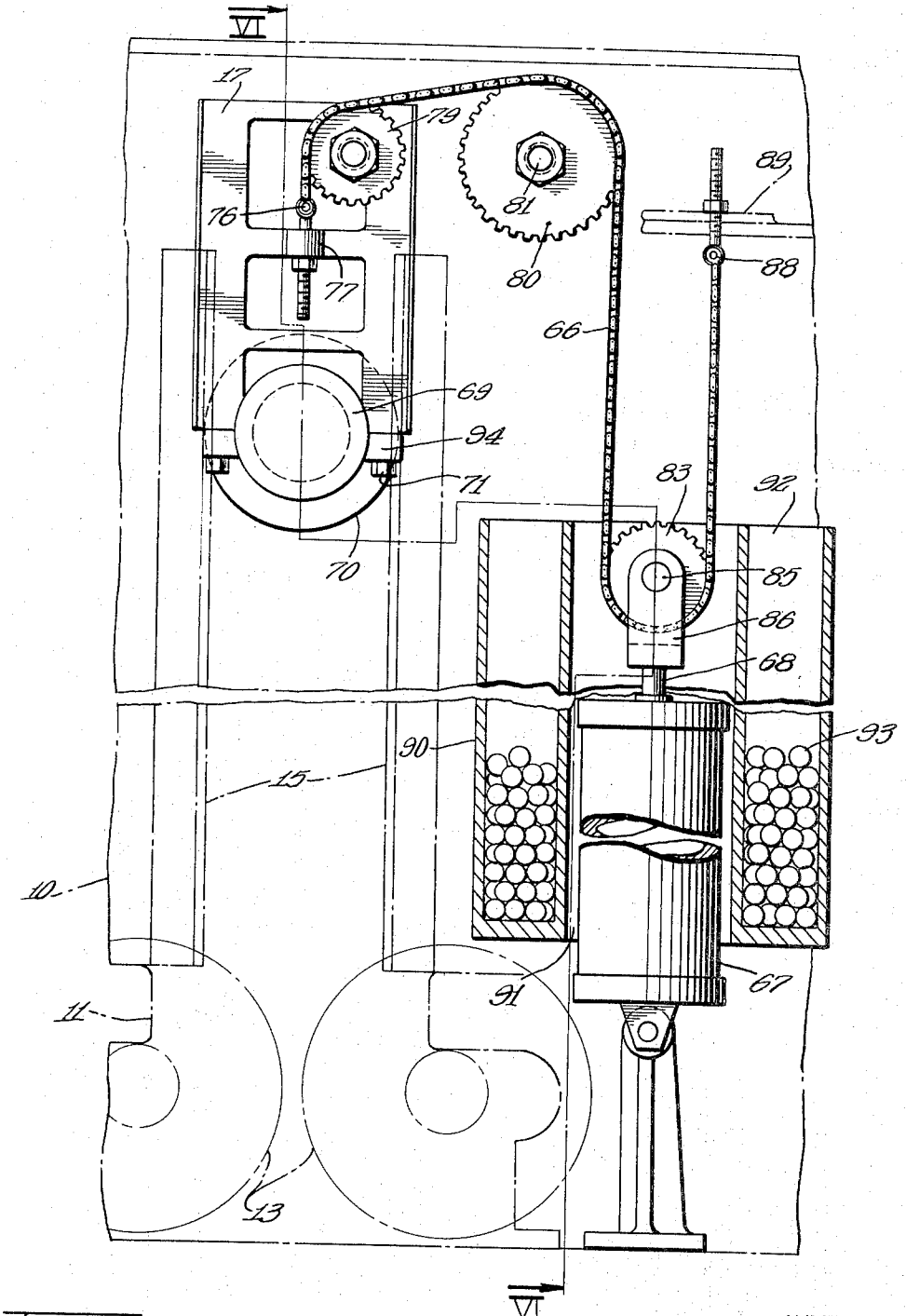


FIG. 5

INVENTOR.
Edward J. Klaczkiewicz

BY Hill, Sherman, Meroni, Gross & Simpson
ATTORNEYS

March 19, 1968 E. J. KLACZKIEWICZ 3,373,952

DRUM WINDER FOR PAPER AND THE LIKE

Filed Jan. 7, 1966 4 Sheets-Sheet 4

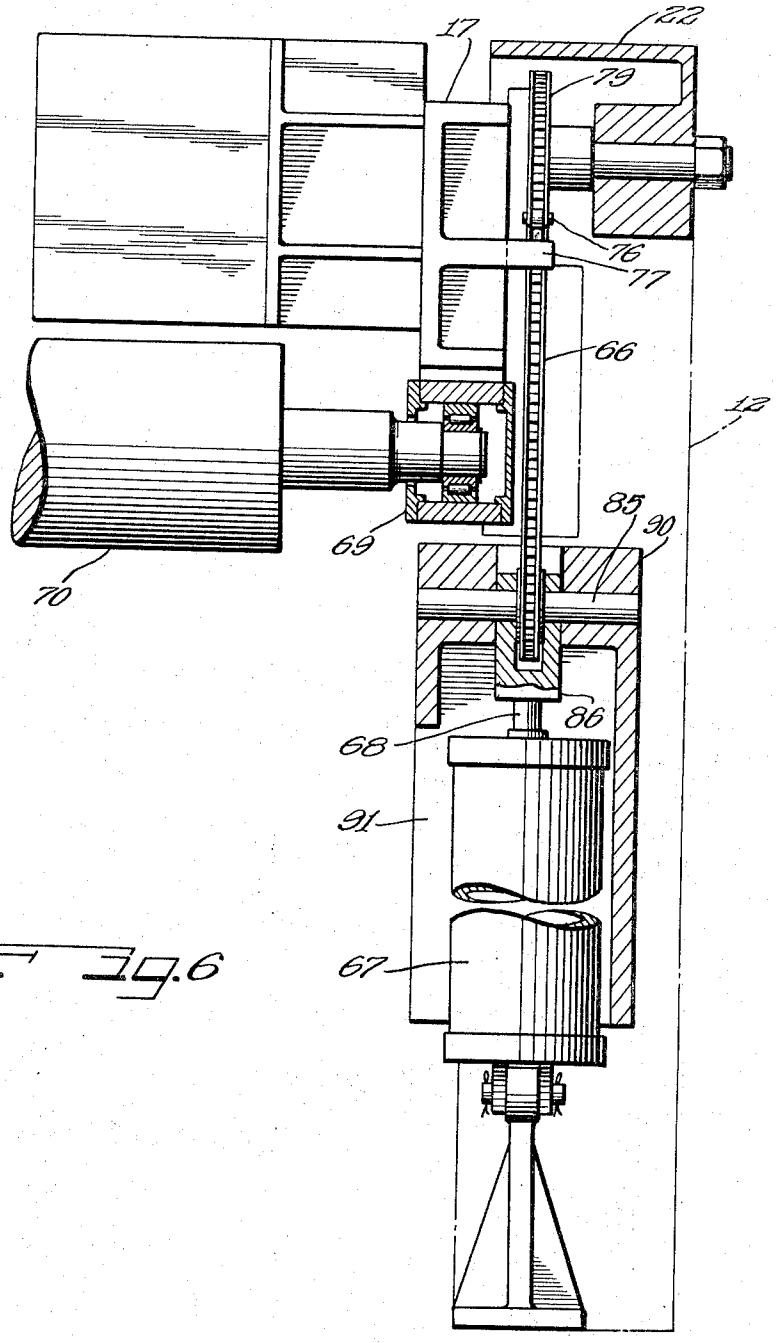


FIG. 6

INVENTOR.
Edward J. Klaczkiewicz

BY Hill, Sherman, Meroni, Gross & Simpson
ATTORNEYS

United States Patent Office 3,373,952 Patented Mar. 19, 1968

3,373,952

DRUM WINDER FOR PAPER AND THE LIKE

Edward J. Klaczkiewicz, Wilmington, Del., assignor to Beloit Eastern Corporation, Downingtown, Pa., a corporation of Delaware

Filed Jan. 7, 1966, Ser. No. 519,206
13 Claims. (Cl. 242—66)

This invention relates to improvements in drum winders for paper and the like.

A principal object of the present invention is to improve upon the drum winders heretofore in use for rewinding paper and the like, by simplifying adjustability and maintenance of the winder and increasing the efficiency thereof by improving upon the slides and supports for the core shaft for the roll of paper.

Another object of the invention is to provide a new and improved drum winder for rewinding paper and the like, in which the usual cantilevered core shaft slides are replaced by slides slidably supported along opposite sides of the center of the core shaft, and thereby providing a greater thrust capacity for the core shaft and restriction in the end play of the shaft.

A still further object of the invention is to provide a novel and improved drum winder for rewinding paper and the like, in which the core shaft is rotatably supported intermediate the guides for the core shaft slides and a brake means is provided, controlling ascent of the core shaft slides and simplifying the adjustability and replacement of the core shaft.

Still another object of the invention is to improve upon the drum winders for rewinding paper and the like by slidably guiding the core slides along opposite sides of the slides and suspending the slides from the centers thereof, and providing detachable chucks for the core shaft, the centers of which are in alignment with the lines of suspension thereof and intermediate the guides for the slides to simplify the replacement and adjustability of the core shaft.

Still another object of the invention is to provide a simple and improved form of drum winder in which core shaft slides slidably supported equal distances from the center of the core shaft, replace the usual cantilever slides, in which a control shaft for the slides ties the slides for movement together and is controlled by a brake, controlling ascent of the core shaft slides, and in which fluid pressure cylinder and piston means are provided for adjustably moving the slides, and interlocked with the brake for the control shaft for the slides.

A still further object of the invention is to provide a novel and improved control for the rider roll of a drum winder having a simple and improved form of counterweight which may readily be filled with shot to the extent required to counterbalance the rider roll.

Still another object of the invention is to improve upon the rider roll supports and counterweighting means for drum winders heretofore in use by supporting the rider roll in slides slidably supported on opposite sides of the rider roll and vertically moved by fluid pressure operated cylinder and piston means at each end of the rider roll, in which counterweights in the form of upwardly opening receptacles are mounted on the cylinder and piston means and may readily be loaded with shot and the like, to counterbalance the rider roll.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a fragmentary view in end elevation of a drum winder constructed in accordance with the principles of the present invention, with the winder drums and frame structure for the winder shown in phantom and

with other parts of the winder removed and shown in section;

FIGURE 2 is a transverse sectional view taken substantially along line II—II of FIGURE 1 and showing certain details of a core shaft slide and guide means therefor;

FIGURE 3 is a fragmentary sectional view taken substantially along line III—III of FIGURE 1 showing the cylinder for vertically moving a core shaft slide in its uppermost position and showing certain parts of the frame in phantom;

FIGURE 4 is a fragmentary side view of the upper part of the winder showing the drive to the winder roll and cross connecting control shafts for the rider roll and core shaft, with certain parts removed and certain other parts broken away;

FIGURE 5 is an end view of the winder, showing the frame in phantom and showing one of the counterweights in section, in order to illustrate the support and control for the rider roll; and

FIGURE 6 is a sectional view taken substantially along line VI—VI of FIGURE 5.

In the embodiment of the invention illustrated in the drawings, I have shown in phantom in FIGURES 1, 2, 5 and 6 a drum winder **10** including a base **11**, shown in phantom, and parallel spaced posts **12, 12** shown in phantom as extending upwardly of opposite sides of said base. The base **11** carries bearing supports (not shown) for rotatably supporting a pair of spaced horizontally aligned winder drums in a conventional manner. The base **11** may also form a support for a motor (not shown) and reduction gearing driven therefrom (not shown) for driving the winder drums **13, 13**.

The posts **12, 12** each have parallel spaced facing channeled guides **15, 15** extending therealong (FIGURE 2) forming slidable guides for core shaft slides **16, 16** and rider roll slides **17, 17** disposed above said core shaft slides and slidably movable along said guides.

As shown in FIGURES 1 and 2, each core shaft slide **16** is in the general form of an elongated plate having a boss **18** extending outwardly of a central upwardly opening recess formed in said slide and forming a mounting for an eye bolt **19** having a flexible support and drive member, such as a drive chain **20** suitably connected to the eye thereof. The chain **20** forms a support for the slides **16** and is connected thereto in alignment with the center of the core shaft and roll of paper being wound thereon, and extends upwardly of said slide along a line disposed midway between the guides **15, 15** over an idler sprocket **21** suitably journalled in a cap **22** for the post **12**, extending along the outside of said idler sprocket. The chain **20** extends from the top of the idler sprocket **21** about a sprocket **23** on the outer end of a control shaft **24** suitably journalled in the cap **22**. From thence the chain extends downwardly to an eye bolt **25** mounted on a horizontal leg **26** of an angle iron, the vertical leg of which is bolted or otherwise secured to a fluid pressure operated cylinder **27**, movable along a piston rod **29**, fixed at its opposite ends. The piston rod **29** is mounted at its upper end in a flange **30** extending outwardly of the cap **22** for the post **12** and at its lower end in a shouldered portion **31** of the base **11**. A second flexible drive device in the form of a drive chain **32** is connected to an eye bolt **33** mounted in the leg **26** of the angle iron and extends downwardly therefrom about a direction changing idler sprocket **35** and upwardly therefrom to an ear **36** extending laterally of the slide **16**, and is suitably connected thereto to lower the slide **16** as the cylinder **27** moves upwardly along the piston rod **29**.

The slide **16** is slidably guided along the channeled guides **15** on follower rollers **37, 37** engaging the insides of legs or flanges **38, 38** of the channeled guides **15**, as

shown in FIGURE 2, the slides **16** also have parallel spaced vertically extending ribs **39**, **39** spaced inwardly of opposite sides thereof and extending therealong. The ribs **39**, **39** form abutments for retainer gibs **40**, **40** extending vertically along said slides and secured thereto as by machine screws **41**. The retainer gibs **40** have inwardly beveled engaging faces **42** slidably engaging corresponding faces extending along the ends of the legs **38** and retaining said slides **16** for vertical movement along the flanges **38**, **38** of the channeled guides **15**, **15**.

The slide **16** has a rectangular boss **43** depending therefrom and extending inwardly therefrom and forming a mounting for a piston rod **44** extensible from and retractible within a cylinder **45**. The cylinder **45** is shown in FIGURE 2 as being mounted on the outside of an outwardly extending boss portion **46** of the boss **43** as by machine screws **47**. The piston rod **44** has a core shaft chuck **48** journalled on the outer end thereof and engaging within the end of a core shaft **49**, a fragment of which is shown in FIGURE 2. The core shaft **49** may be of a conventional form and may be surrounded by a tubular shell on which the web is wound.

The leading end of the paper web is thus threaded around the tubular shell of the core shaft and suitably clamped thereto. The rolls **13**, **13** are then driven to rotate the core shaft and shell so that a roll of paper will build up on said shell in contact with the winder drum **13**, **13**. As the roll builds up on the core shaft **49**, the paper building up on said core shaft riding on the nips between the winder drums **13**, **13** will lift the slides **16**, **16** along the guides **15**, **15** extending along opposite posts **12**, **12**, in cooperation with the cylinders **27**, **27**.

The core shaft chuck **48** and core shaft **49** mounted thereon are thus rotatable about coaxial axes midway between the guides **15**, **15**. The core shaft slides **16**, **16** are also slidably supported equal distances from the center of the core shaft to provide a rigid slidable support for the slides and core shaft, with a resultant greater thrust capacity and a restriction in end play along the axis of the core shaft.

The cylinders **27**, **27** at opposite ends of the winder may thus serve to quickly raise the core shaft slides and may also serve to lower the slides under the control of the control shaft **24**. The control shaft **24** is suitably journalled in the caps **22** for the posts **12** at the top thereof and extends thereacross and is provided with a pair of parallel spaced flanges **50**, **50** extending radially outwardly therefrom, having a brake **51** mounted in the space therebetween. The brake **51** may be a conventional diaphragm brake known to the trade as a Horton diaphragm brake, so only herein shown and described generally. The brake includes a lower shoe **51***a* lined with a brake lining (not shown) engageable with the periphery of the shaft **24**. An upper shoe **52** is pivotally suspended from a bracket **53** on a pivot pin **54**. The bracket **53** is shown as being suitably mounted on and extending inwardly of an associated cap **22** for a post **12**. The shoe **52** has lugs **55** extending outwardly from opposite ends thereof. The shoe **51***a* has corresponding lugs **56** extending outwardly of opposite ends thereof. A separate rod **57** threaded at one end thereof extends through each lug **55** and the registering lug **56** and is secured to the associated lug **55** as by nuts **59** engaging opposite sides of said lug. A compression spring **60** encircles each rod **57** and is interposed between a collar **61** secured to said rod and the lug **56**, to bias the brake shoe **51***a* in on off position. A fluid pressure operated diaphragm **63** is connected with the shoe **51***a* through a plunger **65**, to apply the brake.

The brake **51** is interconnected in the fluid pressure circuit controlling operation of the fluid pressure operated cylinders **27**, to apply the brake during raising movement of the slides **16**, **16** and the core shaft **49** and thereby control movement of the slides **16**, **16** and make it possible to accurately stop the slides in a desired location. The brake may also control descent of the slides.

The rider roll slides **17**, **17** are slidably guided in the guides **15**, **15** and are vertically moved along said guides by flexible drive devices, such as drive chains **66**, operated by fluid pressure cylinders **67**, having piston rods **68** extensible therefrom, as will hereinafter more clearly appear as this specification proceeds.

As shown in FIGURES 1, 5, and 6 the slides **17**, **17** provide supports for bearing boxes **69** at their lower ends, forming bearing supports for a rider roll **70**, riding on top of the roll of paper during the winding operation and maintaining a predetermined pressure nip between the roll of paper and the winder drums **13**, **13** and thereby exerting a predetermined force on the roll of paper as it is being wound, which decreases as the roll of paper builds up on the winder shaft and is relieved as the roll of paper is built up to a predetermined diameter. The bearing boxes **69** are held in place by bearing caps **94**, retained to the bottoms of the slides **17** as by the machine screws **71**.

One rider roll slide **17**, shown in FIGURE 4 as being the left hand slide, forms a support for a motor **73** driving the rider roll through V-belt drives generally indicated by reference character **75**. The motor **73** may be a speed reducer motor in which the speed of rotation of the rider roll may be varied in accordance with the diameter of the roll of paper. The drive to the rider roll is conventional and is no part of the present invention so need not herein be shown or described in detail.

As shown in FIGURE 5 each drive chain **66** is connected at one end with an eye bolt **76** extending through and secured to a lug **77** extending downwardly of the associated slide **17**. From the eye bolt **76** the endless chain **66** extends upwardly over an idler sprocket **79**, suitably journalled in the cap **22**, to a control sprocket **80**, suitably secured to the outer end of a control shaft **81** extending across the winder and tying the two chains **66**, **66** on opposite sides of the machine together, to effect uniform raising and lowering movement of the rider roll. From the control sprocket **80**, the chain **66** extends downwardly about an idler sprocket **83** on a shaft **85**, mounted at its opposite ends in a clevis **86** on the top of the piston rod **68**, and secured thereto. From the idler sprocket **83** the endless chain extends upwardly to and is connected with an eye bolt **88**, secured to a ledge **89**, formed integrally with the post **12** adjacent the upper end thereof.

Extensible movement of the piston rod **68** will thus accommodate lowering movement of the rider roll **70** downwardly into engagement with the periphery of the roll of paper being wound on the core shaft **49**.

The shaft **85** mounted in the clevis **86** is shown in FIGURE **6** as extending beyond opposite ends of said clevis and forming a mounting for a counterweight **90** having a hollow central portion **91** opening to the inner side thereof and extending downwardly along the cylinder **67**. As shown in FIGURE 5 the counterweight has an upwardly opening receptacle **92** contained therein, extending partially about the cylinder **67** and adapted to be loaded with the lead shot **93** or other weighting means, to provide the necessary weight to counterbalance the weight of the rider roll **70** and determine the pressure of engagement of the rider roll on the periphery of the roll of paper, in cooperation with the cylinder **67**.

It may be seen from FIGURE 5 that the lead shot **93** may easily be inserted in the receptacle **91** or removed therefrom to the extent required to properly balance the rider roll **70**. This overcomes the burdensome operation of adjusting the counterweight heretofore present in drum winders, and makes it possible to rapidly load the counterweight to the required weight for efficient winding requirements.

In operation, shot is loaded in the two counterweights to the extent required to initially adjust the counterweight so the system is in equilibrium with the rider roll just touching the roll of paper. Fluid pressure is released from the piston rod ends of the cylinders **67** and fluid pressure

may be applied to the head ends of said cylinders in the amount required to provide a downward force of the rider roll against the roll of paper and create pressure nips between the roll of paper and the winding drums **13, 13**. As the paper is wound on the core shaft, the diameter of the roll of paper will increase and the core shaft will move upwardly and raise the core shaft slides **17, 17** along the guides **15, 15**. Pressure may then be released from the head ends of the cylinders **67** in the amount required to reduce the pressure of the rider roll on the roll of paper, until such time as the counterweights **91** take over to provide a minimum pressure of the rider roll on the roll of paper as the roll reaches its maximum diameter. Pressure may be relieved entirely from the roll of paper by applying fluid under pressure to the piston rod ends of the cylinders **67, 67** which may positively lift the rider roll **70** above the roll of paper. The control for the rider roll may be an automatic control of a conventional form and is no part of the present invention so need not herein be shown or described.

While I have herein shown and described one form in which the invention may be embodied, it may readily be understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts thereof.

I claim as my invention:

1. A drum winder for webs of paper and the like comprising:

a frame structure having a pair of parallel laterally spaced upright posts at each end of said frame structure,

a pair of horizontal parallel spaced power driven winder drums disposed between said posts adjacent the lower ends thereof,

parallel spaced guides extending vertically along each of said posts on opposite sides of the space between said winder drums,

core shaft slides disposed between and slidably guided in said guides,

fluid pressure operated means vertically moving said core shaft slides along said posts,

and a core shaft journalled in said core shaft slides between said guides.

2. The structure of claim **1**,

wherein chucks are mounted in said core shaft slides for engaging within opposite ends of the core shaft and supporting the core shaft for rotation about an axis disposed midway between said slides.

3. The structure of claim **2**,

wherein the fluid presure operated means for vertically moving said core shaft includes a fluid pressure operated cylinder and piston and a flexible drive connection extending therefrom to said core shaft slides,

and wherein a brake is provided in said flexible drive connection, controlling upward movement of said core shaft slides.

4. The structure of claim **2**,

wherein the means vertically moving said core shaft includes:

a pair of spaced fluid operated cylinders and pistons, each extending vertically along an associated post,

flexible drive members extending from opposite ends of said cylinders and pistons and trained upwardly and downwardly therefrom,

wherein the upwardly trained flexible drive members are trained about a control shaft equilizing movement of said flexible drive members,

and wherein a brake is provided on said control shaft.

5. The structure of claim **4**,

wherein the brake is fluid pressure operated,

and wherein fluid pressure operated means are provided for operating said brake and interconnected with said cylinders and pistons.

6. In a drum winder for webs of paper and the like,

a frame structure having a pair of parallel laterally spaced posts,

a pair of winder drums disposed between said posts adjacent the lower ends thereof,

spaced guides extending vertically along each of said posts,

core shaft slides extending between and slidably guided in said guides,

a core shaft journalled in said core shaft slides,

fluid pressure operated means vertically moving said core shaft slides and core shaft vertically along said guides,

rider roller slides slidably guided in said guides above said core shaft slides,

and a counterweight removably loaded in accordance with the weight required to counterbalance said rider roll.

7. The structure of claim **6**,

wherein means are provided to drive said rider roll,

wherein a fluid pressure operated cylinder and piston is provided to elevate and accommodate lowering movement of said rider roll,

wherein flexible drive means are provided from said cylinder and piston to said rider roll to elevate and lower said rider roll,

wherein the counterweight is connected with said drive means,

and wherein the counterweight is in the form of an upwardly opening receptacle having metallic weights removably contained therein in accordance with the weight required to counterbalance said rider roll.

8. The structure of claim **6**,

wherein a pair of vertically extending fluid pressure operated cylinder and pistons, one being associated with each post, is provided to elevate and accommodate lowering movement of said rider roll,

wherein piston rods are vertically extensible from said cylinders and pistons and each supports a transverse pivot pin having a direction idler freely mounted thereon,

wherein flexible drive members are fixed to said posts adjacent the upper ends of said posts and are trained downwardly along said idlers and upwardly over spaced idlers and downwardly therefrom to said rider roll slides,

wherein a control shaft connects said last mentioned idlers for rotation together,

and wherein the counterweight is mounted on each transverse pivot pin, supported on each piston rod and extends downwardly about the associated cylinder and is in the form of an upwardly opening receptacle removably containing shot and the like, counterbalancing the weight of said rider roll.

9. The structure of claim **6**,

wherein chucks are mounted in said core shaft slides and support said core shaft for rotation about an axis disposed midway between said slides.

10. The structure of claim **6**,

wherein chucks are mounted in said core shaft slides and support said core shaft for rotation about an an axis disposed midway between said slides and said winder drums,

wherein a pair of spaced fluid pressure operated cylinders and pistons is provided for moving said core shaft slides vertically,

wherein the operative connections from said cylinders and pistons include:

a flexible drive member extending upwardly of each cylinder,

spaced direction changing idlers for said drive member directing said drive member to extend downwardly along the space between said guides,

a drive connection between said flexible drive members and said core shaft slides,

a control shaft connected with one of said idlers of each pair of spaced idlers and equalizing travel of said flexible drive members,

other flexible drive members extending downwardly of said cylinders and pistons about idlers adjacent the lower end portions of said posts and upwardly therefrom to said slides,

and wherein a brake is provided for said control shaft for controlling upward movement of said core shaft slides.

11. The structure of claim **10**,

wherein the brake is fluid pressure operated, and wherein the fluid pressure operated means for the brake is interconnected with said cylinder and piston means to effect the application of said brake upon the admission of fluid under pressure to said fluid pressure cylinder and piston means, to raise said slides and the control shaft supported thereon.

12. The structure of claim **6**,

wherein the fluid pressure operated means for vertically moving the rider roll slides comprises a separate cylinder and piston extending vertically along each of said posts,

wherein piston rods are extensible from said cylinders and pistons and have a direction changing idler supported on the end thereof,

wherein flexible drive members are fixed to said posts, adjacent the upper ends thereof and extend downwardly therefrom about said direction changing idlers and upwardly therefrom,

wherein spaced idlers on said posts guide said flexible drive members to extend downwardly into alignment with the space between said guides,

wherein means are provided to connect said flexible drive members to said rider roll slides,

wherein a control shaft connects at least one of said idlers with a coaxial idler on the opposite post to rotate at the same rates of speed,

wherein a counterweight is supported on each piston rod,

wherein the counterweights are each in the form of an upwardly opening receptacle having weighting shot therein, sufficient to counterbalance said rider roll,

wherein the fluid pressure operating means for elevating and lowering said core shaft slides and the core shafts supported thereon comprise fluid pressure cylinders and pistons,

wherein flexible drive devices extend upwardly and downwardly of said cylinders and pistons and are trained to said core shaft slides,

wherein connecting means are provided for connecting said flexible drive devices to said core shaft slides, to move said slides vertically along said guides upon the admission of fluid under pressure to one end or the other of said cylinder,

wherein a second control shaft is journalled in said posts adjacent the upper ends thereof and has direction changing idlers thereon changing the direction of the upwardly extending flexible drive device,

and wherein a brake controls operation of said second control shaft and upward movement of said slides.

13. The structure of claim **12**,

wherein chucks are mounted in said core shaft slides for detachably supporting said core shaft for rotation about an axis disposed midway between said slides and winding drums.

References Cited

UNITED STATES PATENTS

1,465,964	8/1923	Cameron et al.	242—66 X
1,869,545	8/1932	Crafts	242—66 X
2,357,202	8/1944	Hornbostel	242—66
2,677,508	5/1954	Locke	242—66
3,282,526	11/1966	Daly	242—66

FOREIGN PATENTS

712,522	7/1954	Great Britain.

WILLIAM S. BURDEN, *Primary Examiner.*