March 30, 1954 I. F. NILES ET AL 2,673,735

DUAL DELIVERY FOR PRINTING PRESSES

Filed Nov. 29, 1949 6 Sheets-Sheet 1

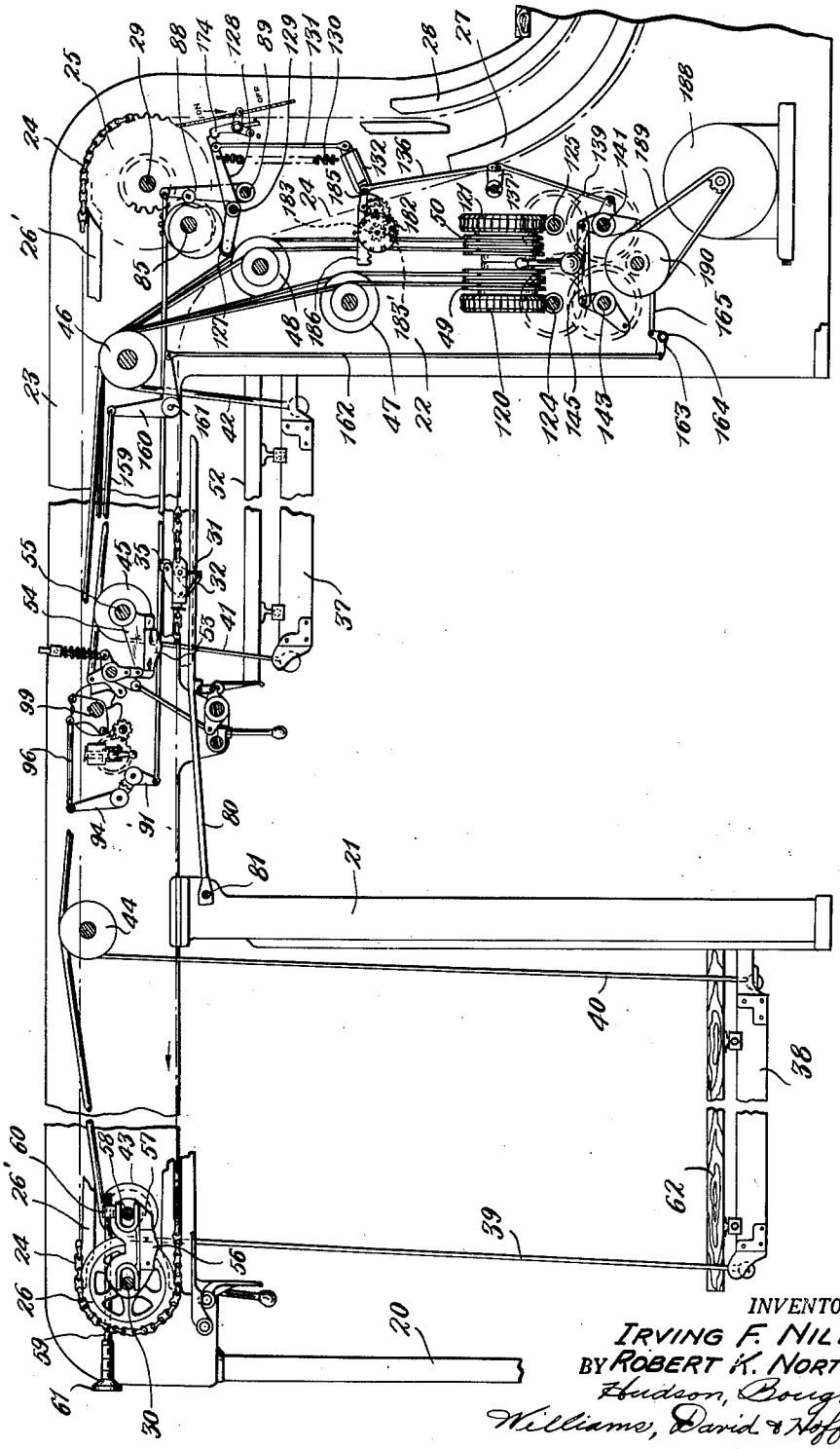


FIG. 1

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DUAL DELIVERY FOR PRINTING PRESSES

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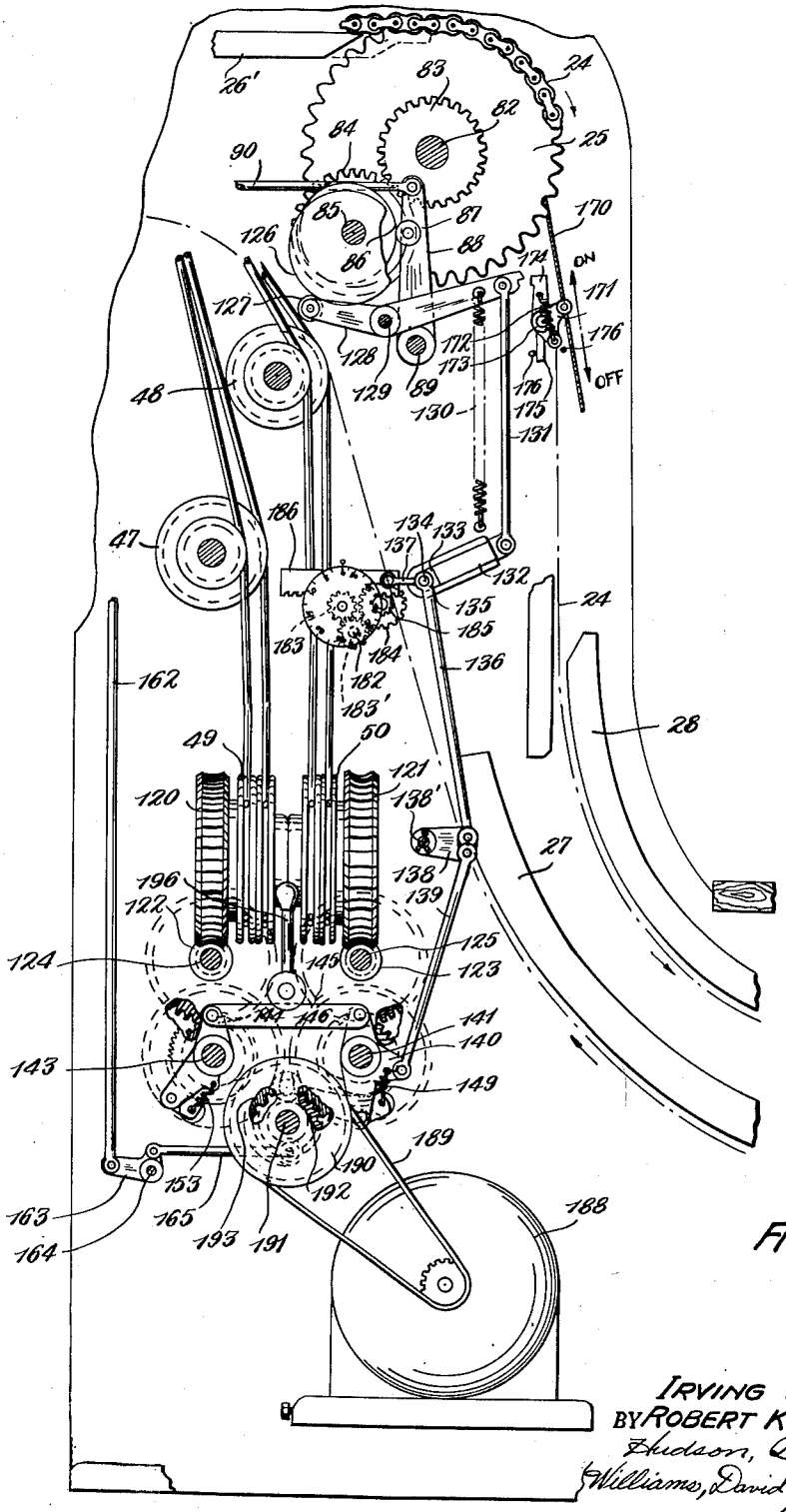


FIG. 2

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DUAL DELIVERY FOR PRINTING PRESSES

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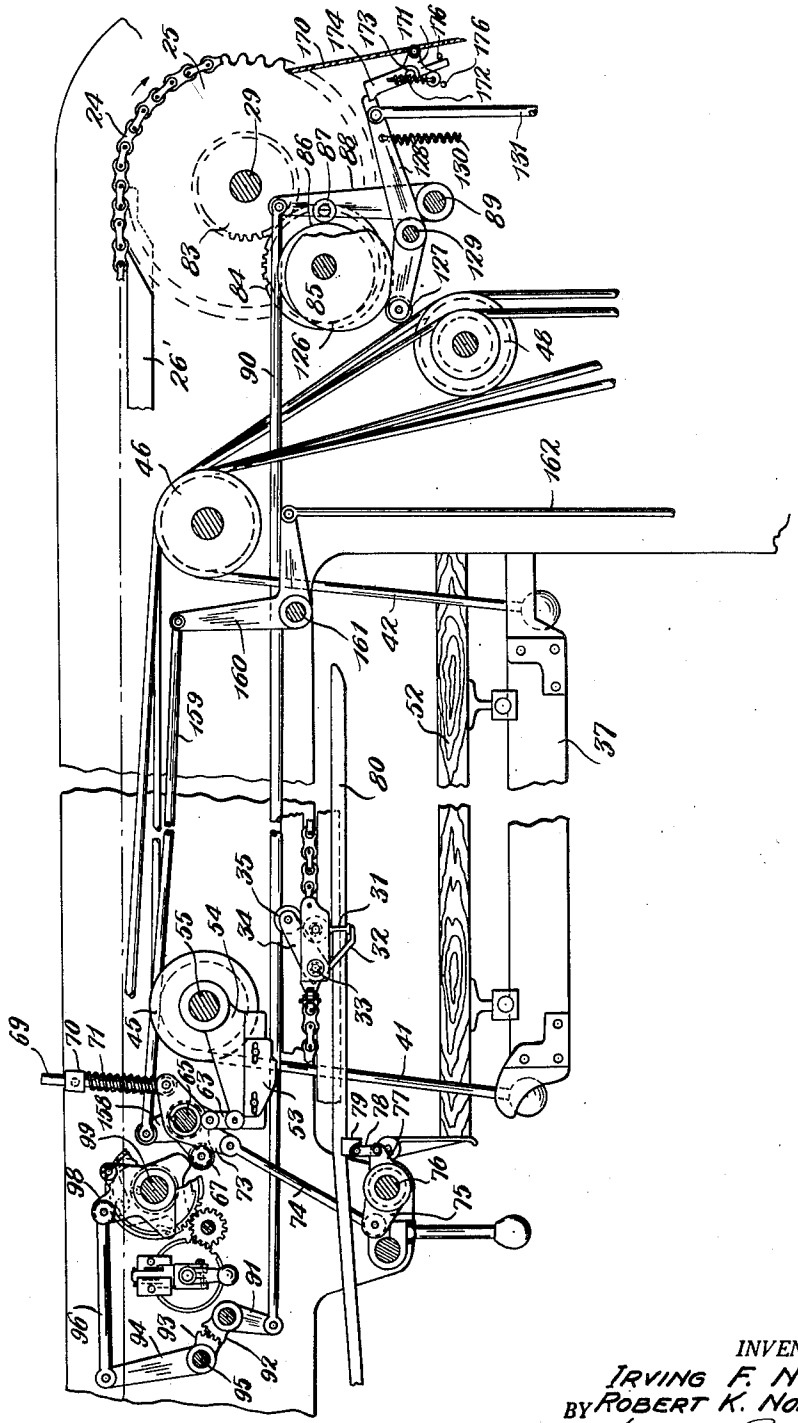


FIG. 3

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DUAL DELIVERY FOR PRINTING PRESSES

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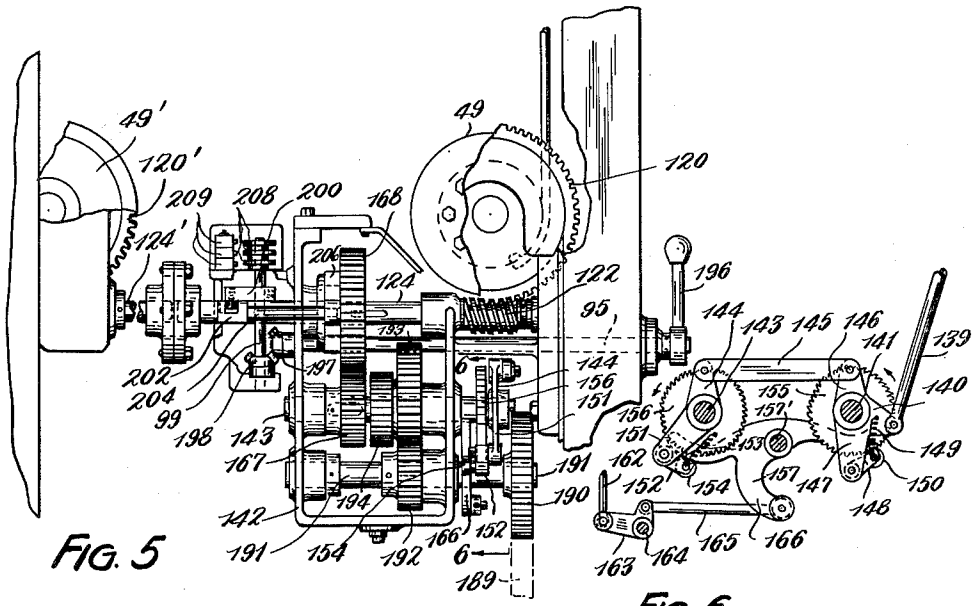


FIG. 5

FIG. 6

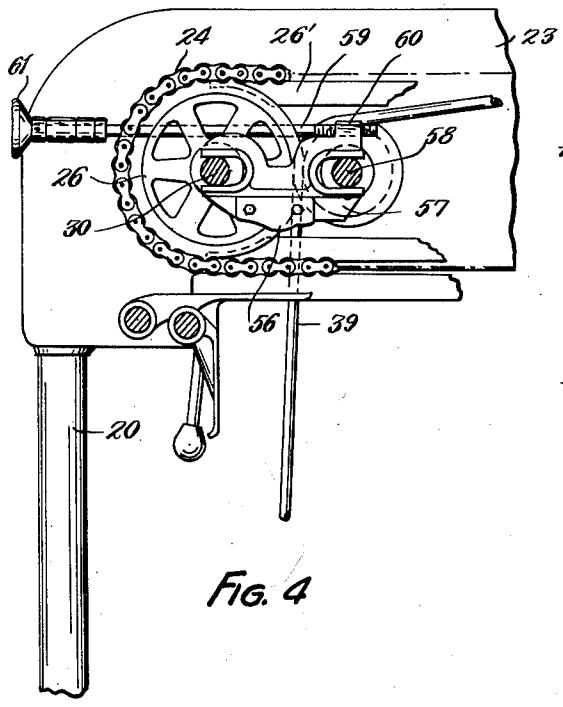


FIG. 4

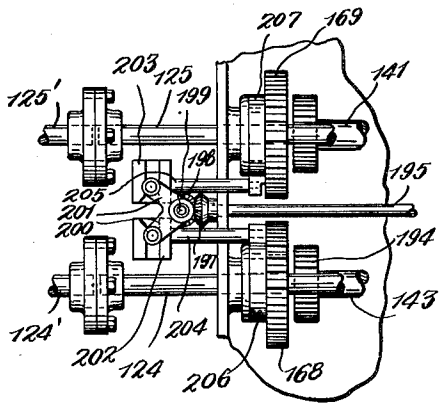


FIG. 7

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DUAL DELIVERY FOR PRINTING PRESSES

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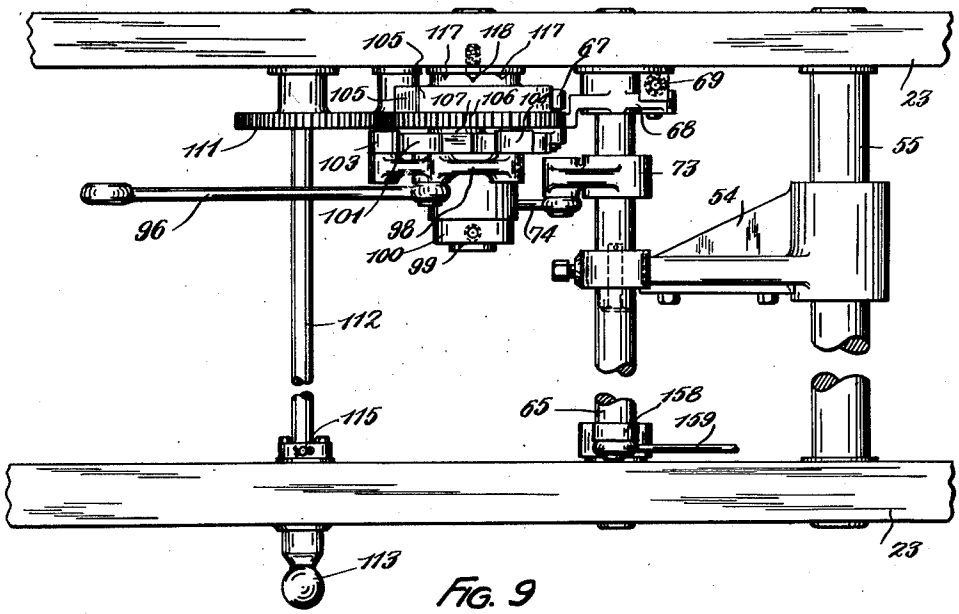


FIG. 9

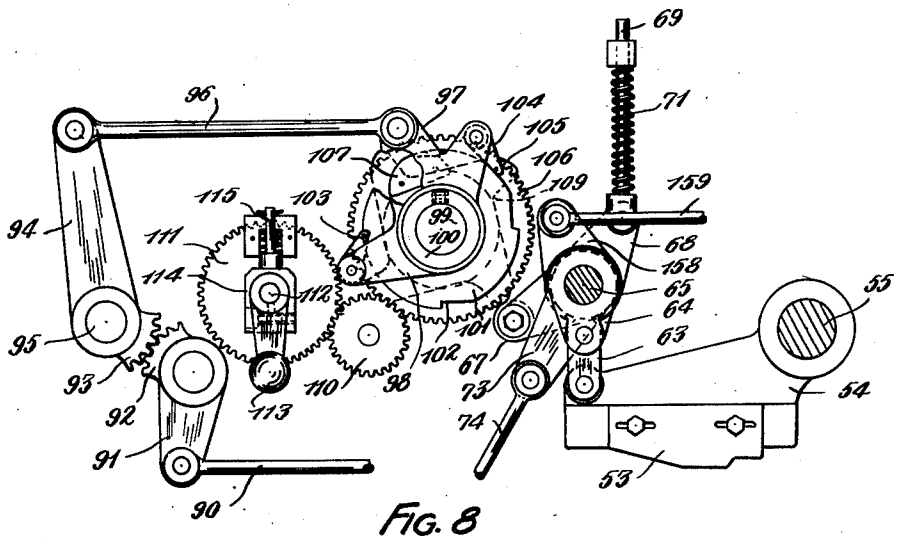


FIG. 8

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DUAL DELIVERY FOR PRINTING PRESSES

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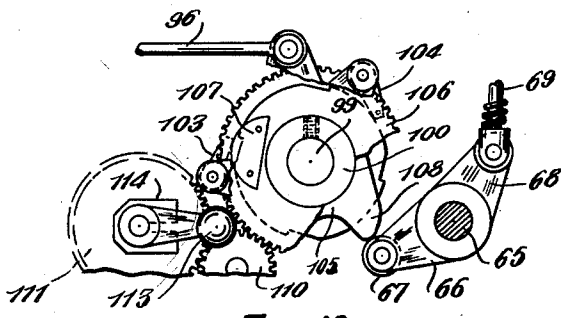


FIG. 10

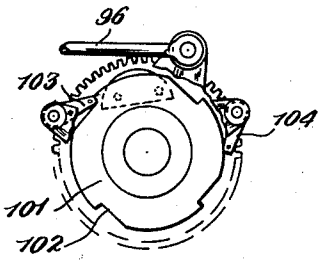


FIG. 12

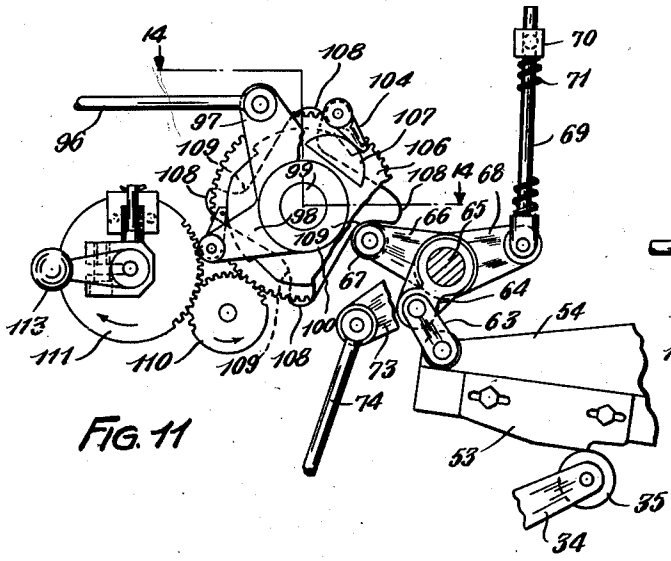


FIG. 11

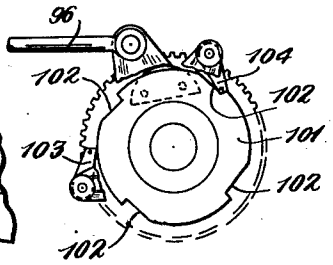


FIG. 13

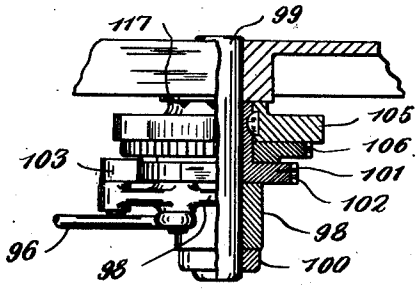


FIG. 14

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UNITED STATES PATENT OFFICE

2,673,735

DUAL DELIVERY FOR PRINTING PRESSES

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Application November 29, 1949, Serial No. 129,894

17 Claims. (Cl. 271—64)

1

This invention relates to improvements in dual delivery for printing presses.

One of the objects of the invention is the provision of a delivery to two pile supports arranged in tandem beneath an endless sheet conveyor together with controls permitting the deposit of successive sheets alternately on the two piles, or the deposit of all sheets on either one of the two piles.

Another object is the provision of novel actuating controls for accomplishing the foregoing object.

Still another object is the provision of a single control operable to select alternating delivery to the two piles or delivery exclusively to either pile which functions also to cause operation of the pile lowering means for the two piles alternately or operation of the pile lowering means for either pile exclusively, in other words a control which maintains the pile lowering means in step with the delivery of sheets to the piles.

A further object of the invention is the provision of novel means for controlling the lowering mechanism for the two piles.

Another object is the provision of rapid acting drive mechanism for moving a pile support either up or down, with a safety control to prevent such action unless the ratchet mechanism for accomplishing the slow lowering of the pile is first disabled.

Other objects and features of novelty will appear as we proceed with the description of that embodiment of the invention which, for the purposes of the present application, we have illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view of delivery mechanism embodying the invention.

Fig. 2 is a fragmental elevational view on a larger scale illustrating the pile lowering mechanism.

Fig. 3 is a fragmental elevational view also on a larger scale illustrating the mechanism for controlling selectively the operation of the sheet grippers above the first pile to open for every other sheet, to open for all sheets or to remain closed.

Fig. 4 is a fragmental detail view showing means for adjusting the position of the gripper tripping cam for the second pile.

Fig. 5 is an elevational view partly broken away illustrating means for effecting slow or rapid drive to the drums which raise and lower the pile supports.

Fig. 6 is a fragmental sectional detail view of the ratchet mechanism, the view being taken substantially on the line 6—6 of Fig. 5.

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Fig. 7 is a fragmental plan view showing the gear shifting mechanism which may be employed in connection with the invention.

Fig. 8 is a detail vertical sectional view of the control mechanism for the gripper tripping means set to cause deposit of sheets alternately on the two piles.

Fig. 9 is a plan view of the same.

Fig. 10 is a detail view partially broken away showing the control set to feed sheets to the first pile support exclusively.

Fig. 11 is a similar view with the control set to deliver sheets to the second pile exclusively.

Fig. 12 is a detail view showing the ratchet guard in intermediate position and the pawl carrier completing an active stroke, one of the pawls being active.

Fig. 13 is a similar view with the pawl carrier completing its inactive stroke, the other pawl being now in position to advance the rotatable cam disk on the next stroke, and

Fig. 14 is a detail plan view partly in horizontal section on the line 14—14 of Fig. 11.

In sheet delivery machines for high speed printing presses, it is advantageous to deliver alternate sheets to two different piles in order that additional time may be available for the ink on the sheets to dry and for each sheet to settle on the pile before the next sheet is deposited. When one pile approaches the maximum height permissible it is also advantageous to direct all of the sheets onto the other pile while the first one is being removed and a new pile tray substituted, thereby enabling the change to be made without interrupting the operation of the printing press. The controls for effecting the change must be operable of course while the machine is running. The present invention provides means for accomplishing these results.

In the drawings we have shown a frame comprising uprights 20, 21 and 22 supporting overhead horizontal members 23. In the elevational views the front frame members have been omitted in order to show the operating mechanism to better advantage. The delivery comprises an endless chain conveyor 24 which includes two chains running over pairs of spaced sprockets 25 and 26 and over suitable guiding tracks 26' and guides 27 and 28. The sprockets 25 and 26 are in pairs spaced transversely of the machine and are mounted to turn on or with shafts 29 and 30. Chains 24 are driven from the printing press or other sheet handling machine with which the delivery mechanism is used, and they carry transverse gripper bars on which are mounted gripper pads 31, Fig. 3, and gripper fingers 32 that are mounted upon

shaft 33, being spring-pressed to sheet gripping position and movable away from that position by an actuating arm 34 having a roller 35 at its free extremity. It will be understood that there are a series of gripper bars spaced along the length of the conveyor at distances corresponding to the spacing of the front edges of consecutive sheets passing through the printing machine.

Two pile supports disposed in tandem beneath the conveyor are indicated at 37 and 38. For convenience support 37 will be referred to hereinafter as the first support and support 38 as the second support. These supports are suspended from wire cables 39, 40, 41 and 42. Although two cables are shown for each support it will be understood that there may be four cables, one at each corner of the support. They run over sheaves 43, 44, 45 and 46 and downwardly over guiding pulleys 47 and 48 to winding drums 49 and 50 which are independently rotatable. In case four cables are employed for each pile support there will be pairs of sheaves 46, 47 and 48 and a second pair of drums 49 and 50 will be located directly behind those shown in Figs. 1 and 2. One such additional drum is indicated at 49' in Fig. 5.

In order that the gripper fingers 32 may be opened at the proper instant to deposit a sheet onto a tray 52 carried by pile support 37 we provide a gripper tripping cam 53 which is carried by a bracket 54 that is mounted to swing on a shaft 55. When this cam is in its lower position, illustrated in Figs. 1, 3 and 8, the roller 35 in traveling with the conveyor strikes the cam and rocks the fingers 32 into open position, thereby releasing the sheet and permitting it to fall onto the tray. When the cam 53 is in its raised position as will be presently described the sheets transported by the grippers will be carried over the first pile into position over the second pile, where the gripper fingers will be opened by engagement by the roller 35 with a relatively fixed cam 56. This latter cam remains always at the same elevation, so that it opens all sheet grippers whether or not they are transporting sheets. In order to regulate closely the instant at which the cam 56 becomes effective however we mount it on a bracket 57 which has open horizontal slots embracing shafts 30 and 58, whereby it may be moved lengthwise of the conveyor by a shaft 59 having a threaded connection with a nut 60 on the bracket. Shaft 59 is provided on its outer end with a wheel 61 by means of which it may be turned in either direction for adjustment purposes. When a set of grippers transporting a sheet are opened by cam 56 the sheet is deposited upon the pile carried by a tray 62 which is mounted on the pile support 38.

In accordance with the invention the cam 53 may be raised and lowered in alternating cycles of the machine so that sheets are deposited alternately on the first and second piles. This is accomplished by means of a link 63 pivotally connected with the free end of swinging bracket 54, this link being pivotally connected at its opposite end to a crank 64 mounted on a rock shaft 65 journaled in the machine frame. Shaft 65 carries an arm 66 upon the outer end of which there is a follower 67. A second arm 68 attached to the shaft is pivotally connected with a rod 69 that extends through a noddle pin 70 pivotally mounted in the frame. A compression spring 71 surrounds rod 69 between the arm 68 and the noddle pin, which tends to turn shaft 65 clockwise and raise bracket 54 as indicated in Fig. 11.

A further arm 73 keyed to shaft 65 is pivotally connected with a rod 74 the lower end of which is pivoted to a crank 75 that turns with a shaft 76 journaled in the frame. This shaft carries a series of arms 77 to each of which is pivoted a short link 78. Each link is pivotally connected to a block 79 which is fixed to the lower side of one of a series of long fingers 80 that are pivoted to swing about a horizontal rod 81 carried by front and rear columns 21 or other frame elements. When these fingers are supported in their upper position as illustrated in Figs. 1 and 3, sheets drawn along by the grippers travel beneath the fingers. When the fingers are in their lowered position the sheets travel above them and are thus supported by them.

Sheet gripper control

The means for oscillating rock shaft 65 in order to feed sheets alternately to the two piles, or for holding it in either extreme of its movement for feeding sheets to one only of the piles will now be described. The drive comes from the conveyor chains 24 which turn sprockets 25. These sprockets are keyed to shaft 29 which carries a gear 83 that meshes with a gear 84 on a cam shaft 85. Cam 86 carried by this shaft engages a follower 87 on an arm 88 which is pivoted at 89. A reciprocating rod 90 pivotally connected to the upper end of arm 88 serves to oscillate an arm 91 that turns a gear sector 92 which meshes with another sector 93 rigid with an arm 94 that oscillates about a shaft 95. The upper end of the latter arm is connected by a link 96 with a projecting arm 97 on a pawl carrier 98 which is mounted to oscillate upon a stub shaft 99 fixed in the frame. The hub of the pawl carrier is held against movement axially of the shaft by a collar 100 pinned to the shaft.

On shaft 99 behind pawl carrier 98 there is a rachet wheel 101 which is provided with four notches or tooth cavities 102 which are adapted to be engaged one at a time by one or the other of two pawls 103 and 104 which are pivotally mounted on the carrier 98. A four lobed cam disk 105 is keyed to the hub of ratchet wheel 101 as shown in Fig. 14. A gear 106 disposed between cam 105 and ratchet wheel 101 turns freely on the hub of wheel 101. A thin guard plate 107 is secured to gear 106, being disposed in a plane that intersects pawls 103 and 104. Cam disk 105 has four prongs or high spots 108 evenly spaced circumferentially, and interposed between these high spots are four low spots 109. When follower 67 is engaged by a high spot 108 shaft 65 is rocked counterclockwise and gripper cam 53 is depressed, fingers 80 being raised at the same time. When on the other hand follower 67 is engaged by a low spot on the cam 105 gripper cam 53 is raised and fingers 80 are lowered. Rod 96 has a complete reciprocation for each cycle of the machine. At the beginning of one of these reciprocations pawl 103 is in engagement with one of the notches 102 of ratchet 101, as indicated in Fig. 8. As the rod 96 moves toward the right the ratchet wheel is advanced one-eighth of a revolution, see Fig. 12, pawl 104 merely riding on the outer periphery of the ratchet wheel. As this occurs follower 67 rides down off a high spot into a low spot 109. At the end of the return stroke pawl 104 comes into engagement with a notch in the ratchet wheel, as indicated in Fig. 13. On the next stroke of rod 96 toward the right pawl 104 acts to advance the ratchet wheel while pawl 103 remains idle. This sequence continues

so long as guard plate 107 remains in the position of Figs. 8, 12, and 13, in which it is inactive, that is to say neither of the pawls 103 and 104 is affected by the guard in its intermediate position.

Guard plate 107 may be shifted either toward the right or toward the left from the Fig. 8 position, this being accomplished in the illustrated case by a pinion 110 meshing with gear 106 and a gear 111 meshing with pinion 110. Gear 111 is pinned to a shaft 112 which is adapted to be turned through a maximum angle of 180°, or 90° in either direction from the Fig. 8 position. A crank handle 113 is clamped to shaft 112 for turning gear 111. Shaft 112 may be held releasably in any one of its three positions by a spring-pressed detent 115 having a flat head for engagement with the flat sides of a rectangular collar 114 secured to shaft 112. The vertical position of the crank illustrated in Fig. 8 is the position for alternating delivery to the two piles. The position to the left, indicated in Fig. 11, is the position for constant delivery to the second pile and the position to the right, illustrated in Fig. 10, is the position used for delivery to the first pile exclusively.

Assuming that the control crank 113 is in the Fig. 8 position and that it is desired to interrupt alternating delivery and inaugurate delivery to the second pile exclusively, the handle 113 is thrown to the Fig. 11 position which carries guard plate 107 around to the position illustrated in that figure. Guard 107 will thereby force pawl 104 outwardly. Movement of rod 96 to the right will then cause pawl 103 to advance the ratchet wheel 101 one-eighth of a revolution, or into the Fig. 11 position. On the return stroke pawl 104 cannot enter a notch 102 and pawl 103 will merely ride on the circular periphery of the ratchet. The parts therefore remain in the Fig. 11 position in spite of the fact that the pawl carrier continues to oscillate back and forth. In this position cam 53 is raised and fingers 80 are lowered, whereby all sheets are carried over the first pile into the space above the second pile. If at the time the operator threw handle 113 to the Fig. 11 position the shaft 65 and its crank arms were in the position of Fig. 11, pawl 103 could not act and hence the ratchet 101 and the cam disk 105 would remain in the Fig. 11 position.

On the other hand if the operator, desiring to discontinue alternating delivery and to inaugurate delivery to the first pile exclusively, should throw handle 113 to its Fig. 10 position guard plate 107 would be shifted to the left to force pawl 103 out of operative position. If this should occur when the follower 67 was in engagement with a high spot 108 of the ratchet wheel and the pawl 104 was out of contact with a notch in the ratchet wheel, the next movement of rod 96 to the right would produce no movement of the ratchet wheel and the shaft 65 would remain stationary and the gripper cam 53 would be held down, thereby causing all of the sheets to be deposited on the first pile. If when the handle 113 is thrown to the Fig. 10 position the follower 67 is in a depression or low spot of the ratchet wheel, pawl 104 will engage a notch in the ratchet wheel and advance the same one-eighth of a revolution to bring a high spot 108 of the cam disk into engagement with the follower 67 or the position to hold the gripper cam down and cause delivery of all of the sheets onto the first pile.

The hub of cam disk 105 is provided with eight properly spaced depressions 117 which are adapted to be engaged by a spring-pressed detent ball 118 for releasably holding the cam disk in its different operative positions and preventing its rotation by the camming action of follower 67 under the influence of spring 71.

Pile lowering mechanism

The lowering mechanisms for the two piles are separate and independent, but they are controlled either automatically or manually by the same mechanism that controls the deposit of sheets alternately on the two piles or exclusively on one or the other of the piles. The drums 49 and 50 are mounted to turn with worm wheels 120 and 121 respectively. Worms 122 and 123 keyed to shafts 124 and 125 mesh with worm wheels 120 and 121. Shaft 124 may be connected by a coupling with an aligned shaft 124' which carries a worm (not shown) similar to worm 122 that is in mesh with a worm wheel 120' with which drum 49' turns. It will be understood that shaft 125 is connected by a similar coupling with a shaft 125' driving worm and worm wheel parts similar to those driven by shaft 124'. Each drum has two speeds, one being effected by a ratchet mechanism which lowers the pile a small increment at a time and the other by a relatively high speed drive means operating in either direction for the purpose largely of raising the pile support after it has been unloaded and is to be raised to sheet receiving position. The ratchet mechanism drive will first be described.

On the cam shaft 85 there is a cam 126 against which a follower 127 bears. This follower is carried at one end of a lever 128 which is pivoted intermediate its ends at 129. A spring 130 holds the follower 127 against its cam. A rod 131 connected to the other end of lever 128 is pivotally connected at its lower end with a grooved crank 132 in the groove of which there is a block 133 mounted to slide. This crank 132 is mounted to swing in the frame about an axis 134. Block 133 carries a pintle 135 which pivotally supports one end of a rod 136 and one end of a short link 137. In Figs. 1 and 2 the pintle is shown concentric with the axis 134, but when block 133 is moved to the right in the groove of crank 132 the pintle is shifted away from axis 134. Rod 136 is pivoted to a short arm 138 that swings upon a pintle 138' mounted in the machine frame, and this arm 138 also carries a pivot for another rod 139 which extends down to and is pivotally connected with an arm 140 of a three armed lever that is mounted to oscillate upon a shaft 141 journaled in a gear box 142 that is suitably mounted in the frame of the machine. A second shaft 143 parallel to shaft 141 oscillatably supports a two armed lever, the upper arm 144 of which is connected by a link 145 with the upper arm 146 of the first lever. Both levers therefore are oscillated by the movement of rod 139.

The lever on shaft 141 has a downwardly extending arm 147 to which is pivoted a pawl 148 that is urged inwardly by a tension spring 149. On the outer end of the pawl a roller 150 is journaled. The lever on shaft 143 also has a downwardly extending arm 151 to which is pivoted a pawl 152 that is urged inwardly by a coil spring 153. A roller 154 is journaled on the outer end of pawl 152. On the shafts 141 and 143 respectively are keyed two ratchet wheels 155 and 156. As the rod 139 moves down and up one of the

pawls 148 and 152 rides back over its ratchet and then engages a tooth on the ratchet and advances it a small part of a revolution. As shown in Fig. 6 pawl 148 is active. Pawl 152 is held out of engagement with its ratchet by roller 154 bearing against a masking bar 157 that is pivotally mounted intermediate its ends at 157'. This bar when tilted slightly in the clockwise direction from its Fig. 6 position bears against roller 150 to disable pawl 148 and withdraws from engagement with roller 154 to permit pawl 152 to engage its ratchet wheel 156.

Masking bar 157 is operated automatically by a system of levers and links from an arm 158 rigid with shaft 65 so as to be controlled along with the control of the sheet grippers. Therefore whenever a sheet is deposited on the first pile that pile is lowered a small increment, the same thing occurring with respect to the second pile when a sheet is dropped on that pile.

As illustrated in the drawings arm 158 is connected by a rod 159 with one arm of a bell crank lever 160 pivoted at 161 in the frame, the other arm of the lever being connected with the upper end of a rod 162 the lower end of which is pivotally connected with one arm of a small bell crank lever 163 pivoted at 164 to the frame. The other arm of this lever is connected by a link 165 with an arm 166 integral with or attached to masking bar 157. Shaft 143 in the gear box has a gear 167 keyed thereto which therefore turns with ratchet wheel 156. Gear 167 is adapted to mesh with a gear 168 which is slidable on shaft 124. When the parts are in the positions of Fig. 5 therefore actuation of ratchet wheel 156 results in rotation of shaft 124, worm 122 and worm wheel 120 with which drum 49 is fast. Similarly actuation of ratchet wheel 155 acts through a gear similar to gear 167, but not shown, to turn a gear 169 which is slidable on shaft 125 and results in the rotation of drum 50 through a small angle. When sheets are being delivered to the two piles alternately the piles are lowered alternately.

If for any reason there should be an interruption in the operation of the feeder and printing press with which the present delivery is associated, so that the delivery conveyor should fail to transport sheets, it would be desirable to interrupt the action of the pile lowering means. For this purpose we employ a cable 170 which can be actuated either manually or automatically to interrupt the feeder and throw off the impression of the press. When cable 170 is pulled downwardly to stop the feeder and throw off the impression of the press a small bell crank 171 is turned clockwise causing a coil spring 172 to swing over to the left of the pivot 173 for the bell crank. When this happens a latch 174 which is loose on pivot 173 snaps over into position to engage beneath the long arm of lever 126 when the latter reaches its uppermost position due to the action of cam 126. When the cable 170 is pulled upwardly to start the feeder and throw the impression on, spring 172 is drawn over center with respect to pivot 173 and latch 174 is snapped to the right out of the path of motion of lever 123. An extension 175 on latch 174 engages stops 176 to limit the extent of its motion. Latch 174 is shown in the "press on" position in Fig. 2 and in the "press off" position in Fig. 3.

The degree of rotation of the ratchet wheels 155 and 156 for each actuation is governed by the position of slide block 133 in grooved lever 132. This in turn is controlled by a graduated dial 182 which carries a pinion 183 that meshes with a pinion 183' which in turn meshes with a small gear 184 which is rigid with a pinion 185 that meshes with a rack 186 to which the link 137 is connected. It will be apparent that if the dial 182 is turned clockwise block 133 will be slid outwardly in grooved lever 132, increasing the travel of rod 136 and the throw of the pawls 148 and 152. It is convenient to graduate the dial in units of 2½ thousandths, as indicated in Fig. 2.

Rapid drive for the pile raising and lowering mechanism employs a separate motor 188 which is connected by a silent chain 189 with a sprocket 190 on a shaft 191 which is journaled in the two sides of the gear box 142. Inside the gear box shaft 191 carries a gear 192 which meshes with a gear 193 that is loose on shaft 143. A second gear 194 is rigid with gear 193. In the position shown these gears are idle.

195 is a rock shaft on the outer end of which there is a handle 196 which stands in an upright intermediate position as shown in Figs. 2 and 3, this being the position for ratchet operation of the lowering mechanisms. In case the operator should desire to substitute a rapid actuation for the ratchet actuation of one of the piles, say for example the second pile, he then throws the handle 113 to the right into the Fig. 10 position, thereby holding the gripper cam 53 down and lifting fingers 80. The sheets are then all delivered onto the first pile. This results in the movement of shaft 65 counterclockwise, which swings arm 158 counterclockwise and lifts rod 162, swinging masking bar 157 counterclockwise far enough to disable pawl 152. There is then no further lowering of the second pile by its ratchet mechanism, and the ratchet lowering mechanism for the first pile functions on every machine cycle instead of every other cycle. The operator next throws handle 196 toward the left as seen in Fig. 2, which rotates a bevel gear 197 on the end of that shaft through the same angle. This gear meshes with a bevel gear 198 at the base of a vertical shaft 199 upon which is fixed a lever having two arms 200 and 201. At the outer ends of these arms there are pins which take into flared grooves in blocks 202 and 203 on the outer ends of slidable shift rods 204 and 205. The inner ends of these rods are attached to yokes 206 and 207 which surround the hubs of gears 168 and 169 respectively and by which those gears may be shifted. The rotation of shaft 195 in the direction stated slides rod 204 and yoke 206 toward the right as viewed in Fig. 7, thereby sliding gear 168 from its Fig. 5 position into mesh with gear 194. The pin on arm 201 moves out of its groove and hence does not shift block 203. Driving force thus comes from motor 188 through chain 189 and gear 190 to shaft 191, through gear 192 which is pinned to that shaft to the pair of gears 193 and 194 and thus to gear 168 on shaft 124 which carries worm 122 and thence to worm wheel 120 and drum 49. At the same time the shaft 124' drives worm wheel 120' and drum 49'.

Shaft 199 at its upper end carries three cams 208 which are disposed opposite three microswitches 209. These switches are interposed in the circuit wires of motor 188. When control handle 196 is thrown over into either of its horizontal positions certain of the switches 209 are closed and the motor may then be started in either direction by up and down button switches mounted at a convenient position on the machine frame enabling the operator to run the pile support up or down at a relatively rapid rate of speed.

It will be observed that the means for shifting the pile raising and lowering means of a pile from slow action to rapid action embodies a safety measure, in that it is impossible to throw the rapid actuation of a pile into effect until after the gears are shifted, thereby disconnecting the ratchet mechanism and closing the switches 209 in the motor circuits. At the same time the speed of actuation of the ratchet mechanism for the other pile is maintained in accordance with the setting of handle 113. Conversely, the motor circuits are broken before the shift can be made from high speed operation to ratchet drive.

Having thus described our invention, we claim:

1. In a dual delivery for sheet handling machines, two pile supports arranged in tandem, an endless conveyor traveling over said pile supports and having a plurality of evenly spaced sets of sheet grippers, said conveyor advancing at each cycle of the machine a distance equal to the distance between successive sets of grippers, said grippers being biased toward closing position and comprising levers by which they may be opened, a cam disposed over the support which is first in the line of travel of said conveyor, said cam functioning when in operative position for actuating said levers for opening grippers to drop sheets onto the first support, a second cam disposed over the second support adapted to actuate said levers, a ratchet wheel, pawl means actuated in timed relation with the delivery cycles of the machine for advancing said ratchet wheel a step at a time, a cam rotating with said ratchet wheel and having alternating high and low spots, a follower running upon said rotatable cam, and means responsive to the movements of said follower onto said high and low spots respectively for moving said first named gripper cam into operative and inoperative positions.

2. A dual delivery for sheet handling machines as defined in claim 1, comprising a guard mounted to swing about the axis of said ratchet wheel having an inactive position, and manual means for shifting said guard from said inactive position to an active position in which said pawl means is disabled and said cam is held stationary with one of its high or low spots in engagement with said follower.

3. In a dual delivery for sheet handling machines, two pile supports arranged in tandem, an endless conveyor traveling over said pile supports and having a plurality of evenly spaced sets of sheet grippers, said conveyor advancing at each cycle of the machine a distance equal to the distance between successive sets of grippers, said grippers being biased toward closing position and comprising levers by which they may be opened, a cam disposed over the support which is first in the line of travel of said conveyor, said cam functioning when in operative position for actuating said levers for opening grippers to drop sheets onto the first support, a second cam disposed over the second support adapted to actuate said levers, a ratchet wheel having an even number of evenly spaced peripheral pockets, a pawl carrier oscillatable about the axis of said ratchet wheel and having two pawls each disposed to engage a pocket on alternate oscillations of said carrier, a cam rotating with said ratchet wheel having a number of high spots equal to the number of said pockets and low spots alternating with said high spots, a follower running on said rotatable cam, one of said pawls actuating said ratchet wheel to cause a cam high spot to engage said follower and the other pawl actuating said ratchet wheel to cause a cam low spot to engage said follower, a guard swingable about the axis of said ratchet wheel, said guard having an intermediate position leaving both pawls free to function, and manual means for shifting said guard in either direction to cause the guard to disable one or the other of said pawls, whereby said first named gripper cam is maintained in or shifted into either operative or inoperative position.

4. In a dual delivery for sheet handling machines, two pile supports arranged in tandem, an endless conveyor traveling over said pile supports and having a plurality of sets of sheet grippers, said conveyor advancing at each cycle of the machine a distance equal to the distance between successive sets of grippers, said grippers being biased toward closing position and comprising levers by which they may be opened, a cam disposed over the support which is first in the line of travel of said conveyor, said cam functioning when in operative position to actuate said levers to open said grippers for dropping a sheet onto the first support, a second cam disposed over the second support adapted to actuate said levers, means for lowering each of said piles individually a small increment at a time, means for automatically disposing said first named cam in operative and inoperative positions alternately in successive machine cycles, and means operatively associated with said last named means for disabling each of said pile lowering means in alternating cycles of the machine.

5. In a dual delivery for sheet handling machines, two pile supports arranged in tandem, an endless conveyor traveling over said pile supports and having a plurality of sets of sheet grippers, said conveyor advancing at each cycle of the machine a distance equal to the distance between successive sets of grippers, said grippers being biased toward closing position and comprising levers by which they may be opened, a cam disposed over the support which is first in the line of travel of said conveyor, said cam functioning when in operative position to actuate said levers to open said grippers for dropping a sheet onto the first support, a second cam disposed over the second support adapted to actuate said levers, means for disposing said first named cam in operative position to actuate said levers for depositing all sheets on said first support or for disposing said cam in inoperative position to enable said grippers to carry all sheets over said first support and deposit them upon said second support, means for lowering each of said piles individually a small increment at a time, and means operatively associated with said cam disposing means for disabling the pile lowering means of the inactive pile.

6. In a dual delivery for sheet handling machines, two pile supports, winding drums, cables attached to each of said supports, sheaves over which said cables run to said drums, a pawl and ratchet means for turning each of said drums a small increment at a time for lowering said supports, said two pawl and ratchet means being disposed side by side, and a common masking bar pivoted intermediate its ends adapted to be swung into position to disable the pawl of either one of said pawl and ratchet means selectively, whereby one only of said pawl and ratchet means may be actuated at a given time.

7. A dual delivery as defined in claim 5, wherein said pile lowering means comprises two ratchets disposed side by side and two pawls, common means for oscillating said pawls, a mask-

ing bar pivotally mounted intermediate its ends adapted in one position to disable one only of said pawls and in another position to disable the other pawl only, and means operatively associated with said gripper cam disposing means for tilting said masking bar to disable the pawl for the lowering means of the inactive pile.

8. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, a ratchet mechanism for turning said drum in one direction a small increment at a time, high speed drive mechanism for said drum, means for shifting drive from said ratchet mechanism to said high speed mechanism, an electric motor for operating said high speed driving mechanism, an electric circuit for said motor, switch means in said circuit, means operated simultaneously with said shifting means for closing said switch means, and a push button switch for operating said motor when said first named switch means is closed.

9. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, a shaft, ratchet mechanism for turning said shaft in a given direction a small increment at a time, a first gear keyed to said shaft, a second gear rotatable upon said shaft, power means for rotating said second gear in either direction, a second shaft operatively connected with said drum, a gear on said second shaft and means for shifting gears to cause either said first or second gear to mesh with the gear on said second shaft, whereby said drum may be turned a small increment at a time in one direction or rapidly in either direction, the said power means for driving said second gear comprising an electric motor, a circuit for said motor, a switch in said circuit, and means for closing said switch actuated by said gear shifting means when operated to cause said second gear to mesh with the gear on said second shaft.

10. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, ratchet mechanism for turning said drum in a given direction a small increment at a time, an electric motor, means driven by said motor for turning said drum rapidly, shifting means for connecting said ratchet mechanism or said rapid drive selectively to said drum, and means actuated by said shifting means when operated to throw in said ratchet mechanism for breaking the motor circuit.

11. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, a shaft, ratchet mechanism for turning said shaft a small increment at a time, a first gear keyed to said shaft, a second gear rotatable on said shaft, power means for rotating said second gear in either direction, a second shaft operatively connected with said drum, a gear slidably keyed to said second shaft, and means for shifting said last named gear into mesh with either one of said first and second gears, whereby said drum may be turned a small increment at a time in one direction or may be turned rapidly in either direction, the said power means for driving said second gear comprising an electric motor, a circuit for said motor, a switch in said circuit, and means for closing said switch actuated by said gear shifting means when operated to cause said sliding gear to mesh with said second gear.

12. In a dual delivery for sheet handling machines in which a sheet is handled during each machine cycle, two pile supports, two winding drums, means for depositing sheets on said pile supports alternately, cables attached to each of said supports, sheaves over which said cables run to said drums, means for lowering said supports a small increment alternately in timed relation to the action of said sheet depositing means, and control means for effecting deposit of all sheets onto one of said pile supports and for lowering that support alone at every cycle of the machine.

13. In a dual delivery for sheet handling machines in which a sheet is handled during each machine cycle, two pile supports, pawl and ratchet means for lowering said supports comprising a pair of ratchet wheels and a pair of pawls oscillating once for each machine cycle, oscillating masking means functioning to mask out each of said pawls alternately on successive cycles of the machine, and means for holding said masking means in one position for masking out one of said pawls continuously, and leaving the other pawl free to operate at each cycle of the machine.

14. In a machine of the character described, two pile supports, winding drums connected with said supports by cables, alternately acting means for turning said drums incrementally one at a time, said means comprising two ratchet wheels disposed adjacent each other, two pawls cooperating with said ratchet wheels, common means for oscillating said pawls back and forth, cam and cam follower means for actuating said common means and means for latching up said follower to disable both of said pawls simultaneously.

15. In a machine of the character described, a pile support, means for depositing sheets thereupon, means for moving said pile support vertically a small increment for each sheet deposited, pawl and ratchet mechanism for operating said moving means, actuating means for said mechanism comprising a pivoted arm swinging through a given angle, a block slidable in said arm, manual means for sliding said block and holding it in selected position in said pivoted arm comprising a rotatable graduated dial and connections attached to said block and operated by the rotary movement of said dial, and operative connections between said block and said pawl and ratchet mechanism.

16. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, a ratchet mechanism for turning said drum in one direction a small increment at a time, high speed drive mechanism for said drum, means for shifting drive from said ratchet mechanism to said high speed mechanism, a reversible motor for operating said high speed drive mechanism, an electric circuit for said motor comprising three wires, switches in certain of said wires, means operated simultaneously with said shifting means for closing said switches, and means comprising push button switches for operating said motor in either direction when said first named switches are closed.

17. In mechanism of the character described, a pile support, cables for suspending said support, a winding drum for taking up or paying out said cables, a shaft, ratchet mechanism for turning said shaft in a given direction a small increment at a time, a first power means for operating said

ratchet mechanism, a first gear keyed to said shaft, a second gear loose upon said shaft, an electric motor for rotating said second gear in either direction, an electric circuit therefor, a second shaft operatively connected with said drum, a gear on said second shaft shiftable into mesh with either of said first and second gears, switch means in said motor circuit arranged to be automatically closed when said shiftable gear is thrown into mesh with said second gear, and manually controlled means for energizing said electric motor actuatable only when said automatic switch means is closed.

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