

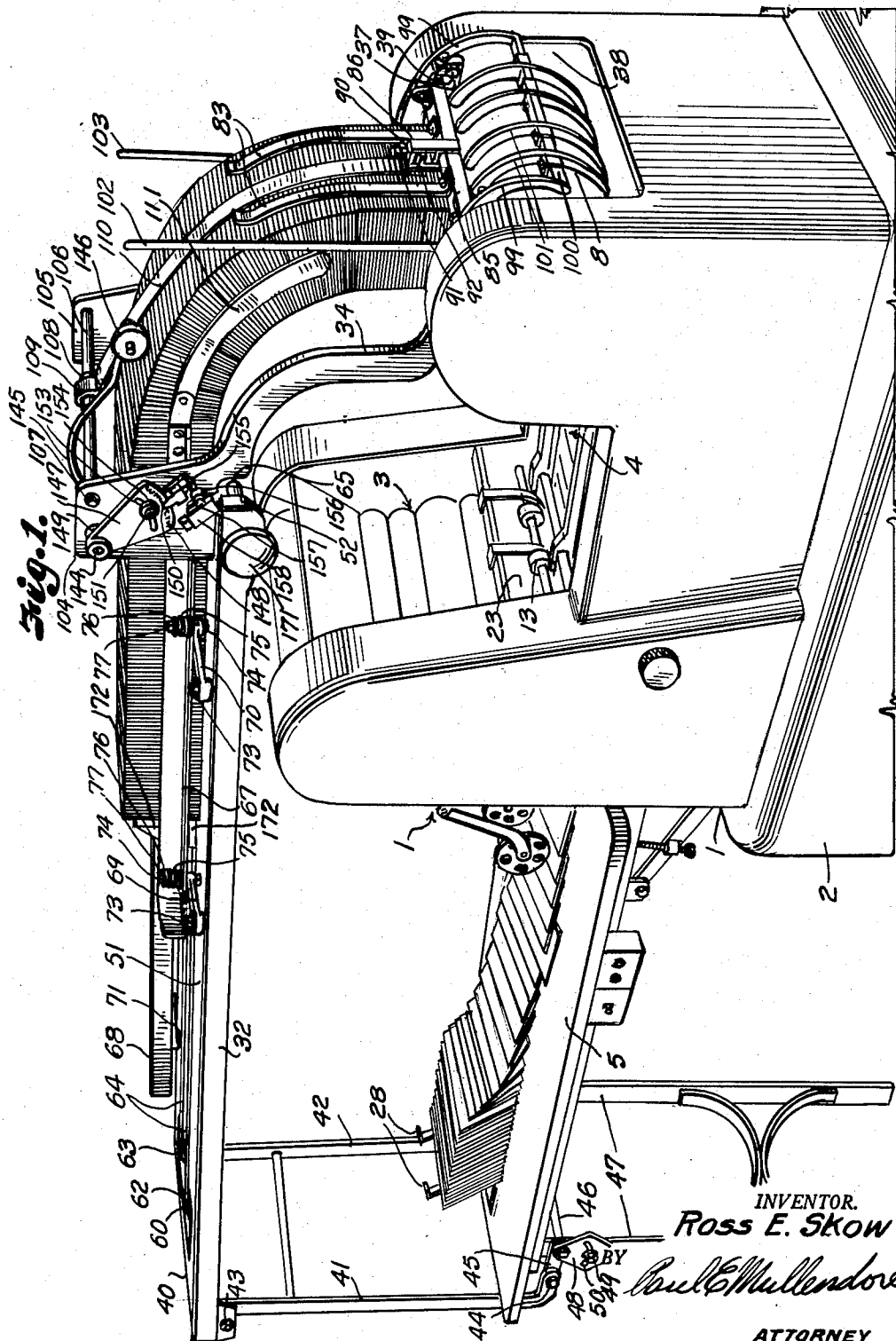
Sept. 23, 1958

MECHANISM FOR SUPPLYING WORKPIECES SUCH AS
ENVELOPES TO THE FEEDING MECHANISM
OF A PRINTING PRESS

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7 Sheets-Sheet 1



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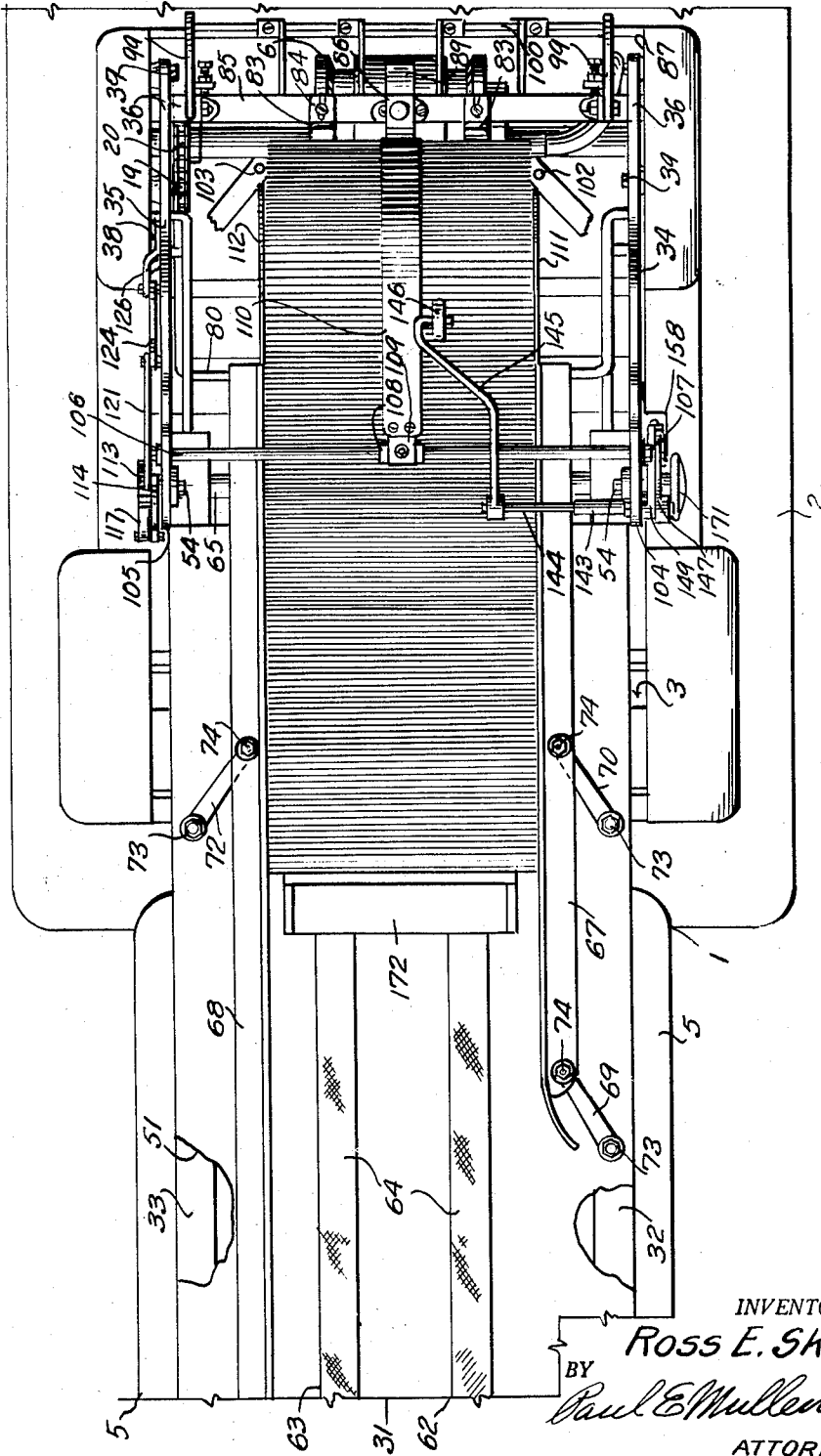
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Fig. 2.



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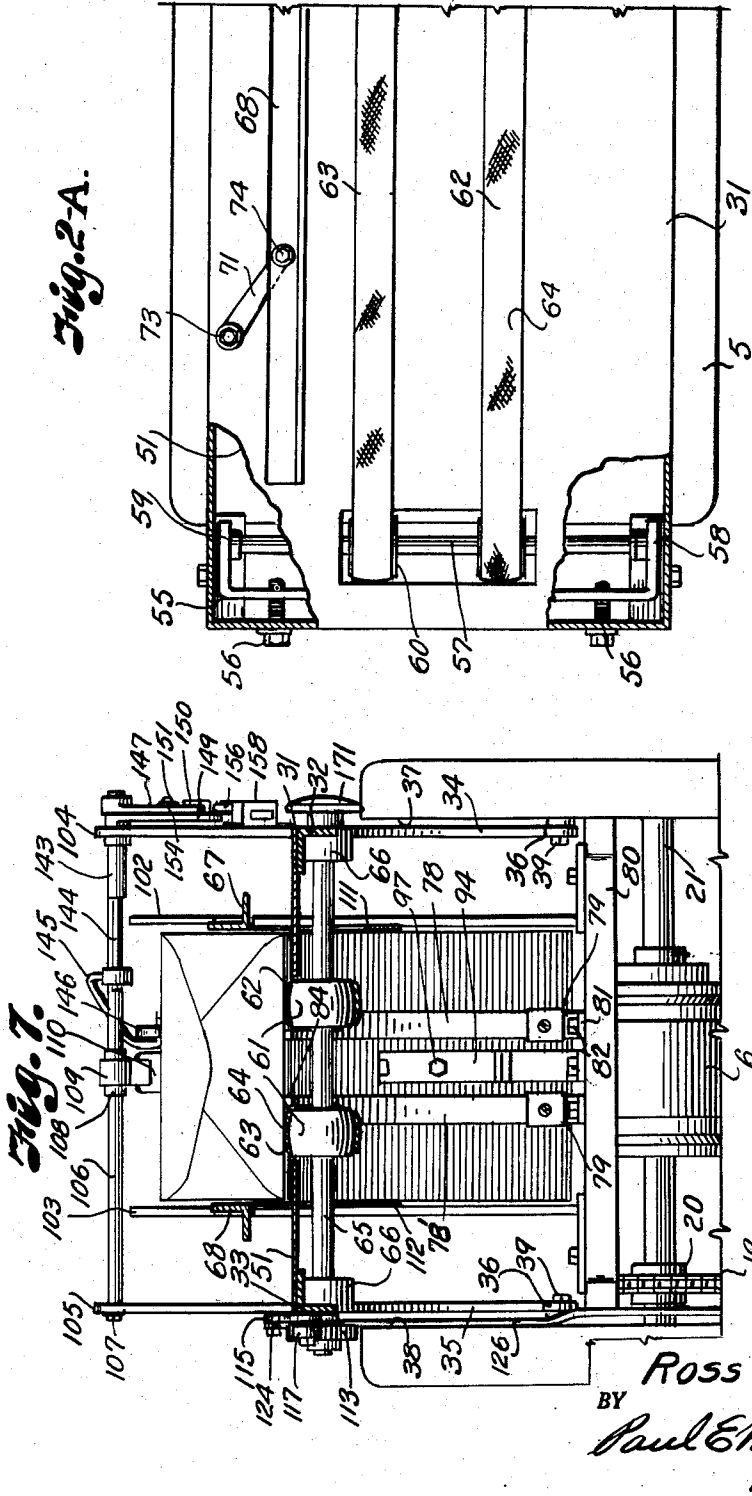
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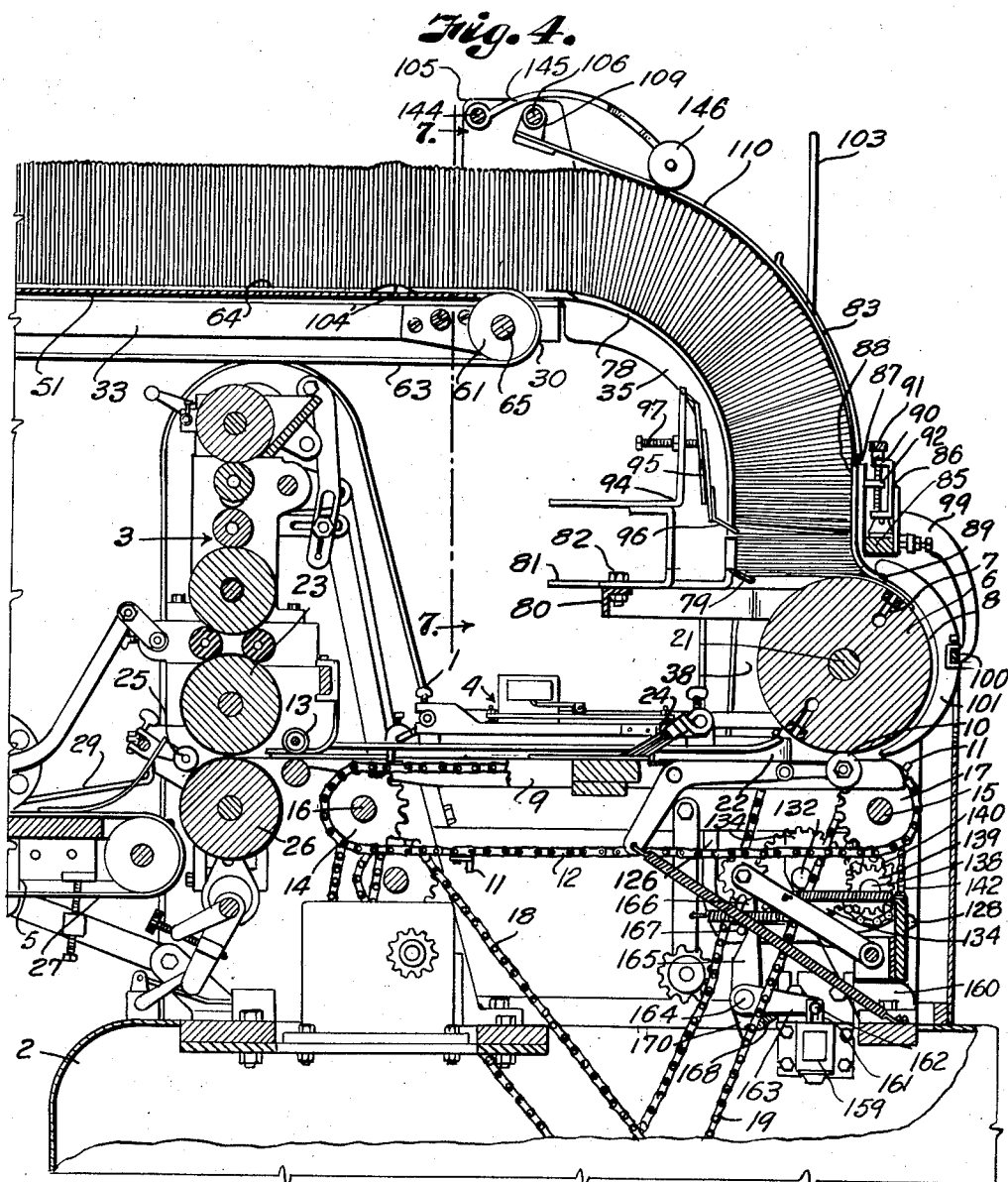
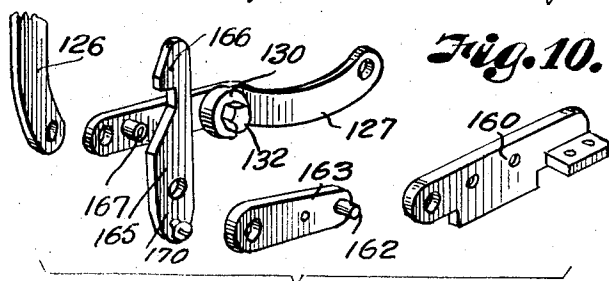
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Fig. 5.

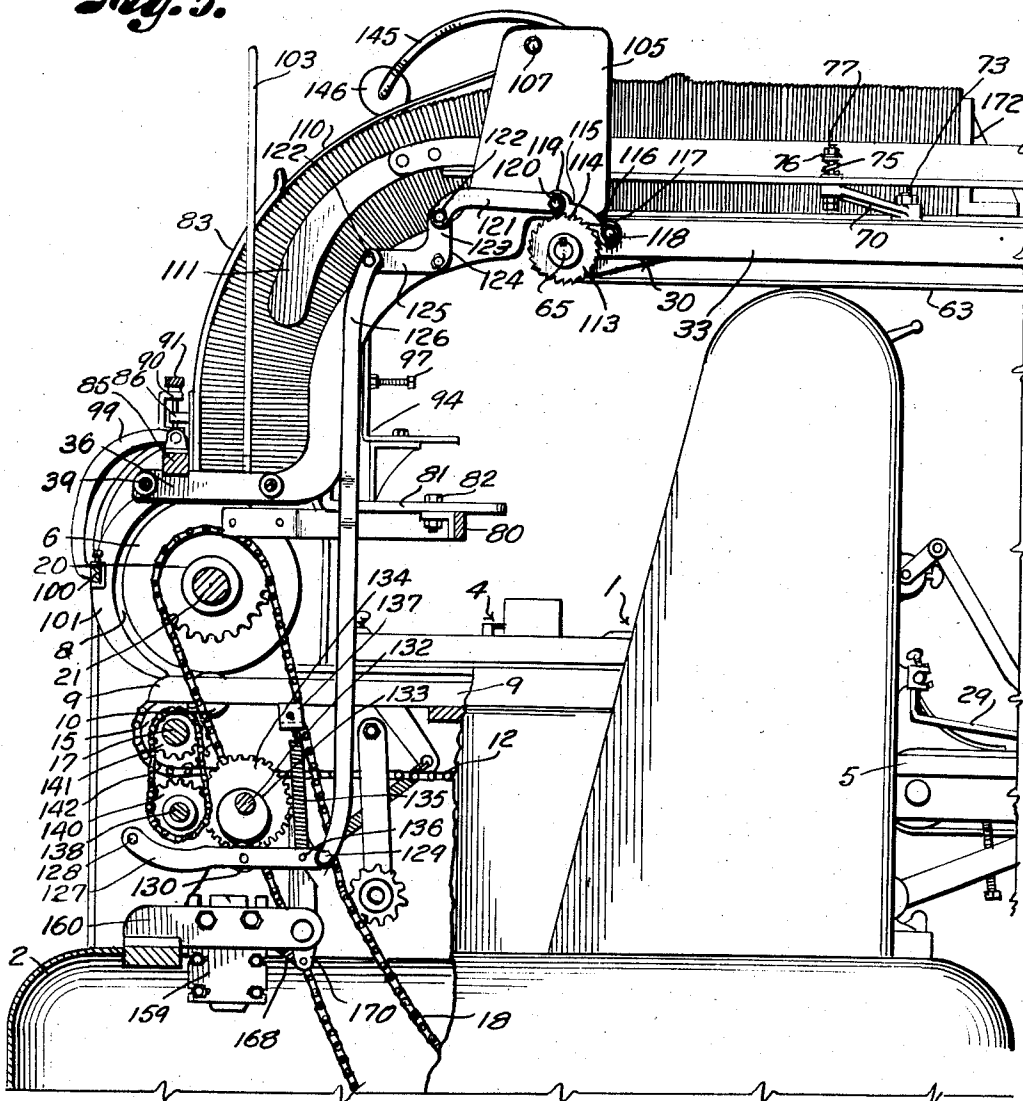
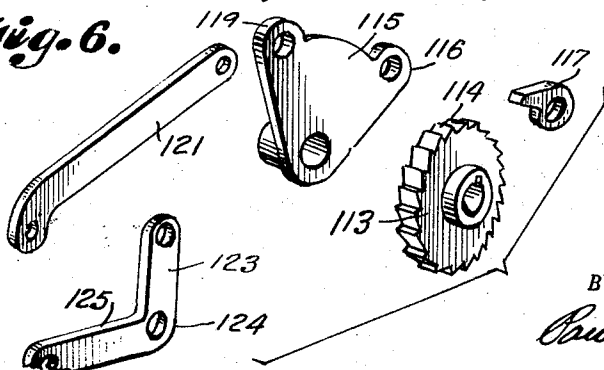


Fig. 6.



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Fig. 9.

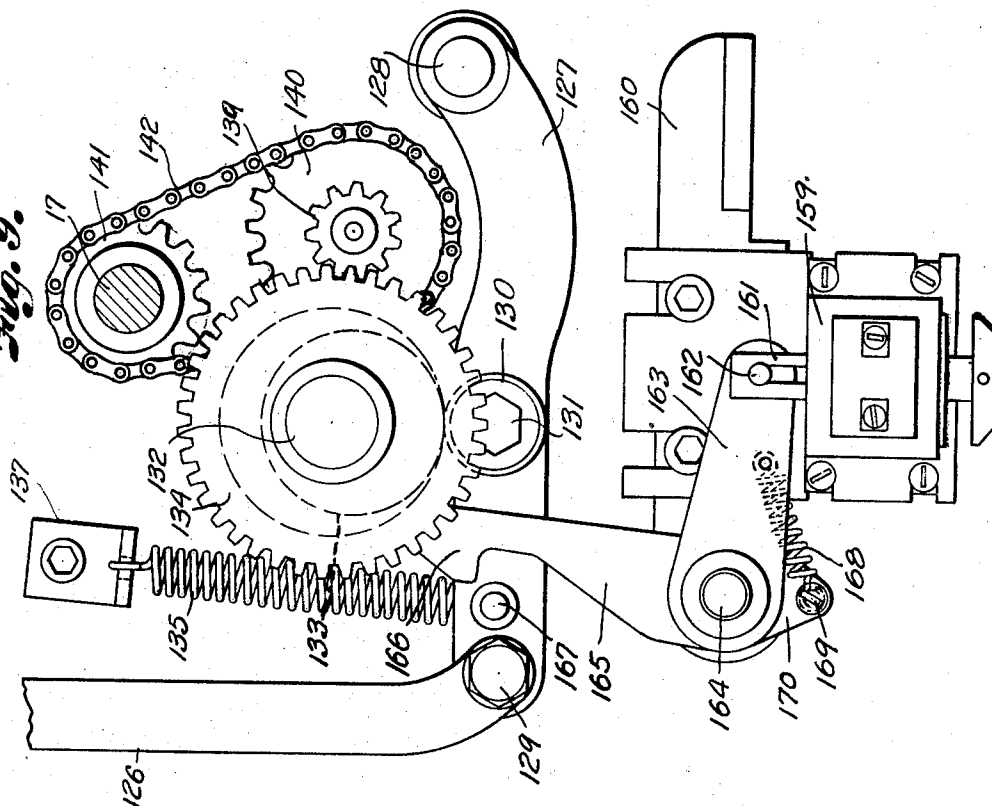
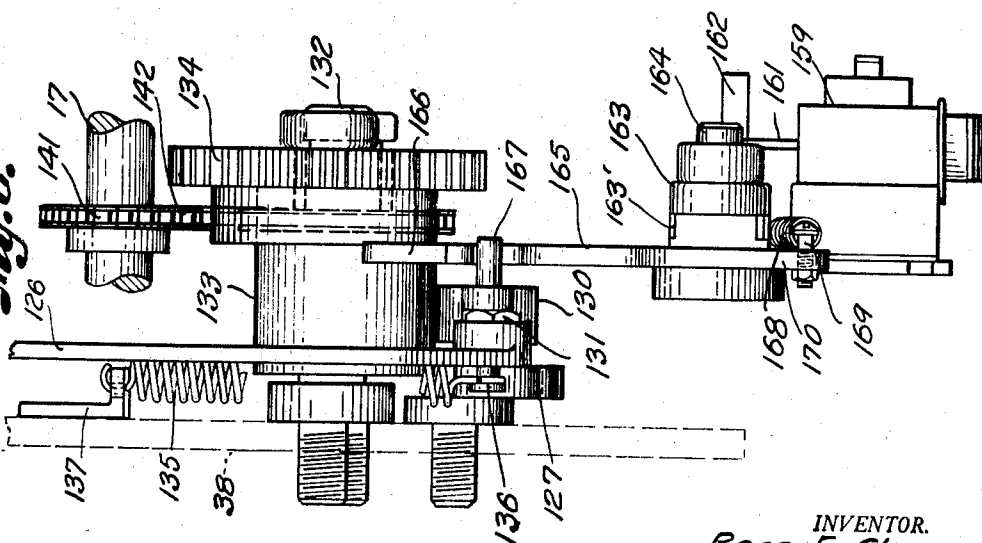


Fig. 8.



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MECHANISM FOR SUPPLYING WORKPIECES SUCH AS ENVELOPES TO THE FEEDING MECHANISM OF A PRINTING PRESS

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Application March 2, 1956, Serial No. 569,132

16 Claims. (Cl. 271—5)

This invention relates to machines for printing envelopes and similar articles, and more particularly to a mechanism for supplying such articles to the feeding mechanism of printing presses of the character disclosed in Patent No. 2,635,538, granted to me April 21, 1953.

It is explained in this patent that printers and envelope manufacturers have many customers requiring envelopes printed to their specifications, but with present day high production machines for manufacturing envelopes, it is economically impractical to set up such envelope making machines for small quantity runs. To avoid this difficulty, standard stock envelopes can be manufactured in large quantities on such high speed machines at relatively low cost, and then later printed on the machine of the patent to meet the needs of customers. When the envelopes are manufactured, they are placed in boxes in which they are sold to the trade. The boxed envelopes are then placed in storage or are delivered to commercial printing establishments or to jobbers dealing in envelopes. Then when an order is received for a standard size envelope to be printed in a special manner, the boxed envelopes are taken from storage, the envelopes removed from the boxes and placed in a stack and fed individually by the feeding mechanism of the press through the printing mechanism. The envelopes, after printing, are counted, assembled in a stack, and replaced in the boxes from which they were removed. This work fatigues the operator, because the operator must shift back and forth from the position in which the supply of envelopes is maintained in the stack to the position where the printed envelopes are reassembled and replaced in their boxes.

It is, therefore, the principal object of the present invention to provide such printing presses with a mechanism that permits the operator to stand in substantially one and the same position, when emptying the envelopes from the boxes and when refilling the boxes with printed envelopes.

A further object of the invention is to provide a conveyor located over the delivery table of the press and which carries the envelopes to the feed cylinder which removes the envelopes individually and delivers them in sequence to the printing mechanism.

Another object is to provide for automatically controlling feed of the envelopes to the feeding mechanism of the press responsive to operation and speed of the press, so that the supply of unprinted envelopes is stopped should the feed of the envelopes exceed the rate of withdrawal of the envelopes into the printing mechanism.

Another object of the invention is to provide a conveying mechanism for the envelopes which accommodates for any variation in the rate at which the operator works.

Other objects are to provide a simple and reliable conveyor mechanism that may be applied as an attachment to existing presses, to provide a step by step movement of the conveyor substantially in time with the withdrawal of the envelopes individually for movement through the press, to provide for movement of the envelopes in a close, compact file through a curved path so that any slowing down or interruption in the press retards the progress of

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the envelopes to shift the file of envelopes sufficiently for use in actuating means to stop the conveyor, to provide a ratchet actuator for the conveyor operable in timed relation with the feeding mechanism of the press, and to provide a connection with the ratchet mechanism to render the ratchet operating mechanism ineffective while the press is catching up with the delivery of the envelopes.

In accomplishing these and other objects of the invention hereinafter pointed out, I have provided improved structure the preferred form of which is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a printing press equipped with an envelope conveying mechanism embodying the features of the present invention.

Figs. 2 and 2-A are a plan view of the envelope conveying mechanism and the press with which it is associated.

Fig. 3 is a fragmentary side elevational view of the envelope conveying mechanism at the delivery end of the press.

Fig. 4 is a substantially central section through the press and envelope conveying mechanism for stacking the unprinted envelopes for withdrawal into the press.

Fig. 5 is a side elevational view of the portion of the press and envelope conveying means shown in Fig. 4.

Fig. 6 is a perspective view of the parts of the ratchet mechanism for effecting the step by step movement of the envelopes in accordance with the withdrawal of the envelopes.

Fig. 7 is a cross section on the line 7—7 of Fig. 4 particularly illustrating the mechanism for controlling operation of the envelope handling conveyor and which is responsive to change in contour of the file of envelopes being delivered to the withdrawal cylinder.

Fig. 8 is a detail view of the driving mechanism for operating the pawl of the ratchet mechanism.

Fig. 9 is a side elevational view of the driving mechanism shown in Fig. 8.

Fig. 10 is a perspective view of the cam lever, supporting bracket, latch and latch operating arm shown in disassembled spaced relation.

Referring more in detail to the drawings:

1 designates a printing press which is constructed in accordance with the disclosure in the above mentioned patent. In brief, the printing press includes a base 2 supporting a printing mechanism 3 and a feeding and registering mechanism 4 by which envelopes are withdrawn individually from a stack or file of unprinted envelopes, registered, and passed through the printing mechanism for discharge of printed envelopes onto a delivery table 5. The feeding mechanism of the patent includes means for supporting unprinted envelopes in stacked relation with the forward edge of the bottom envelope in contact with the periphery of a withdrawal cylinder 6 having ports 7 through which a vacuum is drawn to seize the envelope and carry it from the stack through a pass 8 onto a pair of laterally spaced parallel rails 9 extending from below the withdrawal cylinder to the printing mechanism 3. The upper edges of the rails provide supports for the ends of the envelopes when the vacuum is released in the cylinder, substantially as at the time the envelope is engaged by a pressure roller 10 that cooperates with the cylinder 6 in moving the envelope along the rails and into position for the rear edge thereof to be engaged by pins 11 on chains 12, which act to carry the envelope along the rails and to discharge the envelope between pressure rollers 13, and that release the envelope from the pins 11 and continue the advance of the envelope. The conveyor chains 12 have upper runs positioned alongside the respective rails and operate over sprockets 14 and 15 that are carried on horizontal shafts 16 and 17. The shaft 16 is driven, as shown in

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the patent, by means of a motor through a driving connection designated by the chain 18. The driving connection is illustrated in detail in the above mentioned patent, but specifically forms no part of the present invention, the point being that the conveyor chains are in continuous motion to convey the envelopes in timed relation with the printing mechanism.

The withdrawal cylinder 6 is similarly driven through a chain 19 that operates over a sprocket 20 on the shaft 21 of the withdrawal cylinder, as best shown in Fig. 5. While the envelope is being moved along the rails, the side edges thereof are engaged between guide rails 22 (Fig. 4) to register the envelope in a sidewise direction with respect to the plate on the printing cylinder 23. The envelope is registered in timed relation with rotation of the printing cylinder by the relative position of the pins 10 to the printing plate as is described in the patent.

A positive contact of the envelope is maintained with the pins through a brush 24 that bears on the envelope. As the gripping rollers 13 are released from engagement with the envelope, the envelope is engaged on the opposite side of the printing cylinder 23 by pressure rollers 25 that cooperate with the impression cylinder 26 of the press in continuing advance of the envelope and holding the registry thereof with the printing plate until the envelope is dropped onto conveyor belts 27 which have their upper runs extending along the top of the table to carry the envelope into contact with an inclined stop 28. The envelopes follow each other in closely spaced apart relation until they are discharged onto the conveyor belts 27, which belts are operated at a speed relative to the cylinders 23 and 26 of the printing mechanism so that the envelopes are partially lapped one upon the other as they travel toward the stop 28. In this way the envelopes slide into face-to-face contact when the foremost envelopes slides up the face of the stop 28. The operator, standing alongside of the table, gathers the envelopes from the stop and places them in one of the empty boxes from which unprinted envelopes were taken to supply the stack.

To assure that the desired number of printed envelopes may be placed in each box, for example, every one-hundredth envelope is pushed out of line by an arm 29 which is operated on every hundred revolutions of the printing cylinders or as may be required. The operator then picks up the packs of envelopes between the envelopes which are pushed out of file, and places them in the box. This procedure is followed in like manner until a sufficient number of envelopes are placed in the box to make up the original number.

In addition to filling the boxes with printed envelopes, the operator of the machine must keep the supply of unprinted envelopes in the stack. This requires that the operator move back and forth from the table to the stack. Therefore, in accordance with the present invention, the printing press is equipped with a conveying mechanism 30 to facilitate handling of the envelopes by the operator while stationed at the delivery table. In carrying out the present invention the envelope conveying or handling mechanism includes an upper table 31 on which the unprinted envelopes are placed and carried to the withdrawal cylinder, as now to be described.

The table 31 includes spaced apart longitudinal members 32 and 33 that are supported at one end by the delivery end of the table 5. The members 32 and 33 extend across the top of the printing mechanism and terminate forwardly from the withdrawal cylinder where they are connected with downwardly curved side arms 34 and 35 having ends 36 thereof that are attached to side members 37 and 38 of the frame which supports the withdrawal cylinder, the ends being attached by fastening devices 39. The opposite ends of the longitudinal members 32 and 33 are connected by a cross member 40 and are supported on arms 41 and 42 which

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are pivotally connected therewith by fastening devices 43. The lower ends of the arms 41 and 42 curve under the end of the delivery table and are pivotally connected as at 44 with arms 45 projecting from a cross shaft 46 having its ends journaled in legs 47 that support the end of the delivery table 5. The arms 45 are fixed in an adjusted position by a plate 48 fixed to the end of the cross shaft 46 and which is adapted to be clamped to one of the legs 47 by means of a bolt 49. The bolt 49 extends through an arcuate slot 50 in the plate and when tightened results in holding the table 31 at a height suitable to the convenience of the operator. The longitudinal members carry a table top 51 that extends in a fore and aft direction, from the cross member 40 to the juncture of the longitudinal members 32 and 33 with the downwardly curved arms 34 and 35. The connection of the longitudinal members 37 and 38 with the forward end of curved arms 34 and 35 is by brackets 52 and 53 rigidly fixed to the ends of the members 32 and 33. The brackets have ears which are secured to the curved arms by bolts 54.

Slidable under the outer end of the upper table is a yoke 55 that is movable to and from the cross member 40 by means of adjusting screws 56 to carry a shaft 57. The shaft 57 has the ends thereof freely journaled in arms 58 and 59 of the yoke 55. Carried on the shaft 57 is a pair of pulleys 60 that cooperate with similar pairs of pulleys 61 to carry endless belts 62 and 63 having upper runs 64 thereof extending along the upper surface of the table top. The pair of pulleys 61 are carried on a driving shaft 65 which has its ends journaled in bearings 66 carried by the brackets 52 and 53 (Fig. 7).

Therefore, when the unprinted envelopes are placed on the upper table with edges thereof bearing upon the runs 64 of the belts 62 and 63, they are carried thereby along the table in the direction of the withdrawal cylinder 6. In order to guide the envelopes with the sides thereof in registry, the table 51 carries side guides 67 and 68. The guides 67 and 68 preferably comprise angles, each having one flange arranged vertically to engage the sides of the envelopes and the other flanges turned outwardly for support on pairs of links 69—70 and 71—72. The links are fixed to swing on the longitudinal members 32 and 33 of the table by fastening devices such as bolts 73. The opposite ends of the links are pivotally connected with outwardly extending flanges of the guide rails by bolts 74 that extend through the flanges of the guide rails and through the ends of the links, as best shown in Fig. 3. To retain the guide rails in adjusted position relative to the envelopes, the bolts 74 carry coil springs 75 that press against the upper faces of the flanges of the guide rails and against washers 76 that are backed by nuts 77 on the bolts to exert sufficient frictional pressure between the flange of the guide rails and the links to retain the guide rails in adjusted spaced apart relation. The guide 68 extends the full length of the upper table 51 to form a back stop whereby the operator automatically centers the envelopes on the upper runs of the belts. The guide 67, however, begins short of the operator's station to avoid interference with placement of the envelopes on the belts. The unprinted envelopes on reaching the end of the table are shifted onto downwardly curved supports 78 and 78', now to be described.

Extending from the side frames 37 and 38 of the printing press is a horizontal frame 80 and mounted on this frame are foot portions 81 of the supports 78 and 78'. The foot portions 81 are slotted and fixed to the frame 80 by bolts 82 that extend through the slots and into the supporting frame therefor, whereby the supports are adjusted to and from fixed guides 83, later described. The upper ends of the curved supports have terminals 84 extending along the sides of the upper runs of the belts to facilitate movement of the envelopes from the belts to the supports. The guides 83 are curved to cooperate with the curved supports to pass the envelope therebe-

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tween. The guides 83 are carried on a cross bar 85 which has its ends carried by the side members 37 and 38 which support the withdrawal cylinder. The rear edges of the envelopes are supported on downwardly sloping fingers 79 that are adjustable in a vertical direction on the guides 78 and 78', as shown in Fig. 4.

To facilitate control of the downward feed of the envelopes and to hold back the envelopes while an envelope is being withdrawn by the withdrawal cylinder, the cross bar 85 also carries a bracket 86 for attaching a vertical control member 87 which carries a rubber strip 88 having a terminal 89 curving downwardly and rearwardly in bearing contact with the surface of the withdrawal cylinder. The bracket 86 has laterally directed ears 90 to support an adjusting screw 91 which passes through a lug 92 on the control member 87, so that the curvature of the rubber terminal and the pressure thereof on the face of the withdrawal cylinder may be changed to assure withdrawal of a single envelope, while the other envelopes are retained between the curved supports and outer curved guides.

To relieve the weight of the upper envelopes from the lower envelopes, the frame 80 carries a bracket 94 which is adjustably mounted thereon to position an arm 95 that depends therefrom. The arm 95 has a projecting end 96 to engage between and support the upper envelopes in the stack from bearing upon the envelopes immediately over the withdrawal cylinder 6 (Fig. 4). The arm 95 is adjusted by a screw 97, which is carried by the bracket 94 and bears against the arm 95.

Pivotally supported from the bar 85 are depending arms 99 which carry a cross bar 100. Adjustably supported on the cross bar 100 are arcuate guides 101 which cooperate with the cylindrical face of the withdrawal cylinder in providing the pass 8 previously referred to. The envelopes are kept in aligning registry in a sidewise direction by vertical rods 102 and 103 that are mounted on the sides of the frame 80.

To effect an orderly progress of the envelopes as they move from the horizontal table to the withdrawal cylinder, the table top 51 carries means 104' for raising the envelopes slightly as they pass thereover. This means effects loosening of the contact between the envelopes so that they better adjust themselves to the curvature of the guides. Means is also provided for applying a resilient pressure to side and outer edges of the envelopes to hold the envelopes in file, but which yields to permit a slight outward bulging of the file of envelopes under certain conditions as they round the curvature of the guides, as now to be described.

Extending upwardly from the arms 34 and 35 at the sides of the delivery end of the upper table 31 are plates 104 and 105 that extend upwardly above the file of envelopes and carry a rod 106 therebetween, the ends of the rod being fixed in the plates by cap screws 107. Loosely mounted on the midportion of the rod 106 between collars 108 is a bracket 109 (Fig. 2). Fixed to the bracket 109 and extending forwardly and downwardly over the upper edges of the envelopes is a resilient arcuate band 110 which has its lower end registering with the control member 87, as best shown in Figs. 2 and 4.

Pressure is applied to the side edges of the envelopes by means of resilient extensions 111 and 112 that are attached to the ends of the side guides 67 and 68, previously described.

Since the feed of envelopes by the withdrawal cylinder is of necessity an intermittent operation, the present invention contemplates a corresponding intermittent, or step by step, operation of the conveyor belts 62 and 63 which feed the envelopes along the length of the upper table 31 and apply pressure to the rounding file of envelopes, thereby assuring movement of the envelopes into feeding contact with the withdrawal cylinder 6. This is accomplished by means of an intermittent drive for the shaft 65, as now to be described.

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Fixed to one end of the shaft 65 is a ratchet wheel 113 having peripheral teeth 114. Oscillatable on the shaft 65 between the ratchet wheel and the longitudinal member 33 is a bell crank lever 115 having one ear 116 carrying a pawl 117 (Figs. 5 and 6), the pawl 117 being pivotally mounted on a stud 118 that is supported in the ear 116. The other ear 119 of the bell crank is connected as at 120 with a link 121. The opposite end of the link 121 is pivotally connected as at 122 with an arm 123 of a bell crank 124. The other arm 125 of the bell crank is connected by a bar 126 with a cam lever 127 of an actuating mechanism (Figs. 4, 5, 8, 9 and 10), which is mounted on the side member 37 of the press frame at a point below the withdrawal cylinder 6 and in a position to be driven from the shaft 15 of the pin conveyor chains 12. The cam lever 127 is pivotally connected with the frame as at 128 and the free end is connected with the depending end of the bar 126 by a bolt 129, as best shown in Figs. 5 and 9. The cam lever 127 carries a cam follower in the form of a roller 130 that is rotatably mounted on a stud 131 which projects laterally from the cam lever, as best shown in Fig. 10.

Rotatably mounted on a stud 132 that projects from the frame at a point above the cam follower is a cam 133 and fixed in driving relation with the cam is a gear 134. The cam lever 127 is yieldingly retained with the cam follower 130 in contact with the periphery of the cam 133 by a coil spring 135 having one end fixed to a pin 136 that projects from one side of the cam lever and the other end connected with a lug 137 that is fixed to the frame at a point above the gear 134, as shown in Fig. 5. Also carried by the frame is a stub shaft 138 and rotatably thereon in meshing relation with the teeth of the gear 134 is a pinion gear 139. Fixed in driving relation with the pinion gear 139 is a sprocket 140 which is driven from a sprocket 141 on the conveyor shaft by means of a chain 142 operating over the respective sprockets.

It is thus obvious that actuation of the pin conveyor chains also effects rotation of the cam 133 to oscillate the cam lever 127 and rock the bell cranks 124 and 114 through the rod 126 and link 121, so that when the cam 133 moves the cam lever in a downward direction, the spring 135 stretches and the pawl 117 is carried in a clockwise direction, Fig. 5, to effect a step rotation of the ratchet wheel 113 and an advance of the conveyor belts 62 and 63. When the spring 135 contracts, the cam lever is raised thereby and the pawl 117 is returned to its original position for engaging another tooth of the ratchet wheel on the next revolution of the cam, consequently as the envelopes are withdrawn by the withdrawal cylinder 6 and carried toward the printing mechanism by the pin conveyor, corresponding movements are applied to the unprinted envelopes on the conveyor belts 62 and 63 to maintain a supply of envelopes in the arcuate portion of the file of envelopes.

In order to control movement of the envelopes to the withdrawal cylinder at a rate for maintaining a desired pressure on the portion of the file of envelopes directly above the withdrawal cylinder, means is provided for starting and stopping the step by step feed of the envelopes. Oscillatably journaled in the plate extension 104 is a shaft 144 which carries an arm 145 that curves over the rod 106 and which carries an envelope contacting member, which in the illustrated instance is a wheel 146. Fixed on the end of the shaft at the outer side of the extension plate 104 is a lever 147 in the form of a segment in order to provide room for an arcuate scale indicated at 148. Also mounted on the end of the shaft between the lever 147 and the plate 104 is a lever 149 which projects beyond the arcuate edge of the lever 147 and carries a pointer 150 to move over the scale 148. The lever 149 is adjustably secured to the lever 127 by means of a screw 151 having the shank thereof extending through an arcuate slot 153 in the lever 147 and into

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a threaded opening of the lever 149 so that the head thereof will draw a washer 154 in clamping contact with the outer side of the lever 147 and the lever 149 into contact with the inner face of the lever 147.

By setting the lever 149 relatively to the scale 148 and tightening the screw 151, the levers operate as a unit when the wheel 146 moves up and down responsive to radial or outward bulging of the rounding file of envelopes, as previously referred to. The lever 149 terminates in an ear 155 that engages a roller 156 on an actuating arm 157 of a microswitch 158. The microswitch 158 is mounted on the plate 104 with the roller 156 thereof in position to be engaged by the ear 155 of the lever 149, so that the lever 149 depresses the arm 157 of the switch 158 when the file of envelopes follows the arcuate guides 78 and 78', but should the feed of envelopes become too great in proportion to withdrawal thereof by the cylinder 6, the file of envelopes will bulge outwardly against the yieldable guide band 110 to raise the roller 146, rock the shaft 144, and move the ear 155 out of contact with the roller 156 of the microswitch 158. The microswitch 158 is connected in circuit with an electromagnet 159 which is adjustably mounted on a bracket 160 that is carried on the frame of the press at a point below the cam lever 127, as best shown in Figs. 5, 8 and 9. The electromagnet 159 has an armature or plunger 161 that is connected by a pin 162 with an arm 163. The arm 163 is loosely supported on a rock shaft 164 that projects laterally from the bracket 160 (Fig. 8) and carries a latch 165 which is connected with the arm 163 by interfitting lugs 163'. The lugs on the arm 163 and those of the latch have a loose fit to allow slight movement of the latch 165 in a clockwise direction (Figs. 8 and 9) in opposition to a spring 168. The latch 165 has a hook portion 166 which engages over a pin 167 that projects from the side of the cam lever. The latch is normally retained in a retracted position by the weight of the plunger 161 of the electromagnet 159, so as to permit continued operation of the cam lever 127 for step by step movement of the envelopes. However, when the arm 145 is lifted, the roller, of the microswitch 159 is released and a circuit is closed through the electromagnet 159. Energization of the electromagnet lifts the plunger 161 to rock the lever 163, and because of the lug connection 163' the latch lever 165 is rocked in a counter clockwise direction (Fig. 9) and into position to engage the pin 167. The spring 168 is fixed at one end to the arm 163 and the other end is fixed to a screw 169 carried by a tail portion 170 of the latch 165. If the cam lever is moving upwardly the hook 166 of the latch 165 may miss the pin 167, but on the downward movement the pin 167 will engage the sloping end of the latch, to cam it in a clockwise direction sufficient to permit passing of the pin. This movement of the latch is possible because of the loose fit between the connecting lugs 163'. As soon as the pin has passed the hooked end of the latch the spring 168 snaps the hook 166 over the pin 167 to hold down the cam lever until the microswitch again opens the circuit to the electromagnet.

The shaft 65 is preferably provided with a hand wheel 171 whereby the conveyor belts may be manipulated by hand independently of the ratchet mechanism, as when charging the feeding mechanism with unprinted envelopes or otherwise adjusting the file of envelopes supplied to the feeding mechanism of the printing press. A weighted back stop is used upon the belts 62 and 63 of the conveyor to back the envelopes and assure positive movement thereof.

The apparatus constructed and assembled as described is operated as follows:

It is first necessary to initially fill the file of unprinted envelopes from the point of the withdrawal cylinder 6 position on the upper table adjacent the operator's station. This is accomplished by lifting the arcuate band 110 and swinging it backwardly on the shaft 106. The arm

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145 is also lifted and swung backwardly to clear the space between the extensions 111 and 112 of the longitudinal guides 67 and 68. This leaves the space open for insertion of the envelopes and to facilitate adjustments to the size of the envelopes. The guides 78 and 78' are then adjusted on the frame 80 to space them from the outer curved guides 83 in accordance with the size of the unprinted envelopes to be run through the press. The longitudinal guides 67 and 68 are then adjusted to and from each other in accordance with the width of the envelopes to be run. This is easily effected by swinging of the links that support them and the links assure parallelism of the guides at all times. After these adjustments, envelopes are placed by hand in the space between the resilient extensions 111 and 112 from where they are moved downwardly into the space between the guides 83 and 78—78' until the face of the foremost envelope rests with one marginal edge upon the periphery of the withdrawal cylinder 6 and the opposite marginal edge rests upon the supports 79, as shown in Fig. 4. The finger 96 is adjusted to relieve the pressure of the upper envelopes in the file of envelopes from the envelopes immediately over the withdrawal cylinder 6. The file of envelopes is continued up the arcuate guides 78—78' and onto the belts 62 and 63 up to the end of the side guide 67. The arcuate guide or retainer 110 is then returned to a position resting upon the outer edges of the rounding portion of the file of envelopes to hold the envelopes yieldingly upon the guides 78—78' and to maintain the normal curvature of the file. The arm 145 is returned to its original position where the roller 146 bears on the outer edges of the envelopes to rise and fall with any outward movement or bulging of the file of envelopes to control the microswitch. The screw 151 is loosened and the arm is adjusted relatively to the arm 147 so as to maintain normal contact with the roller 156 of the microswitch 158, as best shown in Figs. 1 and 4. When this adjustment is made, the screw 151 is retightened so that the levers 147 and 149 are connected to move as a unit. When the last of the envelopes is in place on the belts 62 and 63, a back stop 172 is placed upon the belts and moved against the envelopes.

When the press is in operation, the withdrawal cylinder 6 removes the envelopes from the bottom of the file; one at a time, and carries them into position on the rails 9, where they are advanced into position to be picked up by the pins 11 on the conveyor chains 12. The envelopes are registered on the rails 9 in both transverse and forward directions and delivered to the pressure rolls 13, which start them through the printing mechanism and between the printing and impression cylinders 23 and 26 to effect printing thereon, all described in the above mentioned patent. As an envelope is released by the rollers 13, the forward portion, upon emerging from the printing cylinder, is engaged by a pressure roller 25 which cooperates with the impression cylinder in continuing withdrawal of the envelope and discharge of the envelope onto the belts 27 of the delivery conveyor. The envelopes are now carried on the belts along the delivery table at a slower rate of speed so that they are partially overlapped, as shown in Fig. 1, and are ultimately gathered into a stack for repacking in the boxes from which unprinted envelopes were originally removed. A count is maintained of the envelopes to be placed in the boxes by the operator noting the envelopes which are pushed out of line by the arm 29. For example, the arm 29 may be set so that every hundredth envelope is deflected. This is most convenient because each box usually contains 500 envelopes, although other multiples may be used as desired. When one or more boxes may be filled with printed envelopes, a like number of boxes may be emptied of unprinted envelopes and the unprinted envelopes are placed upon the conveyor belts 22 and 23 of the upper or supply table to keep the supply in keeping with the output of the press. The back stop 172 is removed and replaced at the rear of the new supply of

envelopes to maintain a closed orderly file of unprinted envelopes.

The envelopes are advanced along the upper table and down the guides 78—78' simultaneously with feed of the press by means of the ratchet mechanism, that is, the cam lever 127 is operated by the cam 133, which is driven through the gears 134, 139, sprocket, 140, chain 142 and sprocket 141 from the shaft of the pin conveyor. On each revolution of the cam, the cam lever is moved downwardly through engagement of the cam with the cam follower 130, and the cam lever is lifted through the spring 135. This effects oscillation of the bell crank 115 which carries the ratchet pawl in a back and forth direction through the link connection 126, bell crank 124 and link 125, to move the ratchet wheel 113 and shaft 65 intermittently and effect a step by step advance of the envelopes. The operation continues as long as the operator maintains the supply of unprinted envelopes on the conveyor belts and removes the printed envelopes from the conveyor belt of the delivery table 5.

It is obvious that in the removal and replacement of the envelopes on the conveyor belts of the respective tables, the operator may maintain his station at the side of the delivery table, and there is no necessity of his moving from one end of the press to the other, as in the case of the press which is described in the above mentioned patent.

It may happen that the feed of the envelopes to the withdrawal cylinder may become faster than the rate of withdrawal by the withdrawal cylinder, in which case it becomes necessary to stop the conveyor belts 62 and 63 until the withdrawal cylinder catches up. When this occurs, stopping of the feed is automatic, because the rounding portion of the file of envelopes will be pushed radially away from the guides 78—78'. This change in contour of the file lifts the arm 145 and moves the terminal 155 away from the roller of the microswitch 158. This closes circuit to the electromagnet 159, so that the plunger is actuated to effect movement of the latch 165 into engagement with the pin 167 when the cam 133 moves the cam lever 127 downwardly as above described. The cam lever 127 is then retained by the latch 165 in its lowest position as the cam moves away from the cam follower 130. The cam may then continue to turn, but the cam lever remains inactive and there is no further advance of the envelopes by the ratchet mechanism until the withdrawal of a sufficient number of envelopes by the cylinder 6 to cause the file of envelopes to settle back into normal position upon the arcuate guides 78—78'. When this occurs, the terminal 155 of the lever 149 reengages the roller of the microswitch to open the circuit to the electromagnet 159. The plunger 161 then becomes effective in withdrawing the latch 165 from the pin 167. The cam lever 127 is then freed to maintain contact with the cam 133 under action of the spring 135. The feed continues, as described, until such a time that the feed by the belts 62 and 63 becomes sufficient to again cause bulging of the file of envelopes, whereupon the feed by the ratchet mechanism is again automatically suspended until the removal of the envelopes by the withdrawal cylinder is sufficient to restore the file of unprinted envelopes to its normal position and contour.

From the foregoing it is obvious that I have provided a positive mechanism for maintaining a supply of unprinted envelopes for the withdrawal cylinder of a press of the type disclosed in the above mentioned patent, in such a manner that the operator of the press may remain at the side of the delivery table. The only movement required of the operator is to place unprinted envelopes on the upper table and to remove the printed envelopes from the lower table. This also permits packing the printed envelopes in the boxes emptied of the unprinted envelopes, to better keep the supply of unprinted envelopes in balance with the capacity of the printing press.

What I claim and desire to secure by Letters Patent is:

1. In combination, a printing press for printing envelopes having means for feeding unprinted envelopes individually through the printing press and discharging the printed envelopes from the press, an upper conveying means leading from an operator's station and over the printing press to said feeding means and on which boxed envelopes are emptied from boxes for edgewise support on said conveying means for supplying the printing press with unprinted envelopes, and a lower means connected with the delivery of the printing press for gathering the printed envelopes and conducting the printed envelopes away from the printing press to the operator's station for replacement by the operator in said boxes.

2. In combination, a printing press for printing envelopes having means for feeding unprinted envelopes individually through the printing press and discharging the printed envelopes from the press, an upper conveying means leading from an operator's station and movable over the printing press to said feeding means and on which boxed envelopes are emptied for edgewise support on said conveying means for supplying the printing press with unprinted envelopes, a lower means connected with the delivery of the printing press for gathering the printed envelopes in edgewise support thereon and returning the printed envelopes to the operator's station for replacement by the operator into said boxes, and means for operating said conveying means in timed relation with the feeding means of the printing press.

3. In combination, a printing press for printing envelopes having means for feeding unprinted envelopes individually through the printing press and discharging the printed envelopes, an upper conveying means leading from an operator's station over the printing press to said feeding means and on which boxed envelopes are emptied by the operator for movement in edgewise support to the printing press, a lower means connected with the delivery of the printing press for gathering printed envelopes on edge and conducting the printed envelopes to the operator's station for reboxing thereof, and means for operating said conveying means in timed relation with the feeding means, said conveying means including means for retaining the unprinted envelopes in an orderly file.

4. In combination, a printing press for printing envelopes having means for feeding unprinted envelopes individually through the printing press and discharging the printed envelopes, conveying means leading from an operator's station to said feeding means and on which boxed envelopes are emptied for supplying the printing press with unprinted envelopes, means connected with the delivery of the printing press for gathering printed envelopes and conducting the printed envelopes to the operator's station for reboxing thereof, means for operating said conveying means in timed relation with the feeding means, said conveying means including means for retaining the unprinted envelopes in an orderly file, and means responsive to change in contour of said file for disconnecting said operating means for stopping the conveying means.

5. In combination with a press for printing workpieces, means for feeding the workpieces through the press, a lower delivery table connected with the press for receiving the printed workpieces, means on the delivery table for gathering the printed workpieces together for convenient handling at an operator's station alongside of the delivery table, an upper work supply table in reach of the operator's station for placement of unprinted workpieces thereon, means on the work supply table for conveying the unprinted workpieces on edge in an orderly file, guide means connecting the work supply table with the feeding means for continuing movement of the file of unprinted envelopes to the feeding means, means having a driving connection with the press and connected with the conveying means on the work supply table for operating said conveying means for effecting advance of the

file of workpieces in accordance with the feed of the workpieces by said feeding means.

6. In combination with a press for printing workpieces, means for feeding the workpieces through the press, a delivery table connected with the press for receiving the printed workpieces, means on the delivery table for gathering the printed workpieces together for convenient handling at an operator's station alongside of the delivery table, a work supply table in reach of the operator for placement of unprinted workpieces thereon, means on the work supply table for conveying the unprinted workpieces on edge in an orderly file, guide means connecting the work supply table with the feeding means for continuing movement of the file of unprinted envelopes to the feeding means, means having a driving connection with the press and connected with the conveying means on the work supply table for operating said conveying means, and a ratchet means in said driving means for effecting step by step advance of the file of workpieces in accordance with feed of the workpieces through the press by said feeding means.

7. In combination with a press for printing workpieces, means for feeding the workpieces through the press, a delivery table connected with the press for receiving the printed workpieces, means on the delivery table for gathering the printed workpieces together for convenient handling at an operator's station alongside of the delivery table, a work supply table in reach of the operator for placement of unprinted workpieces thereon, means on the work supply table for conveying the unprinted workpieces on edge in an orderly file, guide means connecting the work supply table with the feeding means for continuing movement of the file of unprinted envelopes to the feeding means, means having a driving connection with the press and connected with the conveying means on the work supply table for operating said conveying means, a ratchet means in said driving means for effecting step by step advance of the file of workpieces in accordance with feeding of the workpieces through the press, means for controlling the ratchet means to stop the workpiece conveying means, a feeler having connection with the ratchet means and adapted to contact the file of envelopes for stopping advance of the envelopes on change in contour of the file of envelopes.

8. In combination with a press for printing workpieces, means for feeding the workpieces through the press, a delivery table connected with the press for receiving the printed workpieces, means on the delivery table for gathering the printed workpieces together for convenient handling at an operator's station alongside of the delivery table, a work supply table over the delivery table and terminating above the feeding means, means on the work supply table for conveying the unprinted workpieces on edge in an orderly file, downwardly curving guide means connecting the conveying means on the work table with the feeding means for continuing movement of the file of unprinted envelopes in an arcuate path to the feeding means, means having a driving connection with the press and connected with the conveying means on the work supply table for operating said conveying means, a means in said driving means for effecting step by step advance of the file of workpieces in accordance with the means for feeding the workpieces through the press, and means responsive to a change in curvature of said file of envelopes while in said means for stopping advance of the workpieces by said driving means.

9. In combination with a printing press for printing envelopes, means for feeding unprinted envelopes through the press including, a withdrawal cylinder for supplying the unprinted envelopes individually to the printing press, a work table for receiving the printed envelopes from the printing press, means on the work table for gathering the printed envelopes, a supply table, means supporting the supply table over the delivery table, guide means connected with the supply table and curving downwardly over

the withdrawal cylinder, conveyor belts having upper runs extending along the supply table for delivering and maintaining a file of envelopes in the downwardly curved guide means to supply the withdrawal cylinder, a resilient and yieldable member extending downwardly over the curving file of envelopes to maintain a normal curvature of the file, driving means having a driving connection with the conveyor belts for effecting advance of the file of envelopes to the withdrawal cylinder, movable means for engaging the curving file of envelopes and adapted to move with change in curvature of the file of envelopes, and means connecting said movable means with said driving means for stopping the conveying means responsive to change in curvature of the file of envelopes.

10. In combination with a printing press for printing envelopes, means for feeding unprinted envelopes through the press including, a withdrawal cylinder for supplying the unprinted envelopes individually to the printing press, a work supply table, means supporting the work supply table above the withdrawal cylinder, guide means connected with the work supply table and curving downwardly over the withdrawal cylinder, conveyor belts having upper runs extending along the supply table for delivering and maintaining a file of envelopes in the downwardly curved guide means to supply the withdrawal cylinder, a resilient and yieldable member extending downwardly over the curving file of envelopes to normally maintain the curvature of the file, means for operating said belts, an arm having pivotal support above the curved guide means and having a part adapted to contact edges of the envelopes, and control means connecting said arm with the said operating means for stopping movement of the belts responsive to movement of said arm upon change in curvature of the file of envelopes to control feed of the envelopes to the withdrawal cylinder.

11. In combination with a printing press for printing envelopes, a withdrawal cylinder for feeding unprinted envelopes individually to the printing press, a supply table, means supporting the supply table above the withdrawal cylinder, guide means in connection with the supply table and curving downwardly over the withdrawal cylinder, a conveyor extending along the supply table for maintaining a file of unprinted envelopes in the downwardly curved guide means to supply the withdrawal cylinder, a resilient member extending downwardly over the curving file of envelopes to maintain a normal curvature of the file, a ratchet having a driving connection with the conveyor for effecting intermittent advance of the unprinted envelopes to the withdrawal cylinder, a cam, a driving connection between the cam and a part of said feeding means for actuating the cam, a cam lever in contact with the cam, means connecting the cam lever with the ratchet means, a latch adapted to engage a part on the cam lever, an electromagnet connected with the latch for withdrawing the latch from engagement with said part of the cam lever, an electric circuit for supplying current to the electromagnet, a switch in said circuit, an arm having pivotal support above the curving of the curved file of envelopes and having a part adapted to contact the envelopes, and means connecting said arm with said switch for actuating the switch to effect release of the latch for engagement of the latch with said part of the cam lever to stop operation of the ratchet when the arm is moved responsive to change from said normal curvature of the file of envelopes to stop feed of the envelopes to the withdrawal cylinder.

12. In an apparatus of the character described, means for feeding unprinted envelopes to a withdrawal cylinder for feeding unprinted envelopes individually to a printing press, a supply table, means supporting the supply table above the withdrawal cylinder, guide means connected with the supply table and curving downwardly over the withdrawal cylinder, a conveyor on the table for delivering a file of envelopes through the downwardly curved guide means to the withdrawal cylinder, a resilient and yieldable member extending downwardly over the curving file

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of envelopes to maintain a substantially normal curvature in the file of envelopes, ratchet means having a driving connection with the conveyor for effecting intermittent advance of the file of envelopes to the withdrawal cylinder, a cam, driving means for actuating the cam, a cam lever in contact with the cam, means connecting the cam lever with the ratchet means, a latch adapted to engage the cam lever, an electromagnet connected with the latch for withdrawing the latch from engagement with the cam lever, an electric current supply for energizing the electromagnet, a switch for controlling the current supply to the electromagnet, an arm having pivotal support above the curved file of envelopes and having a part adapted to contact the envelopes, and means connecting said arm with the switch to actuate the switch for releasing the latch to engage the cam lever and stop operation of the ratchet means when the arm is moved responsive to change in curvature of the file of envelopes to stop feed of the envelopes to the withdrawal cylinder.

13. In an apparatus of the character described, means for feeding unprinted envelopes to a withdrawal cylinder for feeding unprinted envelopes individually to a printing press, a supply table, means supporting the supply table above the withdrawal cylinder, guide means connected with the supply table and curving downwardly over the withdrawal cylinder, a conveyor on the table for delivering a file of envelopes on edge and in face contact to the downwardly curved guide means for progress through the guide means responsive to pressure effected by said conveyor, and means on the table and over which the edges of the envelopes ride for shifting the envelopes to loosen the face to face contact when the envelopes are moved from said table in the guide means.

14. In an apparatus of the character described, means for feeding unprinted envelopes to a withdrawal cylinder for feeding unprinted envelopes individually to a printing press, a supply table, means supporting the supply table above the withdrawal cylinder, inner and outer guides curving downwardly over the withdrawal cylinder, a conveyor on the table for delivering a file of envelopes between the downwardly curved guide means to the withdrawal cylinder, spaced apart side guides, paral-

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lel links connecting the side guides with the table for contact with side edges of the envelopes, and extensions carried by the side guides and having portions curving downwardly to cooperate with the inner and outer guides in directing the file of envelopes to the withdrawal cylinder.

15. In an apparatus of the character described, means for feeding unprinted envelopes to a withdrawal cylinder for feeding unprinted envelopes individually to a printing press, a supply table, means supporting the supply table above the withdrawal cylinder, guide means connected with the supply table and curving downwardly over the withdrawal cylinder, a conveyor on the table for delivering a file of envelopes through the downwardly curved guide means to the withdrawal cylinder, and a resilient member extending downwardly over the curving file of envelopes to maintain a substantially normal curvature in the file of envelopes.

16. In an apparatus of the character described, means for feeding unprinted envelopes to a withdrawal cylinder for feeding unprinted envelopes individually to a printing press, a supply table, means supporting the supply table above the withdrawal cylinder, guide means connected with the supply table and curving downwardly over the withdrawal cylinder, a conveyor on the table for delivering a file of envelopes through the downwardly curved guide means to the withdrawal cylinder, means for actuating the conveyor, a resilient member extending downwardly over the curving file of envelopes to maintain a substantially normal curvature in the file of envelopes, and means responsive to change in curvature of said file of envelopes for controlling the conveyor actuating means.

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