W. E., F. W. & J. T. WRIGHT.

MULTIPLE WINDING MACHINE.

APPLICATION FILED NOV. 2, 1907.

913,604. Patented Feb. 23, 1909.

3 SHEETS—SHEET 1.

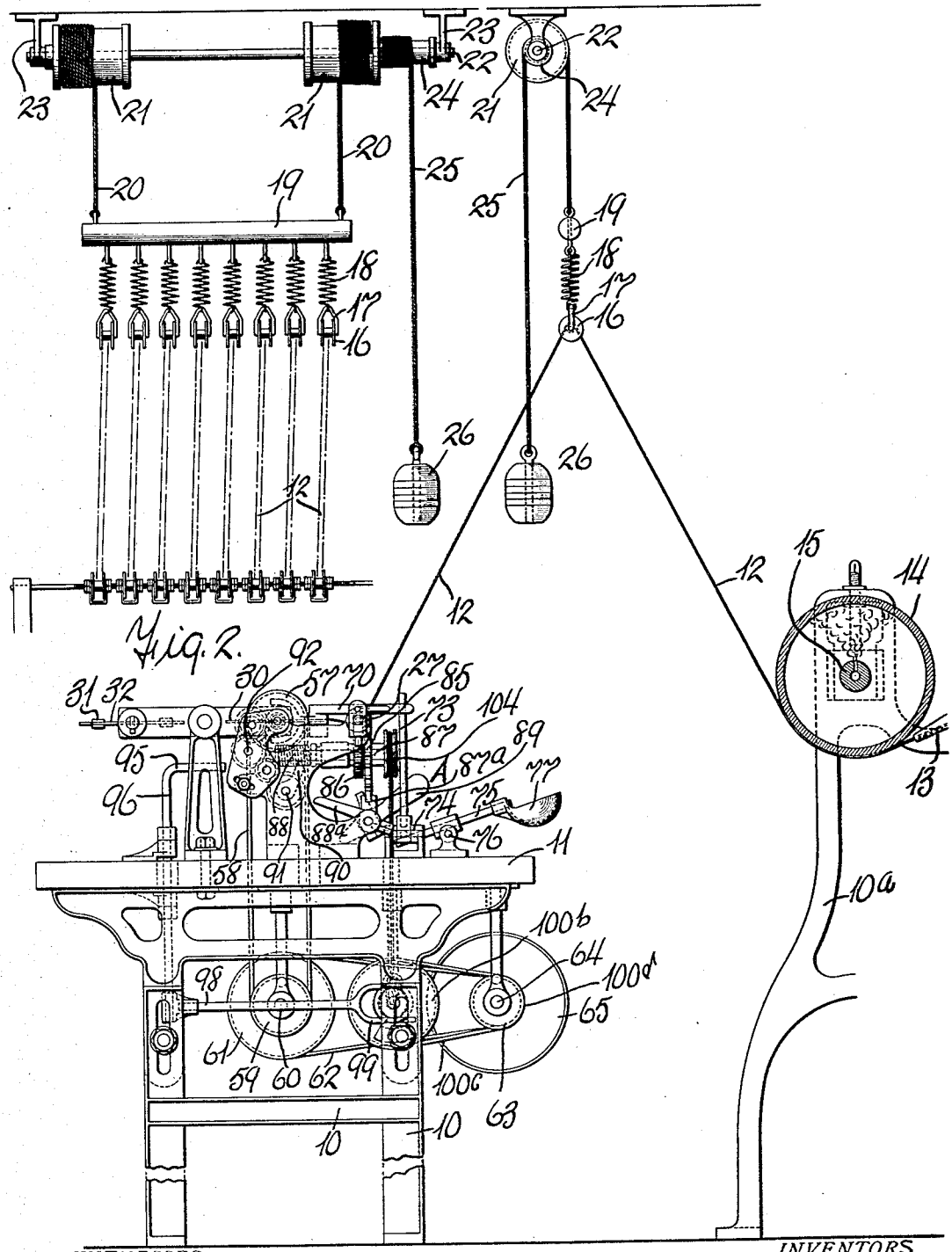


Fig. 2.

Fig. 1.

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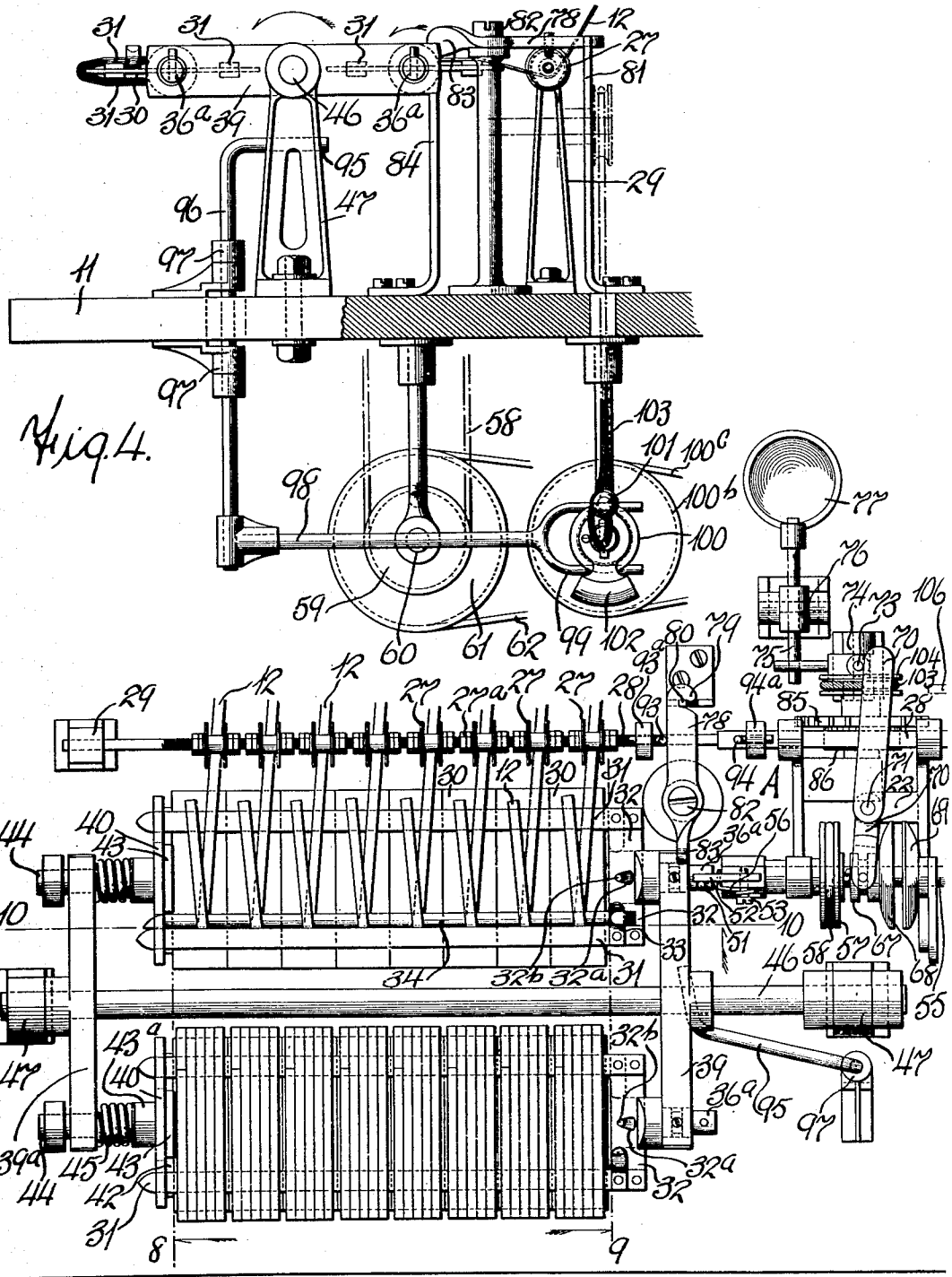


Fig. 4.

Fig. 3.

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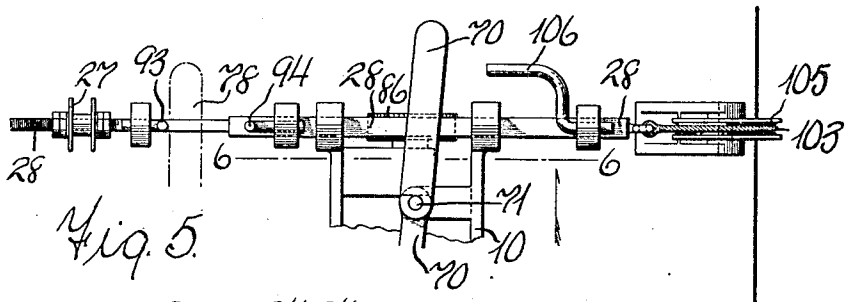


Fig. 5.

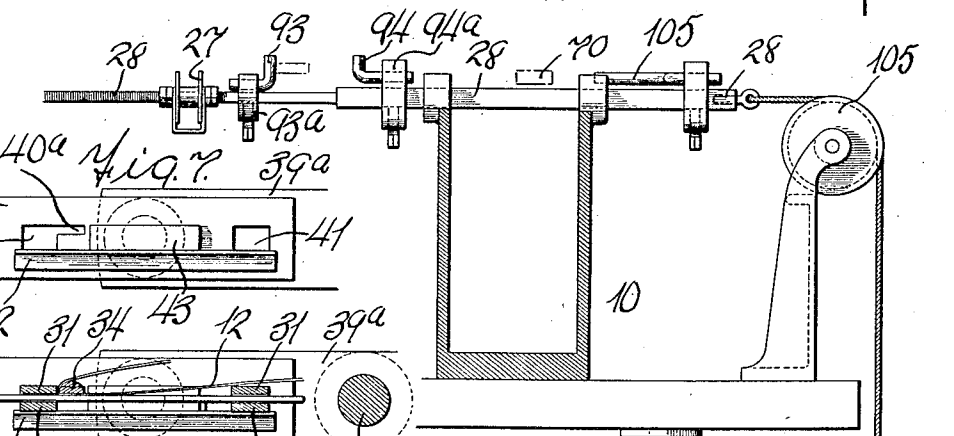


Fig. 7.

Fig. 8.

Fig. 6.

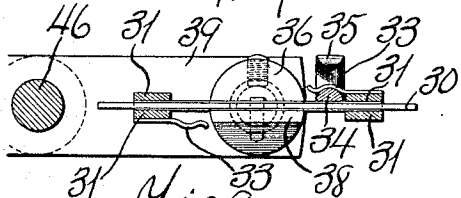
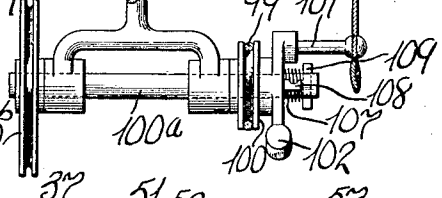


Fig. 9.



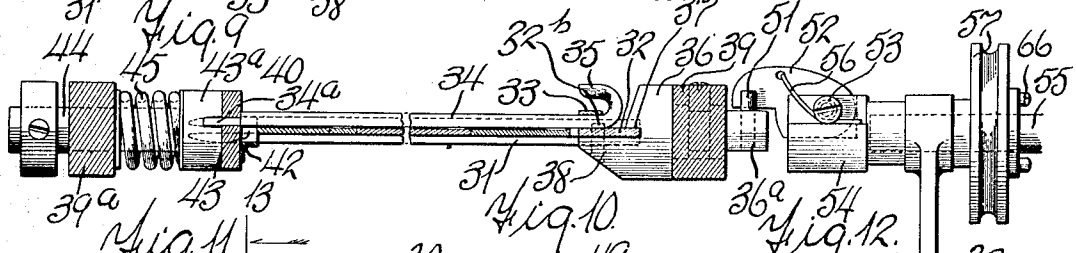


Fig. 11.

Fig. 10.

Fig. 12.

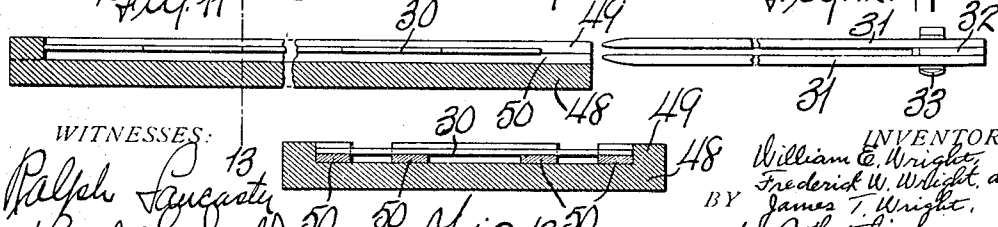


Fig. 13.

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MULTIPLE WINDING-MACHINE.

No. 913,604. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed November 2, 1907. Serial No. 400,418.

To all whom it may concern:

Be it known that we, WILLIAM E. WRIGHT, FREDERICK W. WRIGHT, and JAMES T. WRIGHT, all of the city of Newark, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Multiple Winding-Machines, of which the following is a full, clear, and exact description.

Our invention relates to improvements in machines for winding tape upon cards.

Many kinds of tape, braid, and similar things are wound upon cards of pasteboard to prepare them for the market.

The object of our invention is to produce a machine which will do this work rapidly and well.

The invention as we have shown it is especially adapted for winding tape which has been folded, and the machine is intended to carry the tape through a series of folders and against a heated roller which smooths the tape and makes the fold permanent, and then to carry a series of these tapes over a tension device and to a machine which will simultaneously and accurately wind a comparatively large number of cards. The machine is further intended to work automatically, to stop and start at the beginning and end of a card series, and we also provide means for starting the winding machine automatically when the tension weight gets below a certain point. The machine is intended to have the folding part run constantly, and the winding part takes care of the tapes which come from the tension roll and folders, and after the winding is stopped temporarily, the mechanism will be again started automatically in time to take care of the tapes which come from the folders, so that there will be no lessening of tension and no stopping of the folding machine.

Another object of our invention is to provide a convenient means for inserting and removing a large number of cards, and for having one series of cards wound while another series is being put into the machine, to the end that the work may go constantly on.

Still another object of our invention is to provide means for easily placing the unwound cards in the machine and for as easily removing those that have been wound.

With these ends in view, and with the general object of producing a machine which will do the character of work above outlined rapidly and in the best manner, our invention consists of certain features of construction and combinations or parts which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a broken side elevation, partly in section, of the apparatus embodying our invention. Fig. 2 is a detail diagrammatic view of the tension device for carrying a series of tapes. Fig. 3 is a plan view of the winding part of the machine. Fig. 4 is a broken side elevation, partly in section, of the winding part of the machine. Fig. 5 is a detail showing a means for returning the guide bar and spools of the machine and operating the clutch, a part of the mechanism being slightly modified as compared with that in Fig. 3. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a detail end view of the winding frame. Fig. 8 is a detail section on the line 8 of Fig. 3, showing the winding frame, a card therein, and the means for fastening the tapes. Fig. 9 is a section on the line 9 of Fig. 3. Fig. 10 is a cross section on the line 10—10 of Fig. 3. Fig. 11 is a detail longitudinal section of the guide frame used in inserting cards in the winding frame. Fig. 12 is a broken detail side view of the card holder, and Fig. 13 is a cross section on the line 13—13 of Fig. 11.

The apparatus comprises a winding machine which is mounted in a suitable frame 10, and has a table 11, and also a part mounted on a separate frame 10^a which carries the folders 13 through which the several tapes 12 pass. The tapes are drawn continuously through the folders and partly around a smoothing and heating roller 14, which has an internal steam pipe 15 for heating it, although it can be heated in any suitable way. This part of the apparatus we do not claim as novel. The several tapes after being folded and pressed by the parts 13 and 14, pass through a series of yieldingly suspended tension pulleys 16, shown best in Figs. 1 and 2, and these are each mounted in a hanger 17 which connects with a spring 18, and this is supported from the cross bar 19. The cross

bar 19 is hung by cables 20 from the drums 21 which are secured to the shaft 22 turning in suitable hangers 23. The shaft is also provided with a drum 24 and a second cable 25, having a weight 26 at the lower end. It will be seen that as the tapes are wound up in the winding machine, they will have a tendency to pull down on the pulleys 16 and raise the weight 26, and the weight, on the other hand, has a tendency to wind the shaft 22 in a direction to pull up on the pulleys 16, and so the tension is maintained on the tapes 12, and the pulleys 16 can move through a relatively wide space. The winding machine must of necessity work intermittently, but the tapes 12 are drawn constantly through the folders and around the ironing roller 14, and this tension device which we have just described, is intended to act automatically to start the winding mechanism when the weight 26 drops too low or the pulleys 16 are raised too high. The means for doing this will be described below.

The object of the arrangement above described is to give the operator time enough while the tension rollers are being raised, to turn the card holders hereinafter referred to, and insert a new set of cards in one side of the winding machine, all as hereinafter described. The tapes 12 after passing over the tension pulleys 16, pass down to the winding apparatus, to which they are delivered through a series of guide spools 27, there being a spool for each tape, and these are adjustably secured by means of nuts 27^a or equivalent fastenings to the threaded rack bar 28 which slides in suitable supports 29. The rack bar and its spools are movable longitudinally, and these parts are given a step by step movement to the left as is shown in Fig. 3, and a single movement to the right corresponding to the movement of all the steps. The step by step movement is for the purpose of causing the bar and guide spools to be moved over a step the width of the tape, so that when the tapes have been given a certain number of winds on the cards 30, they will be stepped over so that the same number of winds may be given on fresh parts of the card and so on until each card is fully wound. The means for doing this will be described later.

The cards 30 are the ordinary cards of commerce for receiving tape, and they are held between two sets of parallel bars 31, each two pairs of bars being connected by a cross piece 32 at one end, thus forming a double two pronged fork for receiving a series of cards, and there are two of these pronged forks or card holders for the machine, so that when one series of cards are being wound, the other series can be removed from the machine without stopping the latter. From the construction shown and described it will be understood that there can be a greater number of these card holders if desired, without affecting the principle of the invention.

The cross piece 32 of each card holder has a wedge-shaped slot 32^a therein, which receives a pin 32^b on the boss 36, which will be presently referred to, so that the card holder can be readily placed in the boss and will then be properly centered and held as presently described. Each card holder has at one end and on opposite sides and near opposite edges, a holding clip 33 (see Fig. 9) which is a spring clip, and is adapted to secure the fastening bar 34 which slides beneath the clip and fastens the tape ends in place upon the cards. For convenience the fastening bar has preferably a handle 35 at one end, so that it can be easily withdrawn from the clip 33 and from the plate 40, to be hereinafter referred to. The cross piece or base 32 of each card holder rests in a socket 37 of the rotatable boss or stud 36, which has a prolonged under side 38 (see Fig. 10) on which the part 32 rests, and it is this part 38 which supports the pin 32^b already referred to. A reduced end 36^a of the stud 36 extends through and turns in the cross head 39 which forms one part of the frame for supporting the card holder, so that they can be simultaneously turned and the relative positions reversed. It is through the medium of the projecting end 36^a that the boss 36 and the card holder connected therewith are turned. The open ends of the bar 31 of the fork or card holder enter slots 41 in a plate 40 (see Figs. 3 and 7) and one of these plates is provided with a reduced slot 40^a (see Fig. 7) which receives the reduced end 34^a of the fastening bar 34 already referred to. This is shown best in Fig. 10. To provide for readily entering the free ends of the card holder in the slots 41 of the plate 40, an angle guide 42 is preferably arranged on the plate 40 below the slot 41. The lateral slot 40^a leads from only one of the slots 41 as shown in Fig. 7, because when the machine receives the tapes and is ready to start, this slot will always be uppermost in the position shown in the figure just referred to. The plates 40 have abutments 43 to push against the nearest card 30, as shown in Fig. 3, and the plates are provided with collars 43^a on the back (see Figs. 3 and 10) which are fast on the stud 44 and are normally pressed by springs 45 so as to hold the plates snug up against the cards 30, with the ends 31 of the card holders in engagement with the aforesaid slots 41. The studs 44 rotate in the head 39^a which forms the second end of the support for the card holders, and the two parts 39 and 39^a turn with the shaft or trunnion 46 which is held in suitable supports 47.

In order that the cards may be easily inserted in the card holder, we provide a guide

frame 48 which is simply a flat plate or board with a raised flange 49 around three edges, and on the top surface of the boards are guide strips 50, while the space between the flanges 49 corresponds to the length of the cards. When a card holder or fork is to be placed in the machine, the cards which have been placed in the guide frame 48 while the machine is winding the previous set, are all slipped in the fork at one operation, the open ends of the forks are placed on the angle guide 42 and inserted in the openings 41 in the plate 40 till the end card 30 comes in contact with the abutment 43, the cross piece is placed in engagement with the boss 36 and pressed into the socket 37 so that the plate 40 is pushed back against the tension of the spring 45 which securely locks all the cards in the fork. The next set of cards is placed in guide frames 48 ready for the next fork be filled, and upon the automatic stopping of the winder, the wound cards and the fork just filled with cards, are simultaneously turned and their relative positions reversed by revolving the wound cards over and empty cards under the shaft 46 so that the empty cards are in position for starting with the several strips of tape 12 lying across each card. The fastening bar 34 is then withdrawn from the wound cards and placed over the strips of tape 12 on empty cards, one end is slipped into the opening 40ª in the plate 40, and the other end is snapped under the clip 33, thereby holding securely the several tapes 12 on their respective cards, then the tapes are cut between the two sets of cards with a scissors and the machine is ready to start at once or when the weight 26 reaches the cup 77.

In operation each card holder has to be separately turned, and to provide for this and to control the guiding mechanism and locking mechanism of the winding apparatus, we use an escapement and clutching device shown at A, which is not new in detail, but the connections between which and the card holders are novel, as are also the means for starting the said escapement and clutch mechanism, and for locking and unlocking the winding device in connection with such clutch mechanism. To provide for connecting in an operative driving manner the card holder with the clutch and escapement mechanism, the projecting stud 36ª of each card holder has a lateral pin 51 which engages one side of a latch or pawl 52 by simple contact therewith, as shown best in Fig. 10, and this latch or pawl is pivoted as shown at 53 on the head 54 of the rotating shaft 55, and a spring 56 pushes the pawl 52 into engagement with the pin 51, and it also permits the pawl to tip back when the holding frame or support 39—39ª is turned over to reverse the position of the card holder, as will presently appear. The shaft 55 is provided with a clutch by which it can be intermittently turned, and this clutch consists in part of a pulley 57 which is driven by a belt 58 connecting with a pulley 59 on the countershaft 60 below the table 11 (see Fig. 4) and this shaft has a pulley 61 connecting by a belt 62 with a pulley 63 on the driving shaft 64 which is driven by a pulley 65, but obviously this and the other driving connections described, can be used, or other equivalent driving mechanism can be substituted. The pulley 57 is provided on one side with pins 66 which engage pins on the sliding sleeve 67 on the shaft 55, this sleeve having thereon a friction wheel 68 which engages a friction wheel or shoe 69, the latter being fast on the machine frame. We have not shown this clutch mechanism with great detail because it is not new, and other clutch mechanism can be substituted for it. It will be seen, however, that when the pins on the clutch engage, the shaft 55 will turn, and it will also cause the boss 36 and its connecting card holder to turn by reason of the connection between the pin 51 and pawl 52. When, on the other hand, the wheel 60 is moved into connection with the shoe 69, the shaft 55 and connected parts stop instantly, and the parts are timed so that when so stopped the card holder will be in the position shown in Figs. 3 and 8, which position brings the tape fastening bar on the top side of the card holder where it can be conveniently operated as shown.

The clutch just described is worked by a lever 70 which engages the sleeve 67 and is fulcrumed as shown at 71. This lever is moved in one direction by a bell-crank lever 73 which is fulcrumed as shown at 74, and is actuated by a tilting lever 75 (see Figs. 1 and 3) and the lever 75 is fulcrumed as shown at 76 and provided with an abutment plate 77 arranged in the path of the weight 26, which has already been referred to. It will now be seen that when the weight 26 drops low so as to raise the pulleys 16 too high, it will strike the abutment plate 77, and through the lever mechanism just described, operate the clutch and start the winding apparatus. The card holding supports 39—39ª are normally locked in the desired position by a lever 78, which at one end is notched as shown at 79 to form a latch which engages the pin 80 on the top of the support 81. The lever 78 is fulcrumed as shown at 82, and its short end is shaped to engage the head 39 forming one end of the support for the card holders. This locks the card winding mechanism against movement in one direction, and it is locked against movement in the other direction by the spring 84 (see Fig. 4) which is secured to the table 11, and which normally springs beneath the part 39.

The movement of the rack bar 28 to guide the tapes 12 to the winding mechanism, is controlled through the escapement A, above referred to, and enough of this is shown to merely illustrate its operation, but the escapement is not itself claimed. The escapement has a toothed wheel 85 which carries a gear 86 engaging the under side of the rack bar 28, and these wheels are secured to a shaft 87 which is normally turned by a spring 88 so as to move the rack bar when the escapement is released, as hereinafter described. The toothed wheel 85 is engaged by a pawl 87^a (see Fig. 1) and the pawl is moved out of engagement with the wheel by an arm 88^a, or by a handle 89 which is attached, so that the escapement may be worked by hand if desired. The arm 88^a is engaged by the arm 90 which is carried by the shaft 91, and this shaft connects with the shaft 55 by a train of gearing 92, not shown in detail, as the arrangement is common, and the gearing is driven from the winding shaft 55 and is timed so that after a given number of winds of the tape on the cards 30, the arm 90 will engage the arm 88^a and actuate the pawl 87^a so that the escapement will permit the spring 88 to turn the shaft 87 and move the rack bar 28 the distance of one tooth, thus causing the tapes to be wound on a fresh part of the cards. The locking lever 78 is moved in one direction by a pin 93 on the rack bar, which movement locks the lever and secures the support 39 of the card holders, and the lever 78 is moved in the opposite direction so as to release the card holding supports and permit the card holders to be tipped over by a pin 94 on the said rack bar, these pins 93 and 94 being preferably secured in collars 93^a and 94^a on the rack bar. Thus, as will presently appear, the card holders are held in proper position until it is time for them to be tipped over and they are then automatically released.

We provide for automatically returning the rack bar to place and for winding up the spring 88, by the mere turning of the support for the card holders. To this end we arrange a crank arm 95 in the path of the head 39, so that when the latter is turned it will strike and turn the arm 95 which is on the end of the lever 96, turning in suitable bearings 97 (see Fig. 4) and connecting with a horizontal lever 98, the latter of which has a fork 99 operating a clutch 100 which is mounted on the shaft 100^a (see Fig. 6), the latter turning in suitable bearings and being driven constantly by a pulley 100^b which connects by a belt 100^c with a pulley 100^d on the driving shaft 64. The clutch carries an arm 101 which is counter-balanced as shown at 102, and this arm connects by a cord or similar connection 103 with a pulley 104 (see Fig. 3) on the shaft of the escapement wheel 65, so that when the winding apparatus is tipped over, the rack bar 28 will be pulled back to its original position, and the escapement spring will be re-wound. In this connection it will be noticed that the rack bar 28 also carries an arm 106 which is adapted to engage the lever 70, already referred to, and move the lever in a direction to stop the winding mechanism when the rack bar has reached the limit of its movement in one direction.

In Fig. 6 it will be seen that the clutch 100 is normally pressed by the spring 107 so as to bring the arm 108 thereon out of engagement with the pin 109 in the shaft 100^a, but when the clutch is actuated as already described by the fork 99, the pin 109 and arm 107 are thrown into engagement, and the arm 101 is turned but is only given one revolution which is sufficient to pull the rack bar 28 back to place. In Figs. 5 and 6 we have shown the arrangement slightly modified from that shown in Figs. 1 and 3, and in the modified form the cable 103 connects direct to the rack bar 28 instead of with a pulley on the escapement shaft.

From the foregoing description it will be seen that the tapes are constantly fed through the folders, that the proper tension is constantly maintained, that the multiple cards can be easily inserted in the card holders, and that one set of cards is being wound while the others are being removed. It will also be seen that the card winding mechanism is automatically locked when the cards are in position to be wound, and that when the cards are wound, the rack bar 28 will have moved so as to cause the pin 94 to engage the locking lever 78 and release the winding mechanism so that it may be turned over. It will be observed that the escapement provides for guiding the tapes properly to the winding cards, and that the clutch mechanism for driving the winding apparatus is adapted to stop automatically and accurately when a set of cards are wound. It will be seen further, that the tension device acts automatically to start the winding apparatus at the right time, that the machine is automatically locked in the right position when the cards are wound, and, as stated, automatically started by the fall of the tension weights, and in general that I am enabled to wind a series of cards very rapidly and very accurately, as the machine takes care of itself except for the placing of the cards in and removing of the wound cards from the machine.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent:—

1. A machine of the kind described, comprising a series of forked card holders, each adapted to hold a plurality of cards, a rotatable support for the card holders, and

means for independently rotating the card holders in their support.

2. A multiple winding machine, comprising a rotatable support, card holders mounted in the said support and turning independently therein, means for guiding a tape to each card in a card holder, and a fastening device to secure the free ends of the tapes to the cards.

3. A multiple winding machine, comprising a rotatable support, card holders detachably secured in the said support, each card holder being adapted to carry a plurality of cards and being rotatable independent on the aforesaid supports, and means for guiding the tapes to the cards in the card holders.

4. In a machine of the kind described, a card holder comprising opposed pairs of parallel prongs spaced apart, open at the free ends, and adapted to receive cards, a cross piece connecting the pairs of prongs at one end, and fastening devices on the card holder to fasten a bar thereto.

5. A multiple winding machine, comprising a rotatable support, independent card holders detachably and rotatably secured in the said support, means for independently turning the card holders, and a guiding device to guide tapes to the several cards in the holders.

6. In a machine of the kind described, the combination with the forked card holders having plural pairs of prongs spaced apart and the fastening clips thereon at right angles to the prongs, of a fastening bar adapted to engage the said clips and lie parallel with the prongs against the cards in a holder, and means for securing the free end of the fastening bar.

7. In a multiple winding machine, the combination with the forked card holder adapted to hold a series of cards, of means for securing the base of the forked card holder, a spring pressed slotted plate to engage the points of the forked card holder, and mechanism for rotating said card holder supporting means.

8. In a machine of the kind described, the combination with the forked card holder adapted to receive a series of cards, of a rotatable boss for securing one end of the card holder, and a rotatable slotted spring pressed plate for securing the opposite ends of the card holder.

9. In a machine of the kind described, the combination with the forked card holder, of the rotatable boss for receiving one end of the card holder, the spring pressed slotted rotatable plate for receiving the opposite end of the card holder, a fastening bar lying parallel with the card holder and against the cards therein, and means for securing the fastening bar.

10. A multiple winding machine comprising a rotatable support, opposed card holders detachably secured and independently rotatable in the said support, means for guiding the tapes to and securing them in one of the card holders, and a lock to fix the position of the said rotatable support.

11. A multiple winding machine comprising a rotatable support, card holders detachably secured in said support and independently rotatable therein, means for guiding tapes to the cards in the card holders, a lock to fix the position of the rotatable support, and automatic means for operating the lock at the beginning and ending of the winding operation.

12. A multiple winding machine comprising a rotatable support, card holders independently rotatable in the said support, means for guiding tapes to the card holders, a locking device to fix the position of the rotatable support, and a group of mechanism controlling the movement of the tape guide, the driving means for rotating the card holder, and the lock for the rotatable support.

13. A multiple winding machine comprising a rotatable support, card holders independently rotatable in the said support, a tape guide movable opposite the card holders, an escapement for moving the tape guide, driving mechanism for turning each card holder, and means for releasing the escapement and actuating the tape guide at a predetermined number of revolutions of the driving mechanism.

14. A multiple winding machine comprising a rotatable support, card holders independently rotatable in the said support, tape guides movable parallel with the card holders, a lock for the rotatable support, means for actuating the lock by the movement of the tape guide, a spring actuated escapement for moving the tape guide, means for driving each rotatable card holder, and means for releasing the escapement at a predetermined number of revolutions of the said driving means.

15. A machine of the kind described, comprising a rotatable support, card holders independently rotatable in the said support, a tape guide movable parallel with the card holders, a spring driven escapement moving the tape guide in one direction, said escapement being regulated from the driving mechanism of the card holder, and means for moving the tape guide in the opposite direction and at the same time winding the escapement spring by the turning of the rotatable support.

16. In a machine of the kind described, the combination with the rotatable support and the card holders independently rotatable in the said support, of a driving shaft arranged to come opposite each card holder as the rotatable support is turned, and a breakable

driving connection between the said shaft and each card holder, whereby the rotatable support can be turned and the card holder separated from its driving shaft.

17. The combination with the rotatable support and the card holders independently rotatable in said support, of a driving shaft having a breakable connection with each card holder, a clutch and brake mechanism arranged to start and stop the aforesaid shaft, and automatic means for operating the clutch brake.

18. The combination with the rotatable support, the card holders independently rotatable therein, and the tape guide movable opposite the card holders, of a spring controlled escapement operating the tape guide in one direction, and a lever mechanism operated by the turning of said rotatable support to move the tape guide in the opposite direction.

19. The combination with the rotatable support and the card holders rotatable independently in said support, of the longitudinally movable tape guide arranged opposite one of the card holders, a lock to hold the support in a definite position, a spring controlled escapement to move the tape guide in one direction, an arm extending into the path of the rotatable support, a lever connection between the arm and the tape guide to move the tape guide in the opposite direction, and means for opening and closing the aforesaid lock by the movement of the tape guide.

20. The combination with the winding apparatus, of a constantly running, folding and ironing device, a freely suspended weight operated tension device between the folding and winding apparatus, and means for starting the winding apparatus over which the tapes run by the fall of the tension weight.

21. The combination with the winding apparatus and the folding apparatus, of a tilting lever for starting the winding apparatus, tension pulleys arranged between the winding and folding apparatus to receive the tapes, said tension pulleys being suspended from a winding drum, and a weight and cable connected with the winding drum to raise the tension pulleys, said weight being arranged in its descent to strike the aforesaid tilting lever and start the winding apparatus.

22. In a machine of the kind described, the combination with the rotatable card holder, of a longitudinally movable tape guide arranged opposite the card holder, said guide comprising a sliding bar and tape spools thereon, a clutch controlled driving shaft having a connection with the said card holder, a lever controlling the clutch, and means for moving the lever by the movement of the tape guide.

23. The combination with the forked card holder having its prongs arranged in a plurality of pairs, of a flanged plate the inside width of which corresponds to the length of the cards, and the guide strips of said plate adapted to receive the aforesaid prongs between them.

24. The combination with the winding apparatus, of a constantly running, folding, and ironing device, a tension device arranged between the folding and winding apparatus and movable up and down with the variation of movement of the winding apparatus, and means for starting the winding apparatus by the movement of the tension device.

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