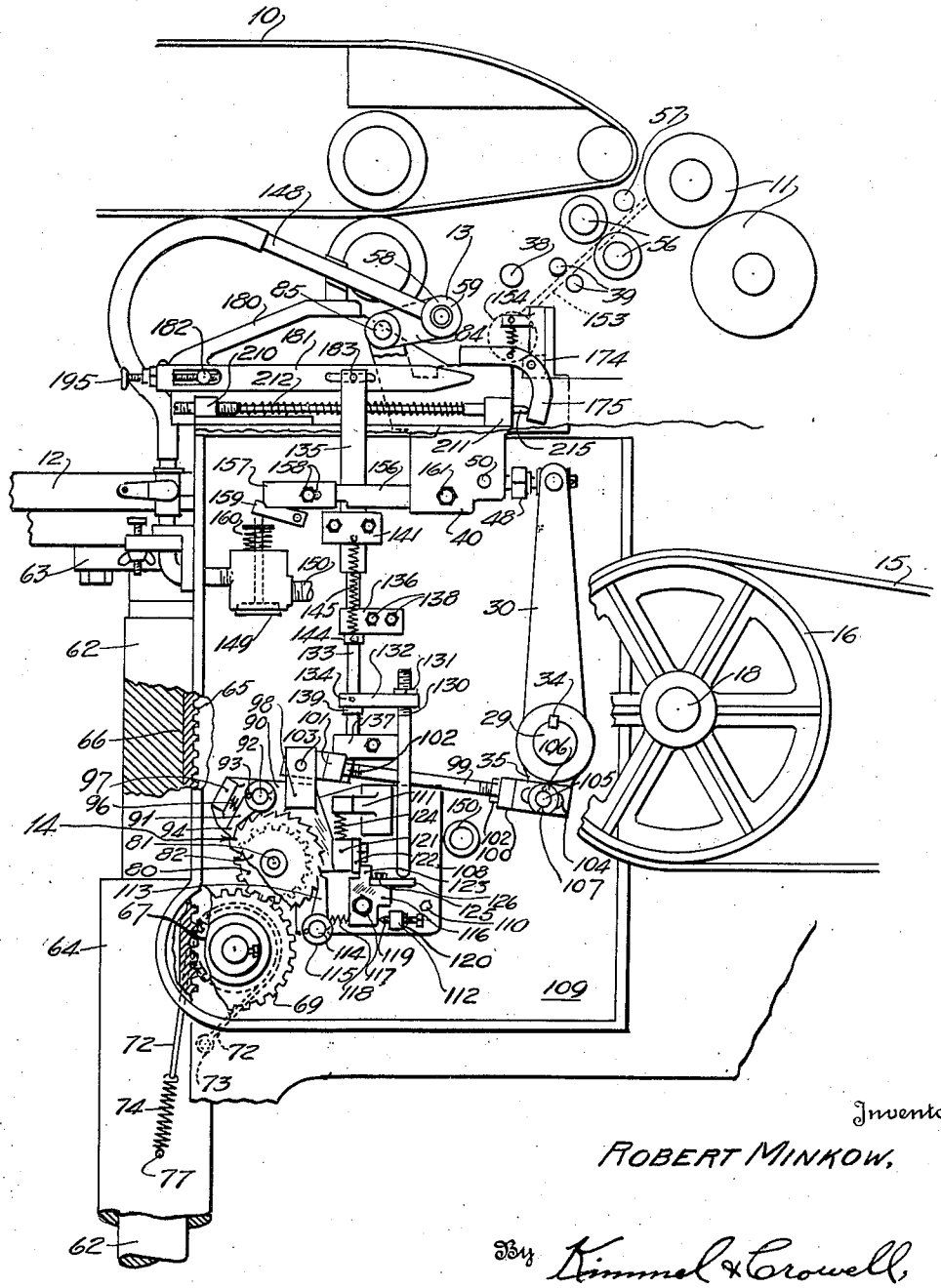
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GLUING MACHINE CONTROL

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Fig. 1.



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Fig. 2.

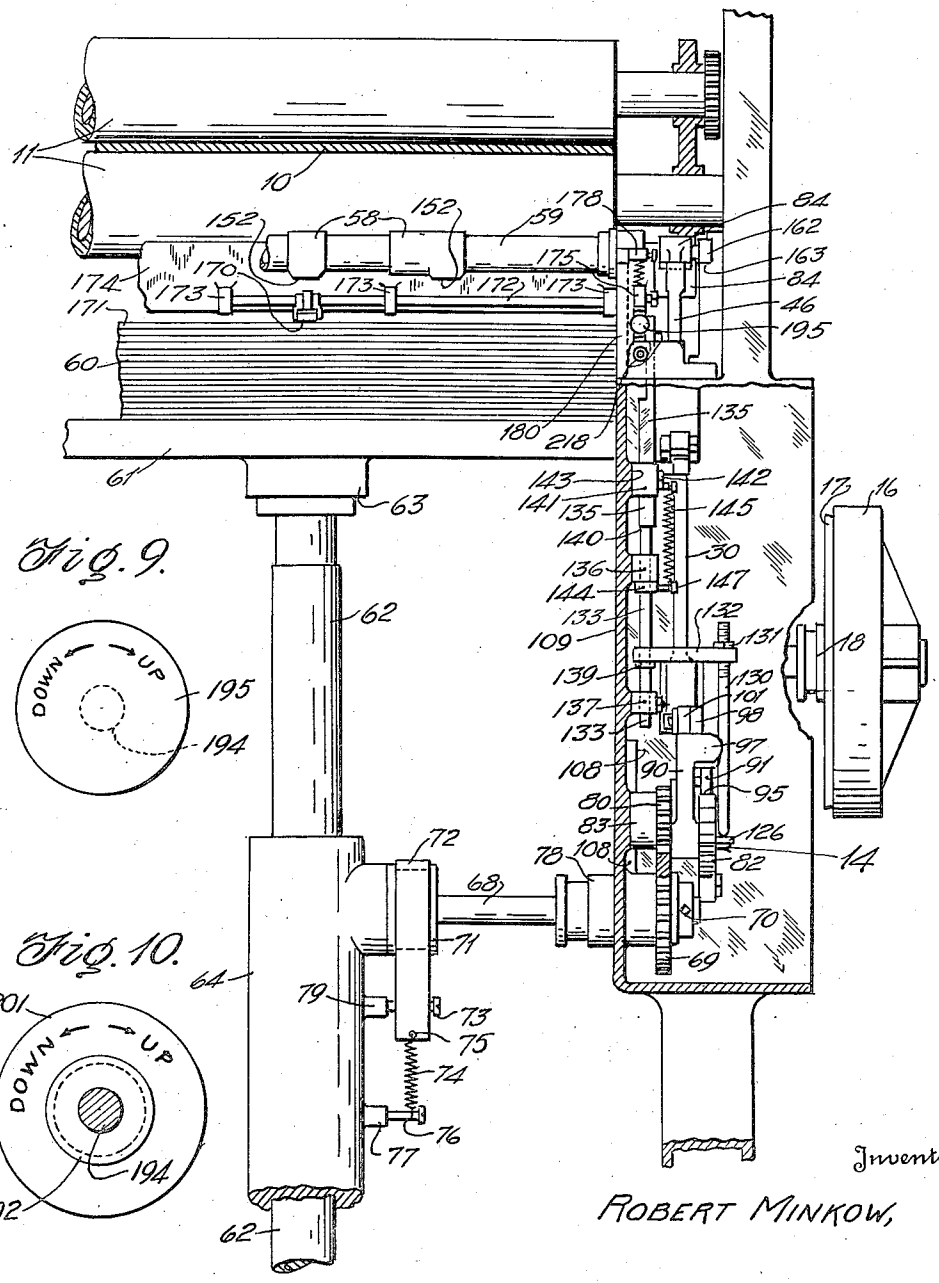


Fig. 9.

Fig. 10.

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Fig. 3

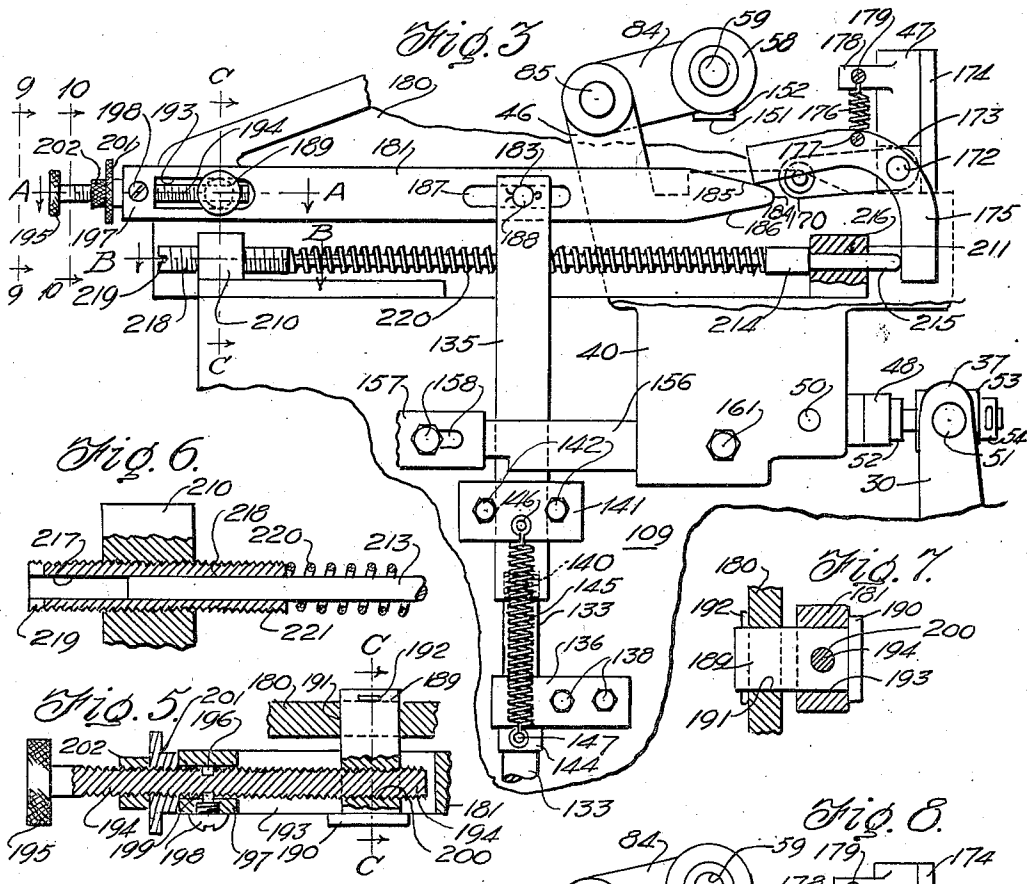


Fig. 6.

Fig. 5.

Fig. 7.

Fig. 4.

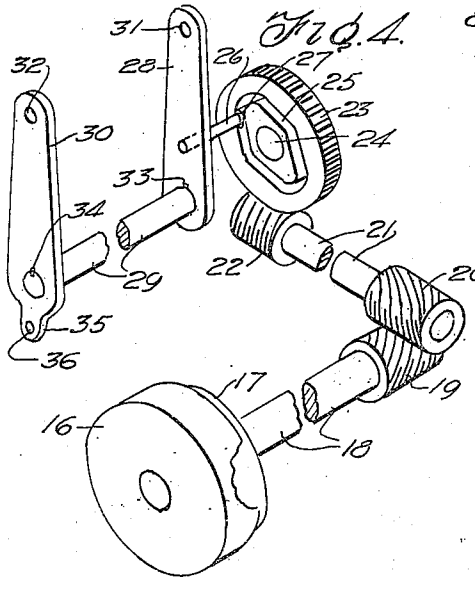
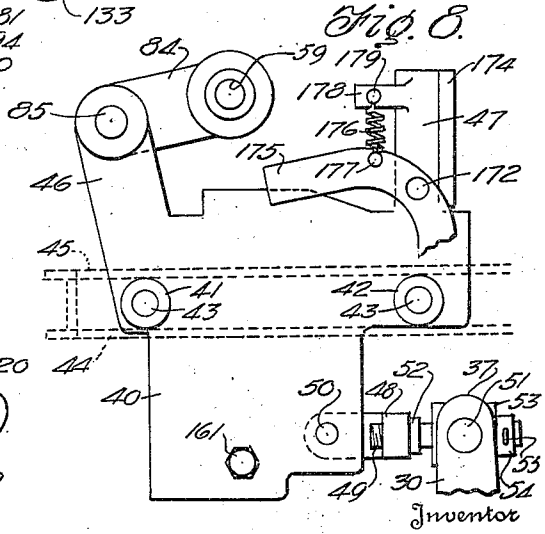


Fig. 8.



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UNITED STATES PATENT OFFICE

2,150,124

GLUING MACHINE CONTROL

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Application September 3, 1937, Serial No. 162,364

11 Claims. (Cl. 271—62)

This invention relates to sheet-feeding mechanism for feeding sheets of material for any suitable purpose and more particularly for feeding in succession sheets of paper or the like to machines for applying adhesive to the sheets.

One object of this invention is to provide a sheet-feeding mechanism. Another object is to provide means for adjusting the machine without stopping it. A further object is to provide means for accurately adjusting the mechanism. Another object is to provide a new and improved sheet-feeding mechanism. A further object is to provide improved automatic means for moving sheets toward the sheet-removing mechanism. A further object is to provide an improved sheet-feeding mechanism which automatically moves the sheets toward the sheet-removing means in response to a decrease in the number of sheets in a stack.

Another object is to automatically feed the sheets in succession to the sheet-removing means. Another object is to provide a sheet-feeding mechanism which is adjustable. A further object is to provide a sheet-feeding mechanism in which the adjustments are readily accessible from the exterior of the machine. Another object is to provide means for adjusting the automatic feeding of the sheets in response to the removal of a definite number of sheets from the stack.

Another object is to provide means for adjustably varying the distance through which the sheet-carrying table is automatically moved. A further object is to provide a sheet-feeding mechanism having fewer parts than have heretofore been deemed necessary. Another object is to provide mechanism of the class described which is more readily fabricated. A further object is to arrange the mechanism in such a manner as to develop increased moment arms throughout the parts. Another object is to provide automatic resetting means free of cam elements. Other objects and advantages of this invention will appear from the following description when taken in connection with the accompanying drawings. In accordance with this invention, the various objects and advantages have been attained by providing a sheet-feeding mechanism comprising a removable support for a stack of sheets, means for removing sheets from the stack, means for automatically moving the support toward the sheet removing means in response to a decrease in the number of sheets in the stack, and adjusting means operable without stopping the machine.

In the drawings wherein like numerals are used to designate corresponding parts in the various figures, Fig. 1 is a side elevation partly in section and partly broken away showing a sheet-feeding mechanism incorporating features of this invention. Fig. 2 is a front elevation partly in section showing the mechanism of Fig. 1. Fig. 3 is a partial side elevation on an enlarged scale showing some of the important features of the feeding mechanism. Fig. 4 is a view partly in perspective showing the power drive for the mechanism. Fig. 5 is an enlarged detail showing in cross section that portion of the machine on the line A—A of Fig. 3. Fig. 6 is an enlarged view on the line B—B of Fig. 3. Fig. 7 is an enlarged cross section on the line C—C in Fig. 5. Fig. 8 is an enlarged view of a portion of the carriage mechanism. Figs. 9 and 10 are views on lines 9—9 and 10—10 respectively of Fig. 3.

The features of this invention have been applied to a mechanism including a conveyor system 10, an adhesive applying mechanism 11, a sheet-stack supporting table 12, sheet-removing mechanism 13, table feeding mechanism 14, and a source of power 15.

In the normal operation of the machine a stack of sheets of paper or other material is placed upon the table 12 and the mechanism 13 removes one sheet at a time from the stack and feeds it up into the glue applying means 11 after which the sheet, to which the glue or other adhesive has been applied, is fed on to the conveyor system 10. After a definite number of sheets of material have been removed by the mechanism 13 the table feeding mechanism 14 is operatively connected to the power drive 15 by automatic means so as to again raise the stack of sheets into position such that the uppermost sheet will be in proper position for the mechanism 13 to continue its cycle of operations.

The motive power is normally applied by a belt 15 or other device to the apparatus so that the parts 10, 11 and 13 are normally operating. The power drive is arranged to raise the table through the intermediation of the mechanism 14 to thereby elevate the stack of sheets. This periodic or intermittent feeding of the table is controlled by the interrelated and coordinated parts of the apparatus hereinafter more specifically described. The belt 15 extends about the periphery of the driving pulley 16 which latter is provided with an internal, transversely tapering clutch surface. The outer friction surface of the other member 17 of the friction clutch is arranged to be moved into engagement with the

inner surface of the pulley 16 by means of a clutch shifting lever which is manually operable but which is not shown. The clutch member 17 is keyed to a shaft 18 extending transversely across the machine which carries a spiral drive gear 19 at its opposite end. A spiral gear 20 carried at one end of a stub shaft 21 meshes with the gear 19 and is driven thereby. At the opposite end of the stub shaft 21 is carried a worm gear 22 which is arranged to drive the worm wheel 23, carried on a stub shaft 24, and having an operating cam 25 in one of its faces.

A carriage operating cam roller stud 26 having a cam roller 27 is mounted to ride in the cam groove 25. The stud is carried upon the carriage operating lever 28 which latter is keyed to the shaft 29. The cam thereby causes the carriage operating levers 28 and 30 to oscillate about the axis of the shaft 29. By means of the openings 31 and 32 at the upper ends of the levers suitable mechanism hereinafter more fully described, is attached to the levers so as to transmit the movement thereof to the carriage. Levers are keyed on the shaft as at 33 and 34. The lever 30 extends upwardly from the shaft 29 and has a further lever arm portion 35 having a suitable bore 36. The upper part 37 of this lever is the carriage operating arm thereof and the lower part 35 is the table feed actuating arm thereof.

The feed roll mechanism is carried upon a carriage the latter being composed of carriage plates, riding upon channel section tracks at each side of the machine, interconnected by the necessary structural members. The right hand carriage plate 40 is provided with the carriage rollers 41 and 42 each of which is carried upon a stud shaft 43. The stud shafts are spaced apart and the rollers 41 and 42 ride in the channel track indicated by the dotted lines 44 and 45. The carriage plate 40 has upwardly extending portions 46 and 47 which may be adjustable relative to each other.

The carriage actuating levers are connected with the plates 40 by the mechanism 48. This mechanism comprises an adjustable link mechanism fastened to the plate by the pin 50 and fastened to the lever 30 by the pin 51. Adjustment for relatively spacing the lever and the plate is accomplished with the threaded member 49 which is threaded into the link portion 48 and locked by the nut 52 which is similarly threaded through the link end portion 53 and locked to it by the nut 54, the latter can be held in place by the cotter pin 55. It is now readily understood that as a result of the oscillating movement of the lever about its shaft, a reciprocating movement is imparted to the plate 40 which rides back and forth on its rollers in the channel track 44.

The sheets 60, which may be paper or other material are stacked upon the feed table 61 and supported thereon in such a manner that they may be readily removed by the sheet-removing mechanism. The table is then secured to and supported upon the shaft 62 by means of any suitable connecting structure 63. The shaft is arranged to ride within the feed table housing 64. The shaft carries a rack 65 by means of which the table may be raised when a definite number of sheets have been removed from the stack. The rack, of course, is usually a separate element 66 fastened to the shaft 62. The rack is actuated by the rack pinion 67 carried upon a shaft 68 which latter is driven by means of the gear wheel 69. The gear wheel is secured thereon by the fastening means 70.

A brake drum 71 is carried on the shaft 68 and is arranged to be constantly engaged by the flexible brake shoe or band 72. The shoe is fixedly secured at one end to the stud 73 secured in the boss 79 on housing 64. It is yieldably secured at the other end by a spring 74 which is fastened to the brake band at 75 and to a stud 76. The stud is secured in the boss 77 on the housing 64. The brake mechanism is provided for the purpose of always causing the table to stop quickly as soon as the forward drive is removed. When it is desired to lower the table the clutch mechanism 78 is disengaged by means of an appropriate clutch release arm, not shown, and the table 61 is thereby allowed to drop by gravity to its lowermost position. The clutch mechanism 78 is constructed and arranged similar to the clutch designated 89, 90 shown in Figures 5 and 8 of the patent to Federwitz et al., No. 1,770,483. As soon as the table is in this position the clutch arm is allowed to re-engage so that the machine may again be operated automatically.

The gear 69 is arranged to mesh with the gear 80 carried on the stub shaft 81, supported by the boss 83 of the frame. The shaft carries at its outer end a ratchet wheel 82. The ratchet wheel 82 becomes the means by which the movement of the lower arm of the lever 30 is imparted into the gear train comprising the gears 82, 80, 69 and 67.

A fixed or latch pawl is provided to prevent the ratchet wheel from moving in a clockwise direction as viewed in Fig. 1 and a feed pawl is provided for feeding the ratchet wheel about its shaft 81. The latch pawl is pivoted on the frame of the machine whereas the ratchet pawl is pivoted on a yoke relatively movable about the axis of the ratchet wheel. A ratchet pawl yoke 90 is rotatably carried on the stub shaft 81 between the gear wheel 80 and the ratchet wheel 82. Upon this yoke is supported the ratchet pawl 91 which is rotatably mounted upon a pawl stud 92 and is secured thereon by a cotter pin 93. The end 94 of the ratchet pawl is so shaped as to engage the teeth 95 of the ratchet wheel. A spring 96 interposed between the ratchet pawl 91 and the boss 97 provides the necessary means for yieldably holding the pawl in engagement with the ratchet wheel. A boss 98 is arranged to provide the means to secure the yoke operating push rod to the yoke.

Threadedly engaged at the opposite ends of the push rod 99 is the push rod driving end 100 and the push rod driven end 101. Lock nuts 102 hold the ends firmly fixed to the rod. The driven end 101 is secured to the yoke by means of the pin 103. Both ends of the push rod are substantially L shaped in longitudinal cross section so that they may engage with the appropriate crank arms without interfering with the operation of the parts.

The driving end 100 of the push rod is provided with the elongated slot 104 which, in cooperation with the pin 105, provides a lost motion connection with the lower arm 35 of the lever 30. The pin 105 extends through the slot 104 and the opening 36 and has a washer 106 secured at its outer end by a cotter pin 107. The slot is so arranged that the pin 105 will ride between the two ends without abutting thereagainst when the rod is about in the position shown in Fig. 1. In this way the lever 30 can oscillate about its shaft without imparting any motion to the operating

rod 99. When the mechanism allows the pin 105 to abut against the end of the slot, the rod 99 will be pushed from the right to the left thereby rotating the yoke 90 about the shaft and at the same time rotating the ratchet wheel 82. It is thus observed that the feed mechanism is normally inactive and is only operated in response to the decrease in the number of sheets of material on the table.

A ratchet trip bracket 108 provided with bosses 111 and 112 is secured to the frame 109 by appropriate holdfast means 110. The locking pawl 113 is pivotally supported on this bracket by the stud shaft 114 to which the pawl is fastened by the cotter pin 115. A trip pawl 116 is pivotally supported on the bracket by means of the stud 117 having a hexagonal head portion at one end and a threaded portion at the other end and secured in a boss on the bracket member. Interposed between the fixed pawl 113 and this trip pawl 116 is the spring 118 which serves two purposes: First, it holds the pawl 113 at all times in engagement with the ratchet gear teeth. Secondly, it urges the trip pawl 116 in a counter-clockwise direction about its axis. The adjustable pin 119 is locked at 120 in the boss 112 and is so arranged as to regulate the degree of movement which must be imparted to the trip pawl before the latter will release the ratchet yoke.

The boss 121 on the ratchet yoke has a removable plate 122 which is arranged to abut against an extending flange 123 of the trip pawl. The dimensions of the plate 122 can be varied so as to require different degrees of movement to release plate 122 from the boss 123. The yoke 90 is continuously urged to rotate in a clockwise direction by means of the spring 124 interposed between the boss 111 on the bracket 108 and the boss 121 on the yoke 90. It will now be understood that so long as the plate 122 is latched behind the flange 123 movement of the lever 30 will not be imparted to the ratchet yoke. The positioning of the parts as just described requires the pawl 116 to be rotated about 30 degrees in a counter-clockwise direction. Then the flange 123 will be under the plate 122. In Fig. 1 it has been released and has not been reset.

As heretofore described, the ratchet feed will only operate when the trip pawl 116 has been operated thereby placing the feed mechanism in operative engagement with the lever 30. A trip plate 126 is secured by the bolt 125 to the trip pawl.

The trip pin 130 is the means by which the pawl 116 is actuated to release the yoke 90 and allow it to rotate in a clockwise direction until the slot 104 engages the pin 105. The trip pin 130 is fastened at 131 to the arm 132 which in turn is fastened to the shaft 133 by the set screw 134. Pin 130 is threadedly secured in 132 and locked by nut 131. Shaft 133 is threadedly secured at its upper end 140 into the lower end trip plunger 135 and is slidably supported in the bearing blocks 136 and 137. The latter are fastened on the frame 109 by the bolts 138. The arm 132 on the shaft 133 is limited in movement by the collar 139. The plunger 135 is centered by a bearing block 141 secured to the frame 109 by the bolts 142, the bearing block being supported on the boss 143. A spring 145 is secured to the bearing block 141 by means of the pin 146 and is secured at its opposite end by a pin 147 secured to the collar 144 which latter is fast on the shaft 133.

Carriage 40 in its reciprocating movement on the machine accomplishes the consecutive removal of each sheet of material from the pile of the sheets supported on the table 12 and causes each sheet to be fed into the series of feed rolls 38, 39, 56 and 57 some of which are idler rolls and others of which are driven rolls. The operation and arrangement of these rolls is well known in the art and need not be fully described.

The suction rolls 58 are mounted upon a hollow shaft 59 which is carried by the links 84 pivotally connected by the pins 85 to the upwardly extending arm 46 of the carriage. An air line 148 is connected by means of a hollow collar to the shaft 59 and at its opposite end to the valve 149. The valve is placed in communication with a vacuum pump by means of appropriate connections secured to the ports 150 and 150'. Each one of the rollers 58 has a suction port 151 in the boss 152 thereon. The end of the hollow shaft is provided with rollers 162 (or gear wheels) arranged to ride upon an angularly upwardly extending runway 163 which may be in the form of a track (or a rack) upon which the wheels or rollers 162 may rotate. The rotation imparted to the shaft as well as the angularly directed rising and falling of the same allows the suction ports 151 to engage the surface of a sheet and to pick it up as a result of the vacuum. The sheet is thereby fed into the position shown by dotted lines at 153 in Fig. 1 from which it continues upwardly between the rollers 56 and has adhesive material applied to one surface by the roller 11.

The oscillation of the shaft 59 about its axis is the result of the movement imparted by the angular runway 163 resulting from the reciprocating movement of the carriage 40. As the roll 58 raises the sheet the movable roller 154 supported by suitable bearings on a shaft on the arms 47 engages the sheet between itself and another roller which is fixed on the frame of the machine. The two rollers feed the sheet into the series of rolls.

Each time the arm 30 oscillates it carries with it the carriage 40 and the arm 155 fastened thereon at the point 161. This arm 155 has an adjustable cam 157 secured thereon by the slotted connection 158. This cam strikes the pawl 159 which in turn operates to open valve 149 against the action of the spring 160 to thereby open the vacuum line to the atmosphere. In this manner the suction on the rolls 58 is terminated and the sheet of material is released from the suction rolls. On the return stroke the spring 160 immediately seats the valve in closed position so that the vacuum is again applied to the suction roll.

For the purpose of actuating the table feed mechanism the sheet engaging roll 170 is arranged so that it can rest upon the top sheet 171 of the stack 60. This roll is fixed on the shaft 172 which latter is supported in bearing blocks 173 carried on the cross plate 174 which is secured to the carriage 40 at each side of the machine. At the outer end of this shaft is secured a bell crank 175. Each time a sheet is removed from the stack, shaft 172 is carried away from the stack of sheets by movement of carriage 40 so as not to interfere with the suction roller lifting the top sheet from the stack. This is shown at 58, 59, 151, 152 in Figure 3 and see Figure 2. As the carriage moves rearwardly the roller 170 again engages the upper sheet of the stack and is in position to actuate the control mechanism if that is necessary.

The bell crank is normally urged to rotate in

a clockwise direction about its shaft by means of a spring 176 which is connected to the bell crank by a pin 177 at one end and to a fixed abutment 178 by means of a pin 179. The abutment 178 is carried on the arm 47 and is an integral part thereof.

The bearing block 180 provides by its outer face a continuation of the wall forming portion 109 of the frame along which the table 61 travels. The opposite wall of the bearing block is provided with several bosses for carrying important parts of the mechanism. The level adjusting bar 181 is pivotally supported on the bearing block at the point 182 and is pivotally connected to the bar 135 at the point 183. By means of adjustments of the bar 181 to be described, the feed mechanism can be operated in accordance with the removal of a definite number of sheets from the stack. The level adjusting bar 181 is tapered at one end 184 having the double tapered surfaces 185 and 186. In this way if one tapered surface of the bar should have excessive wear the bar may be reversed so that the opposite face may be used for the level adjustment. The bell crank 175 engages the surface 185 of the level bar. When the required number of sheets have been removed from the stack, thereby compelling the gauge roller 170 to swing in a counter-clockwise direction with shaft 172 which in turn moves the bell crank in a counter-clockwise direction. The bell crank moves the level bar 181 about its pivot 182 causing the rod 135 to be moved downwardly. This rod in turn carries the shaft 133 and the trip pin 130. The pin engages the plate 126 thereby rotating the trip pawl and allowing the yoke 90 to rotate because of the force applied by the spring 124. This allows the ratchet pawl 91 to rotate in a clockwise direction about the ratchet wheel moving past the number of teeth which corresponds to the distance which the table 12 is to be raised and throws one end of the slot 104 in engagement with the pin 105. With the forward oscillation of the lower arm 35 of lever 30 movement is imparted to the yoke and ratchet wheel thereby in turn raising the table by means of the gear train.

The connection between the push rod 135 and the level adjusting bar 181 is by means of a slot 187 and pin 188 connection thereby allowing the level bar 181 to move to the right or left for adjustment without directly acting upon the push rod 135. The level bar 181 being moved to the right allows a smaller number of sheets to be removed and by being moved to the left allows a greater number of sheets to be removed, before the table is fed upwardly.

The adjustments of the level bar 181 can all be made at the left hand extremity of the bar as viewed in Fig. 3. This extremity is easily accessible without requiring the stoppage of the machine or the removal of parts. These adjustments are accurate and precise.

The pin 189 has at one end a flange 190 which prevents the level bar from riding off of the pin. The pin passes through a hole 191 in the bearing block 180 to which latter it is fastened by the cotter pin 192. Pin 189 retains the level bar in a pivoted position as a consequence of it extending through the elongated slot 193 in the bar. It is retained in fixed position with respect to the slot by means of the level adjusting screw 194. This screw member has a knurled and direction dialed operating knob 195 at its outer end, which is accessible from the front of the machine, and an annular slot 196 intermediate its ends. The screw 194 passes through the end wall 197 of the bar 181 and is allowed to freely turn therein but is locked insofar as longitudinal movement is concerned by means of the set screw 198 which has an extension 199 riding in the annular groove 196 of the screw 194. As a consequence there is no relative longitudinal movement between the bar 181 and the screw 194. The threads of the screw 194 engage an internally threaded portion 200 extending radially through the pin 189. In this way, by adjusting the screw 194, after grasping the knurled end 195 and turning it clockwise or counter-clockwise, the bar 181 is moved to the right or left respectively as a result of the pivot pin 189 sliding relatively in the slot 193. After the bar 181 is adjusted to provide for the appropriate number of sheets the adjusting screw is locked in position by means of the manually operable knurled (see Fig. 9) lock nuts 201 and 202. The former has a larger diameter than the latter and carries on its outer face the dial instructions (see Fig. 10). It will now be appreciated that a very simple but effective and accurate adjustment of the mechanism can be accomplished without interfering with the operation of the machine and without the need for shutting down the machine or requiring a skilled mechanic to make the adjustments.

Carried on the bearing block 180 are the bosses 210 and 211 by means of which the tension adjusting means 212 is supported. The tension means comprises a tension rod 213 having an enlarged portion 214 and a reduced end portion 215, the latter of which is arranged to slide in the opening 216 in the boss 211. The left hand end of the pin 213 is arranged to ride in the bore 217 of the sleeve screw 218. The sleeve screw is provided at its outer end with a slot 219 by means of which a screw driver may be used to adjust the sleeve in the boss 210. A coil spring 220 surrounds the pin 213 and abuts against one end 221 of the sleeve screw 218 and at its opposite end against the enlarged portion 214 of the pin. By this means the pin which is carried on the bearing block 180 provides a yieldable relatively fixed abutment for the bell crank 175. When the carriage 40 is at its extreme right hand limit of motion the spring 176 holds the bell crank at the extreme of its clockwise motion. When the bell crank pushes against the pin 215 it will be forced into engagement with the top sheet of the stack of material but if the stack is so high that the feed mechanism need not be operated the yielding abutment provided by the pin 215 will allow the bell crank to force the pin to the left. In this way none of the parts will break. The sleeve screw is adjusted to regulate the amount of tension the bell crank must overcome. This adjustment allows the right amount of force to be applied to actuate the bell crank so as to trip the feed mechanism while at the same time providing an abutment to prevent any breakage of the parts if the stack of sheets is very high. This arrangement also avoids the possibility of the table being raised by the feeding mechanism when the stack of sheets is already sufficiently high.

All of the important adjustments of the machine can be made from the front while the machine is in operation. The actuation of the sheet-feeding mechanism can be changed so that it will respond to a decrease in a different number of sheets on the stack without either stopping the machine or interfering with its operation or having to remove any parts.

The level bar 181 can be adjusted from its left

hand extremity as viewed in Fig. 3 by merely taking hold of the knurled knob 195 and turning it to the right or left. When it is turned in a clockwise direction the level bar is moved to the right. The pin 183 moves to the left relative to the level bar and the pivot 189 is caused to move with respect to the level bar while actually remaining as a fixed pivot with respect to the bearing block 180. When the screw member 194 is turned clockwise it draws the level bar 181 to the right and thereby causes its upper face 185 to be raised with respect to the end of the bell crank 175. After the level bar has been set to correspond to the appropriate height in the stack of sheets the lock nuts 201 and 202 are fastened so that the adjustment will remain definite and fixed. By placing appropriate indicia marks adjacent the knurled knob 195 accurate vernier adjustments can be made which will give a known action by the mechanism. If the knob is turned counter-clockwise the bar 181 is pushed to the left with the result that the upper face 185 presents a lower point of surface to the bell crank and the pin 183 is moved relatively to the right. As a result of this adjustment the bell crank will engage the tapered surface of the level bar as a result of the roller 170 engaging the uppermost sheet of the stack. The uppermost sheet however must correspond in level to the point at which the bell crank engages the tapered surface.

The adjustment of the tension bar is also accomplished from the front of the mechanism by turning the sleeve screw 218 in a clockwise direction. The spring 220 is compressed to a greater amount with the result that a greater positive force must be applied to the bell crank in order that it may move the level bar. It will be understood however that under all circumstances it will require less effort to cause the pin 215 to yield against the spring than is required to break any of the component parts of the mechanism. Under such circumstances the pin will yield against the spring and thereby prevent a breakage of the parts. The relative tensioning of the spring also accomplishes a very nice control between the effective values of the spring 145 and the spring 220.

In the use and operation of this improved controlling means for a sheet feeding mechanism, the shaft 29 will be rocked under the action of the cam groove 25 carried by the gear wheel 23 which is operatively connected to the clutch 17. As the shaft 29 rocks the lever 30 will swing and move the carriage 40 back and forth on the guide 44—45. The spring 124 will bias the pawl carrier 90 in a clockwise direction and maintain the inner end of the slot 104 in contact with the pin 107 carried by the depending arm or lever 35. In this manner as the lever 30 and the arm 35 are rocked with the rocking of the shaft 29, the pawl carrier 90 will be rocked so as to effect a step by step rotation of the gear train 80 and 67. Rotation of the gear train will effect a step by step raising of the table 12 so as to maintain the sheets on this table in a position for removal by the suction operated removing means. During the rocking of the pawl carrier 90 under the action of the spring 124 which moves the carrier in a clockwise direction and under the action of the arm 35 which moves the pawl carrier 90 in a counter-clockwise direction, the pawl member 116 is in a released position. As shown in Figure 1, this pawl member 116 is shown in a locked position, in which position the pawl carrier 90 is held against movement by the spring 124. The pin 119 is moved away from the lower end of the pawl 116 a distance sufficiently to permit the pawl 116 as viewed in Figure 1 to swing forwardly under the action of the spring 118 so as to underlie the release plate 122. When in this position, that is with the upper end 123 of the pawl 116 underlying the release plate 122, the spring 124 will act to maintain the slot 104 in the push rod 100 in contact at one end thereof with the pin 105.

As the sheets are removed from the table 12, the feeler 170 gradually swings downwardly in a counter-clockwise direction under the pressure of the pin 215 which is tensioned by means of the spring 220. The pin 215 is held by means of the spring 220 into engagement with one arm of the bell crank 175. After a predetermined number of sheets have been removed from the stack the other arm of the bell crank 175 will come into contact with the tapered surface 185 of the releasing lever 181. The taper on this lever 181 is such as to permit the carriage 40 to reciprocate to the desired degree until the desired number of sheets have been removed from the stack. The tension of the spring 220 will overcome the tension of the spring 145 and thereby rock the controlling lever 181 downwardly. Downward rocking of the lever 181 will cause the plunger rod 135 to move downwardly and this will in turn cause the trip member 130 to release the pawl 116 so that the push rod 99 is in a neutral position. In this neutral position the lever 30 may rock back and forth without movement of the table feeding means actuated by the push rod 99. The number of sheets which when removed from the stack will actuate the control lever 181 may be varied by means of the adjusting member 199 which will adjust the controlling lever 181 toward or away from the normally horizontal leg of the bell crank 175.

The machines to which the improvements of this invention are applied are well known in the art and a more complete description of the operation thereof may be ascertained from one or more of the following patents: 1,432,824; 1,684,741; 1,770,483; 1,803,935; 1,806,181; 1,857,260; 2,016,462; 2,065,178.

It will now be readily appreciated that a very compact and readily constructed mechanism has been provided which is capable of being adjusted by very simple operations performed from the outside of a machine. Furthermore, the number of parts to accomplish these adjustments is relatively small. A large number of parts have been eliminated.

Although a preferred embodiment has been illustrated and described, variations within the true spirit and scope of the same are to be determined by the appended claims.

What I claim is:

1. In apparatus for feeding sheets from a stack thereof comprising a carriage movable forwardly and rearwardly of the stack, mechanism for feeding the stack vertically, means for controlling said feeding mechanism comprising a member pivoted upon said carriage and movable thereby to a position over the stack adjacent the edge thereof, a gauge arm, means engageable by said member in response to movement of said carriage for deflecting said gauge arm toward the upper face of the stack, and means responsive to predetermined pivotal movement of said member effecting control of said feeding mechanism said control including a longitudinally slidable bar

extending to the front of the machine and carrying adjusting means at said front end.

2. Sheet-feeding mechanism including a support for a stack of sheets; means to move said support vertically; means responsive to decrease of sheets on said support arranged to effect an actuation of said support feeding means comprising a lever longitudinally adjustable adjacent the front of the machine, a yieldable abutment and a bell crank for contacting the lever and abutment, said lever adjustable while the machine is in operation.

3. Sheet-feeding mechanism including a support for a stack of sheets; means to move said support vertically; means responsive to decrease of sheets on said support arranged to effect an actuation of said support feeding means comprising a lever adjustable adjacent the front of the machine, an adjustable abutment and a bell crank for contacting the abutment and the top of the lever, said lever and abutment adjustable while the machine is in operation.

4. Sheet-feeding mechanism including a support for a stack of sheets; means to move said support vertically; means responsive to decrease of sheets on said support arranged to effect an actuation of said support feeding means comprising a lever pivoted and adjustable at the front of the machine, an abutment and bell crank for contacting same, said lever adjustable while the machine is in operation.

5. Sheet-feeding mechanism having a support for a stack of sheets; means to move said support vertically automatically; and control means for rendering said last means operative in response to the decrease in sheets in said stack including a pivoted horizontally extending lever adjustable in its lengthwise direction and longitudinally of the machine to vary the number of sheets removed to which the control means responds.

6. Sheet-feeding mechanism having a support for a stack of sheets; means to move said support vertically; of means arranged to actuate said last named means automatically in response to decrease in sheets in said stack including a pivoted lever having a tapered upper surface, an elongated pin adjacent said lever, a bell crank arranged to engage the tapered surface of said lever and one end of said pin, means yieldably moving said pin against said bell crank, and means arranged to engage the upper sheet of said stack and to thereby rotate said bell crank.

7. Mechanism comprising stack carrying means, feeding mechanism for effecting elevation of said stack, a carriage movable relatively forwardly and rearwardly with respect to said stack, means controlling said feeding mechanism comprising a bell crank pivoted on said carriage, means rotated by said bell crank into engagement with the stack, and a longitudinally yieldable abutment extending to and adjustable at the front of the machine, said carriage moving said bell crank into engagement with said abutment.

8. Sheet feeding means comprising a support for a stack of sheets, means to move said support vertically in response to decrease of sheets in said stack, and means extending to the front of the support for carrying a member which may move said means longitudinally to adjustably vary the height of said stack which is effective to actuate said last named means.

9. In a sheet feeding mechanism including a movable carriage and mechanism for feeding a stack of sheets upwardly toward said carriage, means for controlling said feeding mechanism comprising a member pivoted on said carriage, filler means deflected by said member toward the top of the stack adjacent an edge thereof in response to movement of said carriage toward said stack, and means effecting control of said feeding mechanism actuatable by said pivoted member, said means being adjustable on the front of the machine while the machine is in operation.

10. In a step by step sheet feeding mechanism, means for rendering said feeding mechanism ineffective when a predetermined number of sheets have been removed from a movable stack table, said means comprising a rock shaft, a sheet engaging member secured to said shaft, a substantially L-shaped crank secured to said shaft, tensionable means engaging one arm of said crank for biasing said member to sheet engaging position, cut-off means connected to said feeding mechanism, and a control member engaging said cut-off means and engageable with the other arm of said crank to thereby actuate said cut-off means when a predetermined number of sheets have been removed from said stack.

11. A step by step sheet feeding mechanism, means for rendering said feeding mechanism ineffective when a predetermined number of sheets have been removed from a movable stack table, said means comprising a rock shaft, a sheet engaging member secured to said shaft, a substantially L-shaped crank secured to said shaft, tensionable means engaging one arm of said crank for biasing said member to sheet engaging position, a spring pressed pawl member operatively connected to said feeding mechanism, means constantly urging said pawl member to a position whereby said feeding mechanism may continue operation, a vertically movable pawl operating member engageable with said pawl member to move said pawl member to a position whereby said feeding mechanism will be rendered ineffective, means constantly urging said pawl operating member to an inoperative position, a control lever, means pivotally securing one end of said lever to the frame of the machine, means connecting said lever intermediate the ends thereof with said pawl operating member, said control member having the opposite end thereof disposed in a position for engagement with the other arm of said bell crank whereby said other arm of said bell crank will rock said opposite end of said lever downwardly upon removal of a predetermined number of sheets from the stack to thereby move said pawl operating member downwardly to an operative pawl engaging position.

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