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J. W. HARRIS.

WINDER.

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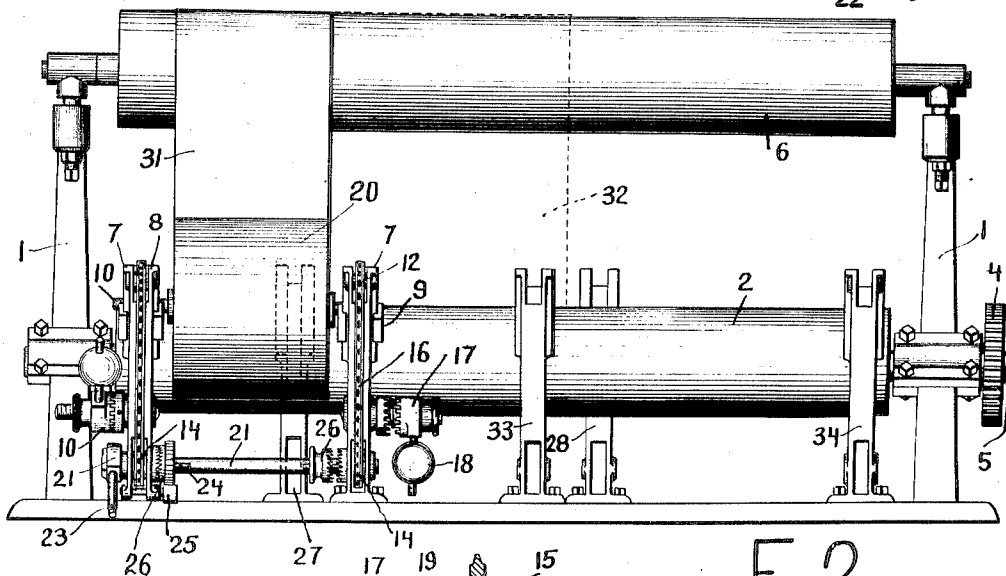
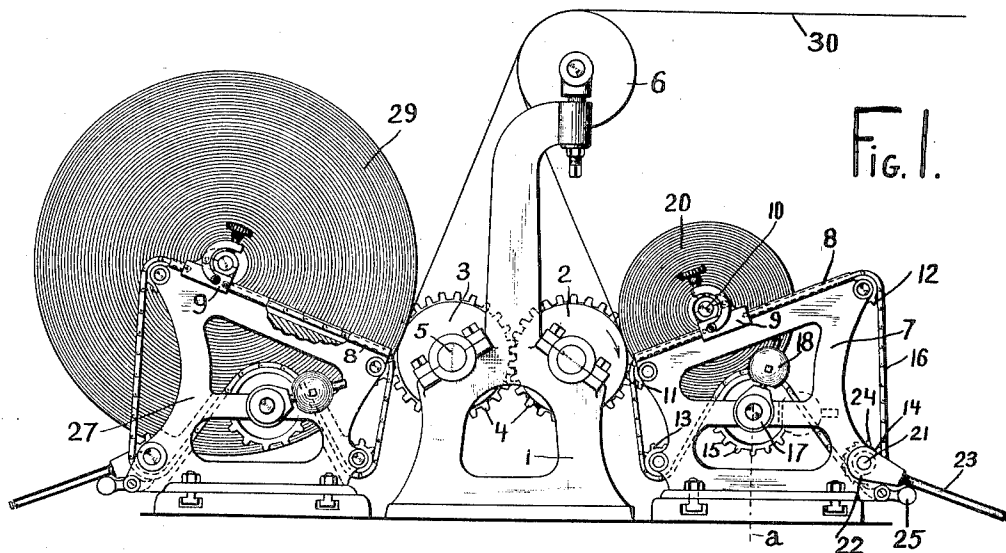


FIG. 3.

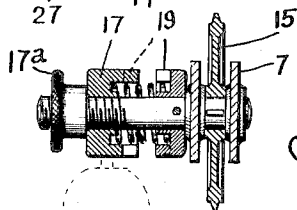


FIG. 2.

Witnesses:
Elmer R. Shipley, 18
Edna Holzberger

James W. Harris

Inventor
by James W. See
Attorney

UNITED STATES PATENT OFFICE.

JAMES W. HARRIS, OF HAMILTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE BLACK & CLAWSON COMPANY, OF HAMILTON, OHIO.

WINDER.

No. 817,426.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES W. HARRIS, a citizen of the United States, residing in Hamilton, Butler county, Ohio, (post-office address, care Champion Coated Paper Company, Hamilton, Ohio,) have invented certain new and useful Improvements in Winders, of which the following is a specification.

This invention, pertaining to improvements in that class of winders designed to wind one or more divisions of a slitted web of paper or fabric into rolls and to be driven through the medium of friction applied directly to the periphery of the roll or rolls being wound, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a winder exemplifying my invention; Fig. 2, a front elevation of the same; and Fig. 3, a vertical section, upon an enlarged scale, in the plane of line *a* of Fig. 1.

In the drawings, 1 indicates a pair of housings; 2, a driving-roll journaled therein and having a length somewhat in excess of the width before slitting of the widest web to be dealt with; 3, a second driving-roll mounted in the housings parallel with the first one; 4, gearing connecting the two rolls so that the rolls turn in opposite directions at equal peripheral rates of speed, the illustration showing the two rolls as being of equal diameter, under which conditions the gears 4 equal each other in size; 5, the shaft of either one of the driving-rolls, through the medium of which the rolls may be operated by power; 6, a guide-roll disposed parallel with and above the driving-rolls and serving to guide the slitted web coming from the source of supply to the winders; 7, a pair of housings independent of the housings 1 and disposed parallel with and at a selected distance apart from each other at the outer side of the driving-roll 2; 8, guides carried by or formed with the top edges of the housings 7, these guides declining toward driving-roll 2; 9, journal-boxes sliding on the guides 8; 10, a drum-shaft, on which a roll of paper is to be wound, removably mounted in the boxes 9, the construction for permitting the insertion and removal of the drum-shaft being of any character suitable or usual in winders; 11, an idle-wheel mounted in each of the hous-

ings 7 at the inner end of its top guide, this wheel being by preference a sprocket-wheel; 12, a similar idle wheel at the outer end of the guide of each of the housings 7; 13, a similar idle wheel mounted in each of the housings 7 below its wheel 11; 14, a similar idle wheel mounted in each of the housings 7 below its wheel 12; 15, an idle sprocket-wheel mounted in each of the housings between the wheels 13 and 14; 16, a chain, one for each of the housings 7, engaging all of the wheels of the housing and having its ends secured to the sliding-box 9, whereby the movement of drum-shaft 10 to and from driving-roll 2 is accompanied by movement of the pair of chains; 17, a hub loose on the spindle of sprocket-wheel 15; 18, a weight carried by an arm of this hub and radially adjustable with reference thereto; 19, a clutch for each of hubs 17, whereby the loose hub and the weight carried by it may at will be locked to its sprocket-wheel 15 in selective angular position with reference thereto; 20, a roll of paper being wound upon drum-shaft 10; 21, a shaft engaging the two chain-wheels 14, this shaft being fast to one of the wheels, the left-hand one in Fig. 2, and loose in the other wheel; 22, a ratchet on shaft 21; 23, a ratchet-lever mounted on shaft 21 and adapted to coöperate with the ratchet 22 in turning shaft 21; 24, a second ratchet on shaft 21; 25, a stop-pawl coöperating with ratchet 24, and 26 clutches to serve in locking shaft 21 to the sprocket-wheels 14.

As thus far considered the parts are adapted for the winding of a single roll of paper or other material. Turning driving-roll 2 by power causes the rotation of the roll 20 by surface friction in the manner usual in surface-driven winders. As the roll enlarges as the result of winding its drum-shaft automatically recedes from the driving-rolls, and the inclination of the guides 8 causes the drum-shaft and the roll being wound upon it to exert a portion of their gravity in maintaining frictional driving contact between the roll of paper and the driving-roll; but in the winding of paper, while it is necessary to maintain sufficient friction to do the work, it is desirable to avoid excessive pressure. If the weight of the drum-shaft and its accumulating paper be depended upon to produce the necessary driving friction, then it is manifest that the gravity effect must be sufficient

when the accumulated roll of paper is small, and this gravity effect may therefore be excessive when the roll of paper gets large. It is the purpose of the weights 18 to compensate for the increasing gravity of the roll being wound. Giving consideration only to the winding being done at the right in Fig. 1, being the winding-roll 20, we will start with the practically empty drum-shaft 10, just starting upon its winding work. The gravity of the parts to produce the driving friction is comparatively small. At this time the hubs of the weights 18 are to be clutched to sprocket-wheels 15 in such position, say, that the weights project outwardly horizontally, as indicated in dotted lines in Fig. 1. Under these conditions the weights 18 add their gravity to that of the drum-shaft 10 in producing frictional contact against driving-roll 2. The weights 18, acting through sprocket-wheels 15 and the chains, pull inwardly upon the drum-shaft. As the roll of paper enlarges its gravity increases and becomes more efficient in producing the driving contact. As the roll of paper thus increases in size and weight the boxes 9 move outwardly, and acting on the chains and the weights move the weights angularly upward, the gravity effect of the weights 18 thus constantly lessening as the gravity effects of the roll of paper constantly increases. Eventually the roll of paper has so increased in size and weight that even its unaided gravity would produce heavier pressure upon the driving-roll than is desirable. At this time the weights 18 should have reached the neutral vertical position over their axes, and upon passing that position their gravity effect instead of becoming added to that of the roll of paper becomes subtracted from it, the weight thus acting first as an addition to and then as a subtraction from the gravity of roll of paper so as to compensate for the constantly-increasing weight of the paper-roll.

The weights 18 being clutched and unclutched from their sprocket-wheels by means of the nuts 17^a may be set in any desired angular position. Thus instead of starting the winding with the weights in their most efficient or horizontal position they may be set initially in some angular position above the horizontal, and when not wanted they may be unclutched and allowed to hang idly downward.

It may and often does happen that the paper is unequal at the two edges of the web being wound, the result being a tendency to form a tapering roll or a roll more solidly wound at one end than at the other. The two weights 18 being independent of each other may be utilized in remedying this defect. Thus it being desired to put an extra strain upon one edge of the paper the weight 18 corresponding with that edge of the paper may be angularly adjusted to a more efficient

position or the weight corresponding with the opposite edge of the paper may be adjusted to a less efficient position or may be unclutched so as to hang idly down. Again, under conditions of winding where the weights 18 are not called for in either increasing or diminishing the general pressure upon the paper, conditions under which both weights would be unclutched and hanging idly downward, either one of the weights may be clutched in proper position and brought into service in producing an extra heavy winding strain at one end of the roll being wound.

It will be understood that quite regardless of whether or not the weights be in service the weights at the opposite ends of the roll of paper are independent of each other. Furthermore, it will be obvious that the purpose of the weights 18 is to endow the roll of paper with an adjustable and a varying gravity effect, so to speak, and that the chain-and-gear arrangement illustrated represents merely a satisfactory mechanical construction by means of which the weights are brought into desired operative relationship with the drum-shaft.

When the roll of paper has been wound to the desired extent and it is desirable to sever the web and remove the roll, it is necessary, or at least highly desirable, that the roll be shifted outwardly away from contact with the driving-roll 2. In order that this may be done, the clutches 26 are thrown into engagement, thus locking both sprocket-wheels 14 to shaft 21, after which ratchet-lever 23 may be operated to slide the boxes 9 and the roll of paper in an obvious manner, and when this is done the parts are retained by the stop-pawl 25. The drum-shaft, with its roll of paper, having been removed and a fresh drum-shaft placed in the boxes 9, the stop-pawl 25 may be released, the pawl or ratchet 22 being at the same time released, if desired, thus permitting the drum-shaft to go into position against the driving-roll, after which clutches 26 may be released, leaving both of boxes 9 free to move independently under the influence of the winder or free to be moved independently by hand in ordinary adjustments, while the roll of paper is being started or while it is still so light and small as to permit of hand adjustment. During the operations of the ratchet-lever 23 the hubs of the weights 18 may be either clutched to or unclutched from their sprocket-wheels 15, preferably the latter.

The two housings 7 are adjustable in position along the driving-roll and also in distance apart, and they may thus be adjusted for winding a web corresponding in width with the greatest capacity of the driving-rolls, or they may be adjusted closer together to suit either a narrower web coming to the general winder or to a division-slit from a wider web coming to the general winder. In Fig. 2 it is

assumed that there is coming to the general winder a comparatively wide web slitted into two divisions of unequal width, the narrower one going to form the roll 20.

Proceeding further with the drawings, 27 indicates a housing similar to housings 7, but disposed upon the opposite side of the pair of driving-rolls; 28, a second similar housing to form with housing 27 a pair of housings for the support of a second roll of paper, this pair of housings being equipped in all respects the same as housings 7; 29, the roll of paper being formed upon a drum-shaft supported by this second pair of housings, this second roll having surface contact with driving roll 3; 30, the web of paper coming to the general winder and slitted into two divisions for the production of the two rolls 20 and 29; 31, the narrower division of the web on its way to roll 20, and 32 the wider division of the web on its way to roll 29.

In Fig. 2 it will be noticed that housing 27 is disposed at the left of the plane of the inner one of housings 7, thus permitting paper 32 having one edge in the same plane as one edge of paper 31 to go properly to the drum-shaft carried by the second pair of housings. The two driving-rolls 2 and 3, moving at equal peripheral rates of speed, causes the two rolls of paper to be wound at equal peripheral rates, and analysis will show that the run of the paper on its way to the point of contact is unaffected by variations in the diameter of the rolls being wound or in differences in the diameters of two rolls being simultaneously wound.

Additional pairs of housings may be employed, as represented, for instance, by the housings 32 and 34, thus permitting three divisions of a wide web to be simultaneously wound, and this principle may be carried to any extent desired, the alternate rolls being wound by driving contact with one of the driving-rolls, while the intermediate rolls are wound by contact with the other one of the driving-rolls.

When the general winder is in operation winding a plurality of rolls of paper, one roll at least being driven by one of the driving-rolls and one or more of the others being driven by the other driving-roll, both edges of each section of paper being wound are exposed, and there is an abundance of room between the edges of two webs being wound by the action of either one of the driving-rolls. In other words, no matter how many of rolls of paper are being wound a single one of the driving-rolls engages alternate paper-rolls only, thus leaving a gap between the webs as wide as the intermediate web being wound by the action of the other driving-roll, an abundance of working room between the edges of webs thus being provided. If one of the webs becomes broken or is purposely broken in order to skip a defect, the remaining webs may

continue to be wound while the defect is being removed from the given web and that web restarted upon its roll.

The action of the weights 18 has been heretofore described in connection with the winding of but a single roll of paper. When a plurality of rolls are being wound, then the weights pertaining to the individual rolls may, in an obvious manner, be utilized in adjusting the frictional pressures of the individual rolls of paper relative to each other. Thus the weights 18 pertaining to one roll of paper might be doing light duty or be entirely out of action, while the weights pertaining to another roll of paper were doing heavy duty, it being thus possible to adjust the strains, not only upon the two edges of the same web, but also upon the several webs with reference to each other.

I claim—

1. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls arranged to be driven at equal peripheral rates of speed, a drum-shaft mounted parallel with said driving-rolls and arranged to move to and from the driving-rolls and adapted to support a winding-roll of paper or other fabric with its peripheral surface in contact with the periphery of one of said driving-rolls, and a second similarly-mounted drum-shaft adapted to support its winding-roll in peripheral contact with the other one of said driving-rolls.

2. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls geared together to turn at equal peripheral rates of speed, a drum-shaft mounted parallel with said driving-rolls and arranged to move to and from the driving-rolls and adapted to support a winding-roll of paper or other fabric with its peripheral surface in contact with the periphery of one of said driving-rolls, and a second similarly-mounted drum-shaft adapted to support its winding-roll in peripheral contact with the other one of said driving-rolls.

3. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls arranged to be driven in relatively opposite directions at equal peripheral rates of speed, a drum-shaft mounted parallel with said driving-rolls and arranged to move to and from the driving-rolls and adapted to support a winding-roll of paper or other fabric with its peripheral surface in contact with the periphery of one of said driving-rolls, and a second similarly-mounted drum-shaft adapted to support its winding-roll in peripheral contact with the other one of said driving-rolls.

4. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls geared together so as to turn in opposite directions at equal peripheral rates of speed, a drum-shaft mounted parallel with

said driving-rolls and arranged to move to and from the driving-rolls and adapted to support a winding-roll of paper or other fabric with its peripheral surface in contact with the periphery of one of said driving-rolls, and a second similarly-mounted drum-shaft adapted to support its winding-roll in peripheral contact with the other one of said driving-rolls.

5. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls, a pair of housings disposed at one side thereof in planes at right angles to said rolls, journal-boxes carried by said housings and adapted to support a drum-shaft, a second pair of housings on the opposite side of the pair of driving-rolls in planes differing from those of the first-mentioned housings but also at right angles to said rolls, and journal-boxes carried by the second pair of housings.

6. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls, a pair of housings disposed at one side thereof, journal-boxes carried by said housings and adapted to support a drum-shaft, a second pair of housings on the opposite side of the pair of driving-rolls, and journal-boxes carried by the second pair of housings, said housings being adjustable longitudinally of the driving-rolls.

7. In a winder, the combination, substantially as set forth, of a pair of parallel driving-rolls, a pair of housings disposed at one side thereof in planes at right angles to said rolls, journal-boxes carried by said housings and adapted to support a drum-shaft, a second pair of housings on the opposite side of the pair of driving-rolls in planes differing from those of the first-mentioned housings but also at right angles to said rolls, journal-boxes carried by the second pair of housings, and a guide-roll disposed parallel with the driving-rolls to serve in guiding webs of paper or other fabric to opposite sides of the driving-rolls.

8. In a winder, the combination, substantially as set forth, of a pair of driving-rolls, and a plurality of drum-shafts adapted to support winding-rolls of paper or other fabric, each of the driving-rolls coöperating with one of the drum-shafts.

9. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, connections between the journal-boxes to cause them to move in unison, hand operating mechanism for moving the journal-boxes from the driving-roll, and a disconnecting device interposed in said connections for severing the connection between the journal-

boxes so as to permit of their independent movement to and from the winding-roll.

10. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, and adjustable weights independently connected with each journal-box and serving to urge the box toward the driving-roll.

11. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, and adjustable weights independently connected with each journal-box and serving to urge the box from the driving-roll.

12. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, and adjustable weights independently connected with each journal-box and serving to urge the box toward and from the driving-roll.

13. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, independent pivoted weight mounted on each housing, and connections between the individual weights and journal-boxes.

14. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, a weight pivoted upon each housing, connections between the weights and the journal-boxes, and means for angularly adjusting the weights independently of each other.

15. In a winder, the combination, substantially as set forth, of a driving-roll, a pair of housings, guides supported by the housings at right angles to and declining toward the axis of the driving-roll, journal-boxes movable on said guides and adapted to support a drum-shaft, a weight pivoted upon each housing, connections between the weights and the journal-boxes, and means for angularly and radially adjusting the weights independently of each other.

16. In a winder, the combination, substan-

5 tially as set forth, of a driving-roll, a pair of
housings, guides supported by the housings
at right angles to and declining toward the
axis of the driving-roll, journal-boxes mov-
10 able on said guides and adapted to support a
drum-shaft, a chain at each housing and hav-
ing its ends connected with the journal-box
thereon, guide - wheels for the chains, a
sprocket-wheel engaging each chain, and an
adjustable weight carried by each sprocket-
15 wheel.

17. In a winder, the combination, substan-
tially as set forth, of a pair of driving-rolls,
mechanism connecting said rolls to cause
15 them to turn in unison in relatively opposite
directions, a pair of housings disposed at one
side thereof and adapted to support a drum-
shaft carrying a roll of paper or other fabric
with its surface in contact with one of said
20 driving-rolls, and a plurality of pairs of hous-
ings disposed on the other side of the pair of
driving-rolls and adapted to each support a

drum-shaft and a roll of paper or other fabric
with its surface in contact with the other one
of said driving-rolls.

18. In a winder, the combination, substan-
tially as set forth, of a pair of parallel driv-
ing-rolls, mechanism connecting said rolls to
cause them to turn in unison in relatively op-
posite directions, one or more paper-roll-sup-
30 porting devices adapted each to support a
roll of paper in contact with one of said driv-
ing-rolls, and one or more paper-roll-support-
ing devices adapted to support a roll of paper
in contact with the other of said driving-rolls,
35 and a guide-roll disposed parallel with said
driving-rolls and adapted to direct the indi-
vidual divisions of a web of paper or other
fabric to the supported paper-rolls.

JAMES W. HARRIS:

Witnesses:

JAMES FITTON,
M. S. BELDEN.