

APPLICATION FILED DEC. 22, 1910.

3 SHEETS—SHEET 1.

3 SHEETS-SHEET 1.

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INVENTOR

WITNESSES:

Lion and Hudson
M. W. B. R. K.

Fi-1-

INVENTOR

R. Burt

Drull, Warfield & Drull
ATTORNEYS

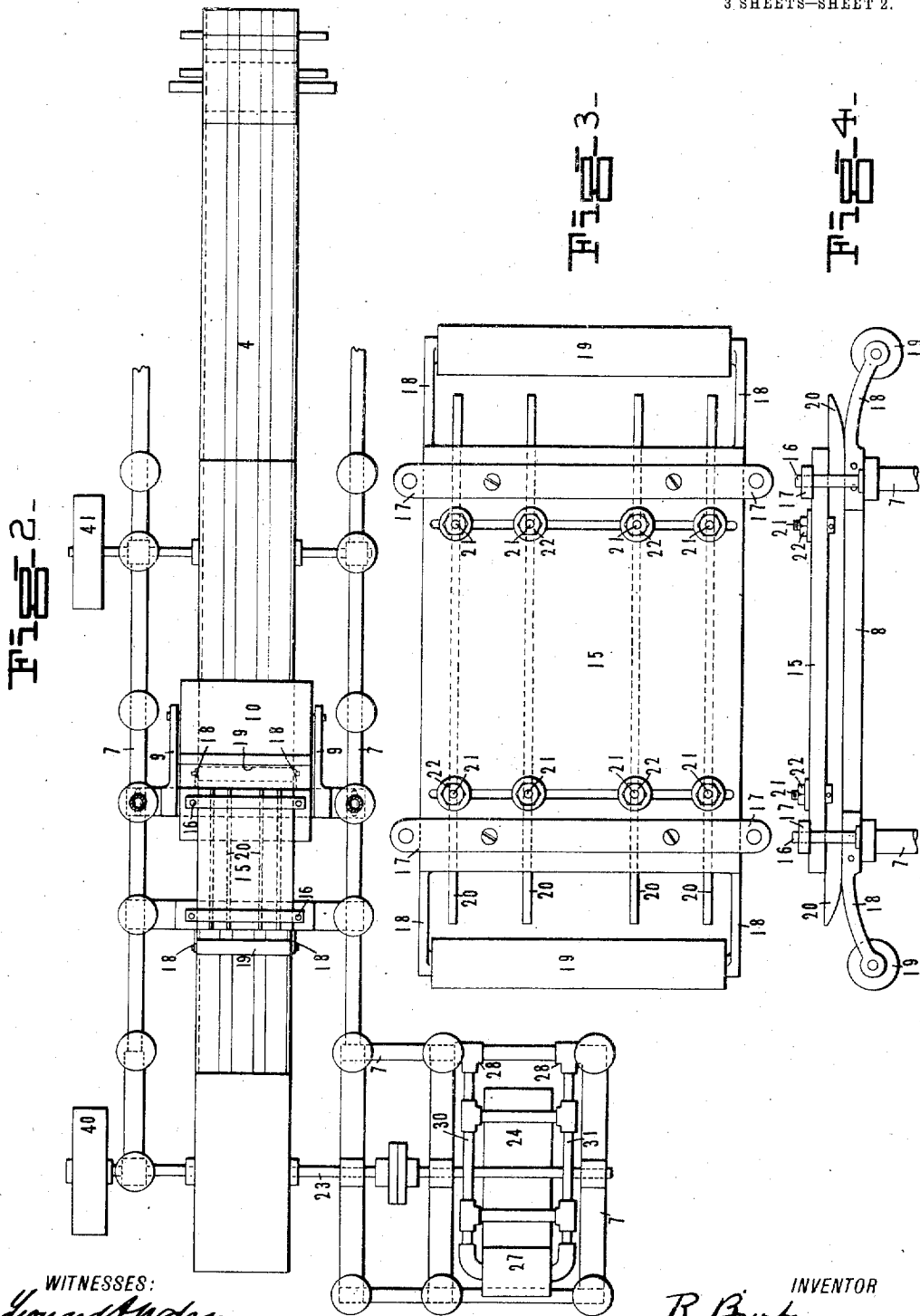
R. BURT.
WINDING MACHINE.

APPLICATION FILED DEC. 22, 1910.

Patented Nov. 19, 1912.

3 SHEETS-SHEET 2.

1,044,485.



WITNESSES:
Leonard Watson
Monroe Terry

INVENTOR
R. Burt
BY
Duell, Warfield & Duell
ATTORNEYS

1,044,485.

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WINDING MACHINE.
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3 SHEETS-SHEET 3.

Fig-5-

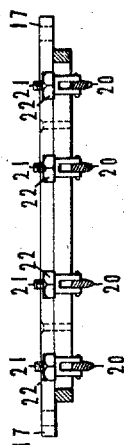
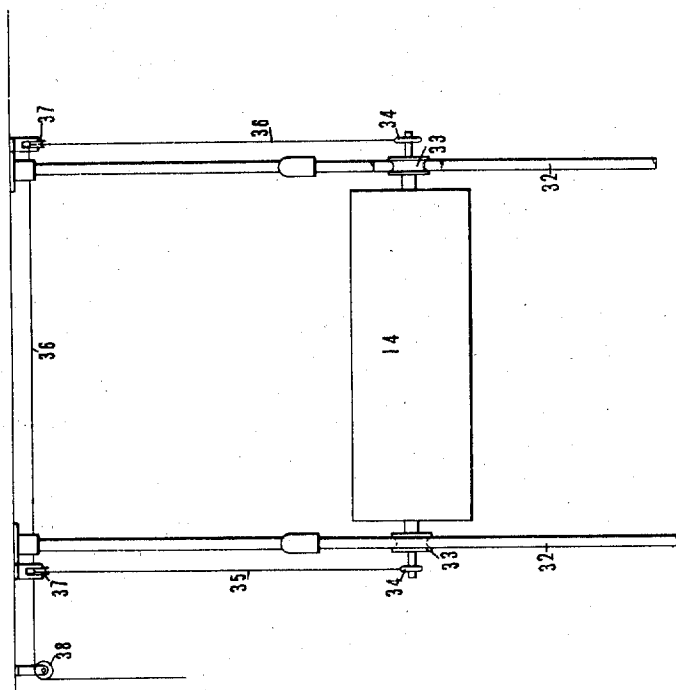


Fig-6-



WITNESSES
Howard Watson

INVENTOR
R. Burt.
BY
Duell, Warfield & Duell
ATTORNEYS

UNITED STATES PATENT OFFICE.

ROBINSON BURT, OF BUFFALO, NEW YORK, ASSIGNOR TO THE F. N. BURT COMPANY, LIMITED, OF BUFFALO, NEW YORK, A CORPORATION OF ONTARIO, CANADA.

WINDING-MACHINE.

1,044,485.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed December 22, 1910. Serial No. 598,701.

To all whom it may concern:

Be it known that I, ROBINSON BURT, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Winding-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines for coiling or winding continuous strips of material and especially to machines for winding or coiling a continuous web of paper, cardboard or similar material.

One object of the invention is to produce a machine for efficiently winding a web into a compact bundle or roll.

Another object of the invention is the production of a practical mechanism to wind or coil a web in accordance with the rate of delivery of the web to the mechanism.

Another object of the invention is the production of a simple device to guide the web as it is coiled so as to produce a coil in which the edges of the convolutions aline with each other avoiding projecting portions.

Another object of the invention is the efficient production of a tightly coiled roll.

Another object of the invention is to produce a mechanism of the character described which may be readily manipulated and controlled.

Still another object of the invention is to produce an efficacious machine capable of rewinding the web into its original form.

Still other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

Referring now to the accompanying drawings which form a part of this specification and in which similar reference characters refer to similar parts throughout the several views, Figure 1 is a side view showing the machine; Fig. 2 is a plan view thereof; Fig. 3 is a detail plan view showing the guiding and tension device enlarged;

Fig. 4 is a side view of the guiding and tension device shown in Fig. 3; Fig. 5 is a transverse section through the tension plate showing the shape of the guide bars and the manner of securing them in position on the tension plate; and Fig. 6 is a view of the controller roller and its sustaining connections.

Although the present embodiment of the invention is adapted to wind or coil a web delivered from any suitable source it is especially useful in connection with a slow and variable delivery such as when a web is delivered from a machine which produces continuous scores therein.

At 1 is indicated diagrammatically a machine for scoring a web. Said machine comprises feed rollers 2—2 between which the web is gripped and fed past rotary scoring rollers 3—3, these latter producing parallel continuous scores 4—4 in the web. It is evident that the web may be fed to the scoring machine from any suitable source of supply and in the present embodiment it is preferred to provide a roll of web 5 centrally supported upon a shaft journaled in bearings 6 on a suitable frame work 7. As the scoring machine operates the feed rollers 2 draw the web from the supply roll 5 and the web is delivered from the scoring machine to the winding or coiling mechanism.

The frame 7 may be of any suitable construction but is preferably composed of metallic bars arranged as shown and providing elevated supports for the parts of the folding, coiling or winding mechanism as well as for the roll 5.

8 represents a preferably horizontal table or support having a smooth upper surface. A bracket 9 secured to the frame supports a comparatively large guide roller 10 near one end of the table. The web after leaving the feed rollers 2 passes around guide rollers 12 and 13, over a controlling roller 14 hereinafter more particularly described, thence around the guide roller 10 from which it passes over the smooth surface of the table, thence to the winding mechanism hereinafter described.

As will hereinafter appear the winding mechanism for the web comprises in its preferred form a rotary drum or roller upon which the web is continuously coiled, and in order that the coil shall be tight and the

sides of the roll free from projecting portions of the web, a device comprising a plate 15 is provided to guide and tension the web prior to its delivery to the winding roll.

- 5 The weight of this plate is determined by the tension desired and it rests upon the web as it passes across the table 8, being removably retained in position by pins or projections 16 extending upwardly from the frames 7, and engaging guiding openings in ears 17, projecting laterally from the plate 15. Projecting from either end of the table 8 are arms 18 supporting web guiding rollers 19 a short distance from the respective
- 10 ends of the table. The tension device is so constructed and positioned as to serve to some extent as a guide for the web inasmuch as the pins 16 will prevent any extreme lateral movement of the web, but in order to provide an accurate guide for the web, a series of parallel lugs or rods 20 is formed on or secured to the bottom of the plate 15, the bottom edges of said lugs or rods being shaped or beveled to engage the scores of the
- 15 web as the latter passes over the plate 8, the ends of the bottom edges being curved to readily receive the web. In order to secure the rods 20 to the plate, the latter is transversely slotted preferably near each end and screw threaded pins 21 secured to each rod project upwardly through the slots and are engaged by nuts 22 whereby the rods 20 may be securely clamped to the bottom of the plate and adjusted so as to be transversely disposed corresponding to the disposition of
- 20 the scores in the web.

- After being operated upon by the tension device the web passes to the coiling or winding mechanism. In the present embodiment
- 25 the winding device comprises a horizontal shaft or roller 23 journaled in the frame 7. The shaft or roller 23 is adapted to be driven in such a manner as to take up the web as it is delivered from the machine
- 30 which has previously operated thereon. The movement of the roller 23 is effected by a gripping mechanism, preferably frictional, which at a proper time is operated to couple the shaft 23 with a motor or driving mechanism. Secured to the roller 23 is a belt pulley 24 adapted to be driven by a friction belt 25. The belt is continuously moved, or driven from a suitable source such as an overhead pulley 26 and under certain conditions passes loosely around the pulley 24 without sufficient frictional contact with the latter to effect any movement thereof. 27 represents a contact roller journaled in a movable frame pivotally mounted at 28 on a standard 29 projecting upwardly from the frame 7. The movable frame for the roller 27 preferably comprises parallel connected bars 30 and 31, at the outer ends of which the roller 27 is journaled, their opposite ends
- 35 being pivotally connected to the standard 29

as explained. The belt 25 extends between the arms 30 and 31 and the construction is such that the roller 27 is adapted to lie or rest against a ply of the belt 25 and regulate the pressure and the arc of contact between the belt and the pulley 24, this being permitted by the movable frame pivoted as aforesaid. The tractive effect of the belt 25 on the pulley 24 is thus governed by the position of the pulley 27, as it increases the arc of contact between the belt and pulley in its inner position or that toward the pulley, and decreases said arc of contact in its outer position.

In order to control the contact between the driving belt and the pulley means are provided to move the roller 27 to vary the arc of contact above referred to. Depending from a suitable point located preferably above the table 8 is a vertical frame comprising parallel pairs of spaced guide rods 32 forming slots or guide ways in which the gudgeons 33 of the roller 14 are adapted to freely move up and down. Eye-pieces 34 loosely surround each gudgeon and are connected by cords 35 and 36 passing over suitably supported guide rollers 37 and 38 to the movable frame carrying the roller 27 preferably at the outer end of said frame. It will be observed that as the roller 14 moves up and down in its guide ways the roller 27 is moved from and toward the periphery of the pulley 24 changing the arc of contact between said pulley and the belt 25. A spring 39 is connected at one end to the movable frame of the roller 27 and at the other end to a portion of the frame 7 to positively effect the inward movement of the roller and assist in setting the gripping mechanism 27.

In operation the supply roller 5 is loosely journaled on its support 6 and the end of the web threaded, in this instance, through the scoring machine between the feed rollers 2, thence around the guide rollers 12 and 13, thence over the roller 14 and around the guide roller 10, over one roller 19, and between the plate 15 and the table 8 from which it passes over the other roller 19 to the shaft or drum 23 on which it is to be wound and to which the end of the web is suitably secured. The main driving pulley 26 being now set in motion, and the scoring machine also being operated, the web will be delivered from the scoring machine and the rate of delivery may vary more or less and may be slower than the rate of take-up by the roller 23, if driven continuously by belt 25. Should any slack occur between the drum 23 and the source of delivery of the web the roller 14 will be permitted to rise, thus taking up the slack and at the same time permitting the contacting roller 27 to move toward the periphery of the pulley 24 to increase the tractive effect of

the belt and pulley whereupon the pulley 24 will be rotated and the drum 23 which is attached to said pulley will also be rotated to coil the web thereon. The coiling of the web on the drum will result in taking up the slack of the web and in drawing down the roller 14, which latter movement results in a movement of the roller 27 away from the pulley 24, thus decreasing the tractive effect between said pulley and the belt 25 until the tractive force between the two is insufficient to drive the pulley against the resistance offered by the tension of the web. Thus the rotation of the drum 23 and the folding or coiling of the web thereon is governed by the rate of delivery of the web and continuous and automatic operation of the several parts of the apparatus is permitted to deliver and wind up the web notwithstanding any variations which may occur in the delivery.

It will be observed that the flexible connection between the controller and the operating mechanism permits the movements of said parts and eliminates compression strain therebetween, whereby the rise of the controller is resisted practically by only its own weight, thus doing away with intermediate connections, the inertia of which might interfere with the accuracy of the control of the web.

In the present embodiment it will be noted that the delivered web is threaded around several guide rollers and around the movable controlling roller 14 before it engages the tension and guiding device. It is obvious, however, that the invention is not limited to the particular construction described and that the web may be extended directly from the delivery mechanism to the tension device if desired.

It may be desirable to rewind the web into the relative arrangement it had on the supply roll, and the shafts of the spaced reels or rollers 5 and 23 are provided with pulleys 40 and 41, respectively, adapted to be connected by a suitable driving belt. When the web has been wound on the roller 23, its trailing end may be secured to the roller 5, and said roller rotated in the proper direction to rewind the web thereon in its original relation thereto. When so operated, the controlling roller is maintained in its upper position by the weight of the roller 27 and its supporting frame, assisted by the spring 39. Thus the belt 25 is held against the pulley 24, and the roller 23 continuously driven, the web being unwound therefrom and wound on the roller 5 in a manner which will be apparent from the foregoing explanation.

Thus by means of the above described apparatus the several objects of the invention are accomplished in a practical and efficient manner.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means, and a flexible member between the controller and the operating means and adapted to eliminate compressive strain therebetween.

2. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means, and a cord between the controller and the operating means.

3. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means comprising a friction grip device, and a flexible member connected to the controller and adapted to govern the friction grip device.

4. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means comprising a belt drive, a contact roller, and a flexible member connecting the controller and the contact roller.

5. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means comprising a belt drive, a contact roller, and a flexible member connecting the controller and the contact roller, and a spring adapted to operate in opposition to the controller.

6. In an apparatus of the class described,

in combination, means to deliver a web, means upon which the web is adapted to be wound, a controller responsive to the rate of delivery of the web, means adapted to operate the winding means comprising a belt drive, a contact roller, a flexible member connecting the controller and the contact roller, and a spring connected to the contact roller and operating in opposition to the controller.

7. In an apparatus of the class described, in combination, means to deliver a web, a frame, means upon which the web is adapted to be wound supported on said frame, arms pivoted to said frame, a contact roller supported by said arms, a driving mechanism comprising a pulley and a belt, the latter adapted to move between said arms and between the roller and pulley, a controller responsive to the rate of delivery of the web, and connecting means between the controller and the roller.

8. In an apparatus of the class described, in combination, means to deliver a web, a frame, means upon which the web is adapted to be wound supported on said frame, arms pivoted to said frame, a contact roller supported by said arms, a driving mechanism comprising a pulley and a belt, the latter adapted to move between said arms and between the roller and pulley, a controller responsive to the rate of delivery of the web, and a cord connecting the controller and the roller.

9. In an apparatus of the class described, in combination, means to deliver a web, a frame, means upon which the web is adapted to be wound supported on said frame, arms pivoted to said frame, a contact roller supported by said arms, a driving mechanism comprising a pulley and a belt, the latter adapted to move between said arms and between the roller and pulley, a controller responsive to the rate of delivery of the web, a cord connecting the controller and the roller, and a spring connected to the arms and the frame and adapted to move the roller in opposition to the controller.

10. In an apparatus of the class described, in combination, means to deliver a web, means upon which the web is adapted to be wound, a gravity controlling roller responsive to the rate of delivery of the web, upright guides for said roller, means adapted to operate the winding means comprising a friction grip device, and a flexible member connected to the controlling roller and adapted to govern the friction grip device.

11. In an apparatus of the class described, in combination, means to deliver a grooved web, means upon which the web is adapted to be wound, a gravity controlling roller responsive to the rate of delivery of the web, upright guides for said roller, means adapted to operate the winding means comprising

a friction grip, a flexible member connected to the controlling roller and adapted to govern the friction grip, a table over which the web is adapted to pass, and a tension weight provided with guides adapted to engage the grooves of the web.

12. In an apparatus of the class described, in combination, means to deliver a grooved web, a frame, means upon which the web is adapted to be wound supported on said frame, arms pivoted to said frame, a contact roller supported by said arms, a driving mechanism comprising a pulley and a belt, the latter adapted to move between said arms and between the roller and pulley, a gravity controller responsive to the rate of delivery of the web, a table over which the web is adapted to pass, tension means comprising a weight having lugs adapted to engage the grooves of the web, and connecting means between the controller and the contact roller.

13. In an apparatus of the class described, in combination, means for delivering a grooved web, a drum on which the web is adapted to be wound, means to rotate the drum in accordance with the rate of delivery, and a web tension device comprising means adapted to engage the grooves of the web.

14. In an apparatus of the class described, in combination, means for delivering a grooved web, a table over which the web is adapted to pass, a tension device having lugs adapted to engage the grooves of the web, a drum on which the web is adapted to be wound, and means to rotate the drum in accordance with the rate of delivery.

15. In an apparatus of the class described, in combination, means for delivering a grooved web, a table over which the web is adapted to pass, a removable weight having lugs adapted to engage the grooves of the web, a drum on which the web is adapted to be wound, and means to rotate the drum in accordance with the rate of delivery.

16. In an apparatus of the class described, in combination, means for delivering a grooved web, a table over which the web is adapted to pass, a removable weight comprising adjustable ribs adapted to engage the grooves of the web, a drum on which the web is adapted to be wound, and means to rotate the drum in accordance with the rate of delivery.

17. In an apparatus of the class described, in combination, means for delivering a web, a drum on which the web is adapted to be wound, a belt pulley secured to the drum, a driving belt encompassing the pulley, and means governed by the rate of delivery to control the contact between the belt and pulley.

18. In an apparatus of the class described, in combination, means for delivering a web, a drum on which the web is adapted to be wound, a belt pulley secured to the drum, a driving belt cooperating with the pulley, spring operated means to cause the belt to grip the pulley, and means governed by the rate of delivery to lessen the grip between the belt and pulley.

19. In an apparatus of the class described, in combination, means for delivering a web, a drum on which the web is adapted to be wound, a belt pulley secured to the drum, a driving belt cooperating with the pulley, a roller adapted to press the belt against the pulley, and means governed by the rate of delivery to control the operation of the roller.

20. In an apparatus of the character described, in combination, a drum on which a web is adapted to be wound, driving mechanism for the drum comprising a gripping mechanism, means tending to automatically set the gripping mechanism, and means connected to the gripping mechanism and responsive to the tension of the web adapted to oppose the setting means.

21. In an apparatus of the character described, in combination, a rotary scoring wheel, means adapted to positively move a web relatively to said wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, and means adapted to move the second-mentioned driving element continuously.

22. In an apparatus of the character described, in combination, a rotary scoring wheel, means adapted to positively move a web relatively to said wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, means adapted to move the second-mentioned driving element continuously, and means adapted to so guide the web from the scoring to the coiling device that the edges of the convolutions of the coil are in substantial alinement.

23. In an apparatus of the character described, in combination, a shaft adapted to support a supply roll of web, a rotary scoring wheel, continuously driven rotary web gripping wheels adapted to move the web from the supply roll relatively to the scoring wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, and means adapted to move the second-mentioned driving element continuously.

In testimony whereof I affix my signature, in the presence of two witnesses.

ROBINSON BURT.

Witnesses:

EDWARD E. TANNER,
HOLLIS H. HANES.

It is hereby certified that in Letters Patent No. 1,044,485, granted November 19, 1912, upon the application of Robinson Burt, of Buffalo, New York, for an improvement in "Winding-Machines," errors appear in the printed specification requiring correction as follows: Page 2, line 103, after the word "roller" insert the reference-numeral 27; same page, line 105, strike out the reference-numeral "27"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of December, A. D., 1912.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.

18. In an apparatus of the class described, in combination, means for delivering a web, a drum on which the web is adapted to be wound, a belt pulley secured to the drum, a driving belt cooperating with the pulley, spring operated means to cause the belt to grip the pulley, and means governed by the rate of delivery to lessen the grip between the belt and pulley.

19. In an apparatus of the class described, in combination, means for delivering a web, a drum on which the web is adapted to be wound, a belt pulley secured to the drum, a driving belt cooperating with the pulley, a roller adapted to press the belt against the pulley, and means governed by the rate of delivery to control the operation of the roller.

20. In an apparatus of the character described, in combination, a drum on which a web is adapted to be wound, driving mechanism for the drum comprising a gripping mechanism, means tending to automatically set the gripping mechanism, and means connected to the gripping mechanism and responsive to the tension of the web adapted to oppose the setting means.

21. In an apparatus of the character described, in combination, a rotary scoring wheel, means adapted to positively move a web relatively to said wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, and means adapted to move the second-mentioned driving element continuously.

22. In an apparatus of the character described, in combination, a rotary scoring wheel, means adapted to positively move a web relatively to said wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, means adapted to move the second-mentioned driving element continuously, and means adapted to so guide the web from the scoring to the coiling device that the edges of the convolutions of the coil are in substantial alinement.

23. In an apparatus of the character described, in combination, a shaft adapted to support a supply roll of web, a rotary scoring wheel, continuously driven rotary web gripping wheels adapted to move the web from the supply roll relatively to the scoring wheel whereby the web is scored by said wheel and positively delivered therefrom, mechanism adapted to coil the scored web comprising a shaft around which the web is to be coiled, a rotary friction grip driving element connected to said shaft, a movable friction grip driving element adapted to cooperate with the rotary grip element, means adapted to vary the driving effect between said grip elements, and means adapted to move the second-mentioned driving element continuously.

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