Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 1

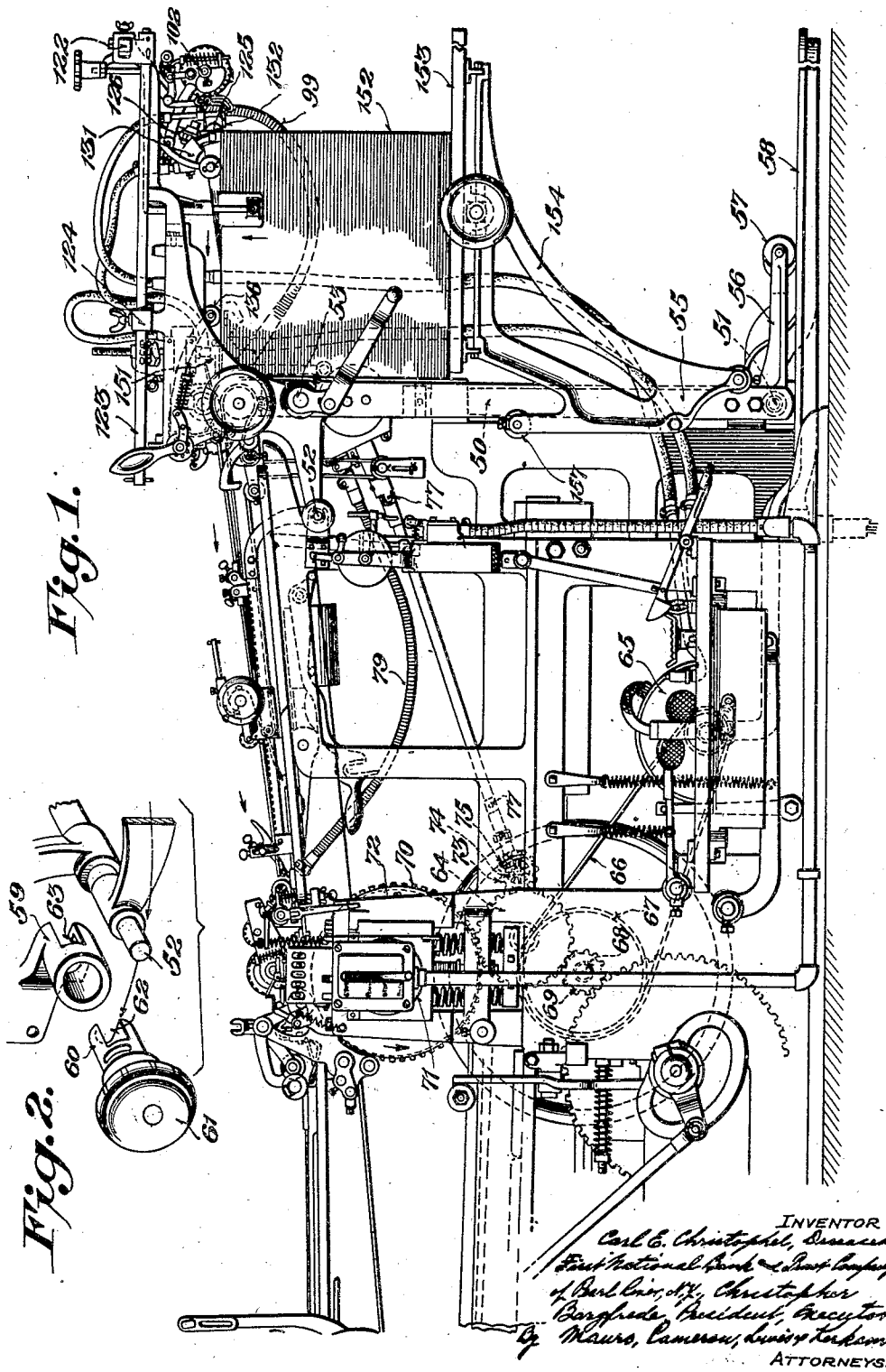


Fig. 1.

Fig. 2.

INVENTOR
Carl E. Christophel, Deceased,
First National Bank of Port Clinton
Executor of Carl E. Christophel
By Barfield, President, Executor,
By Mauro, Cameron, Irwin & Jackson
ATTORNEYS.

Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 2

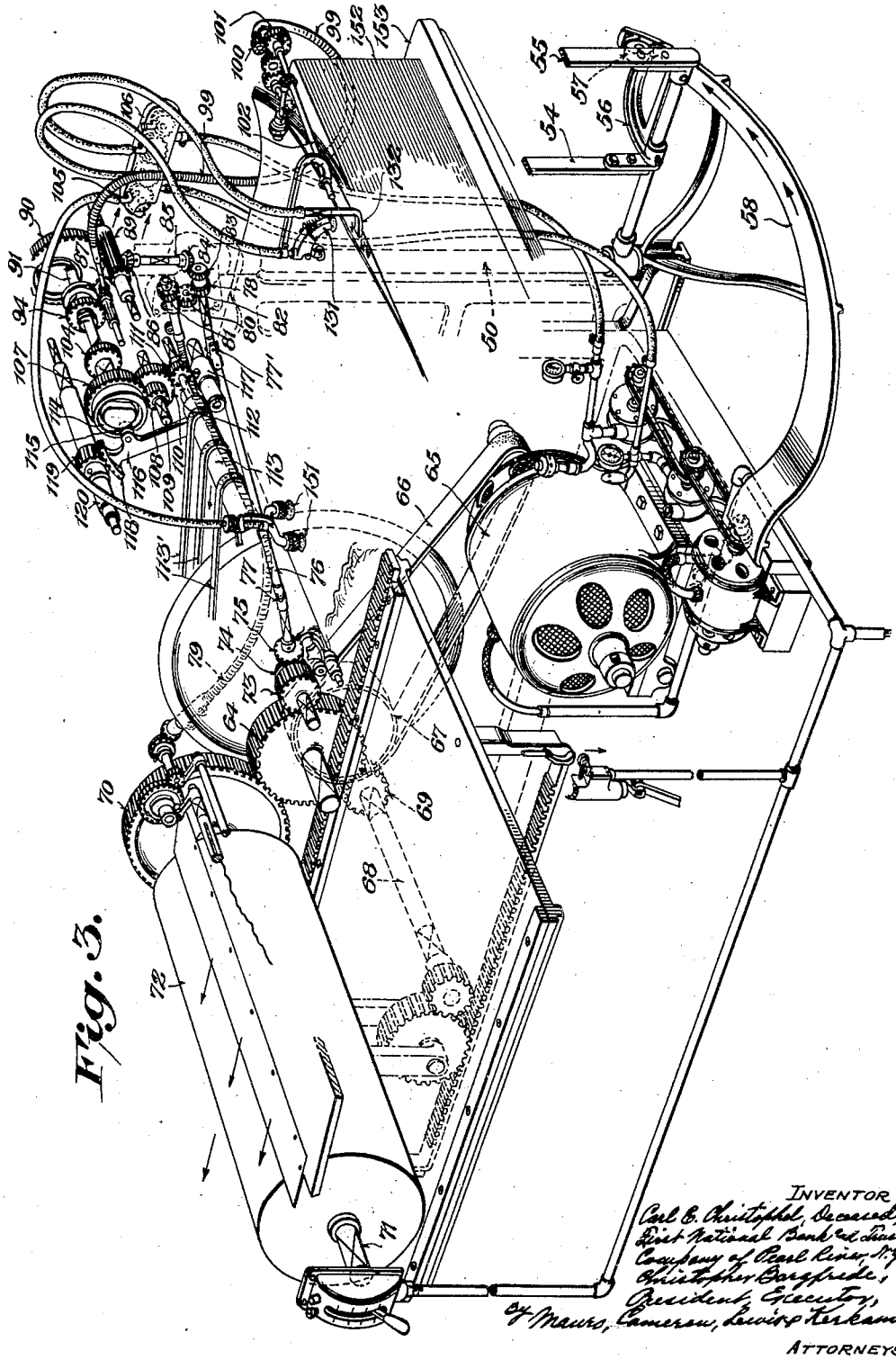


Fig. 5.

INVENTOR
Carl E. Christophel, Deceased,
First National Bank of Saint
Louis, Missouri, and Saint
Louis Trust Company of Saint Louis, Missouri,
Christopher Bergfeld,
President, Executors,
by Mauro, Cameron, Lewis & Kirkham.
ATTORNEYS.

Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 3

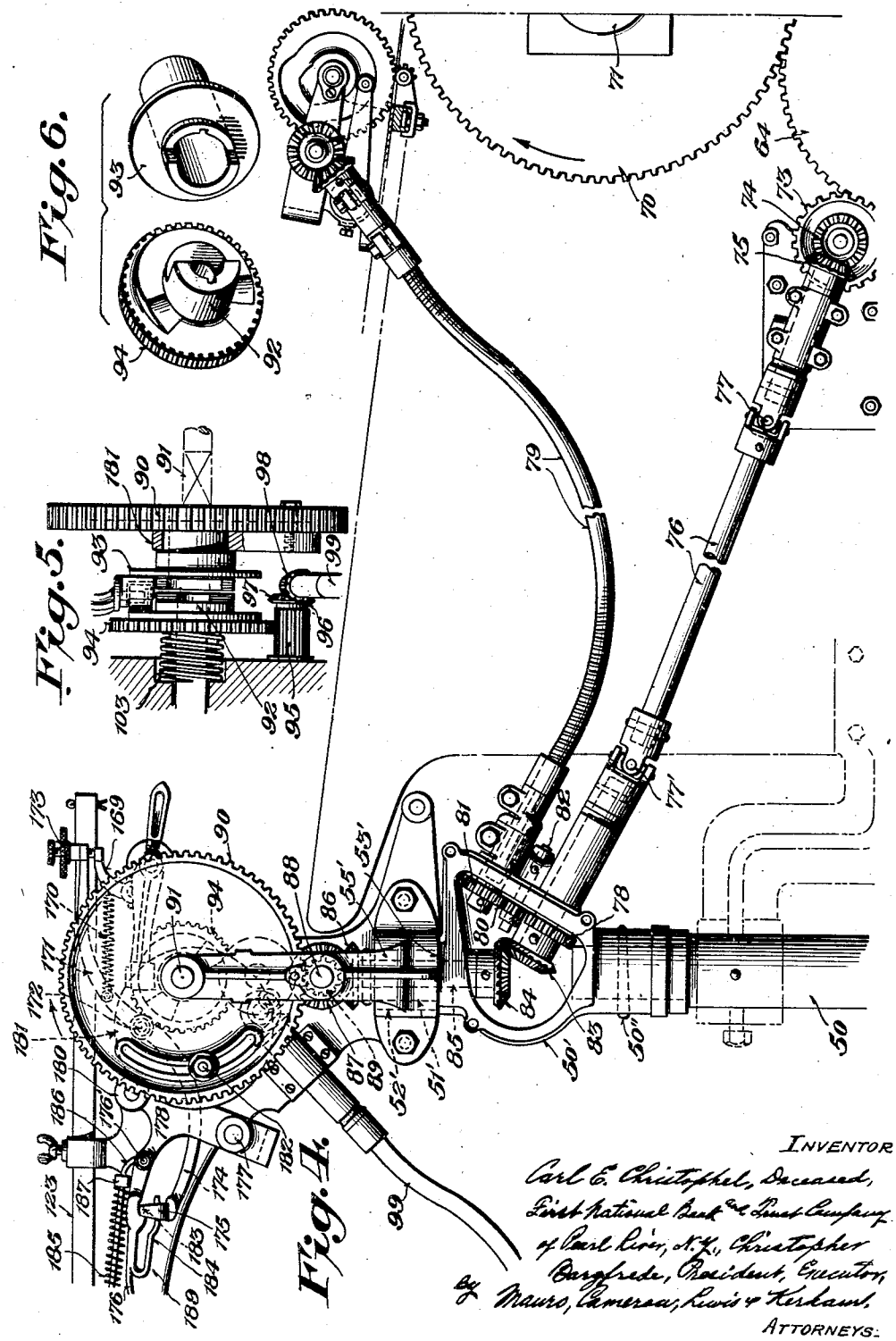


Fig. 4.

Fig. 5.

Fig. 6.

INVENTOR

Carl E. Christophel, Deceased, First National Bank & Trust Company of Port Jervis, N.Y., Christopher Bergfrede, President, Executor,

By Mauro, Cameron, Lewis & Kerkam.

ATTORNEYS.

Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 4

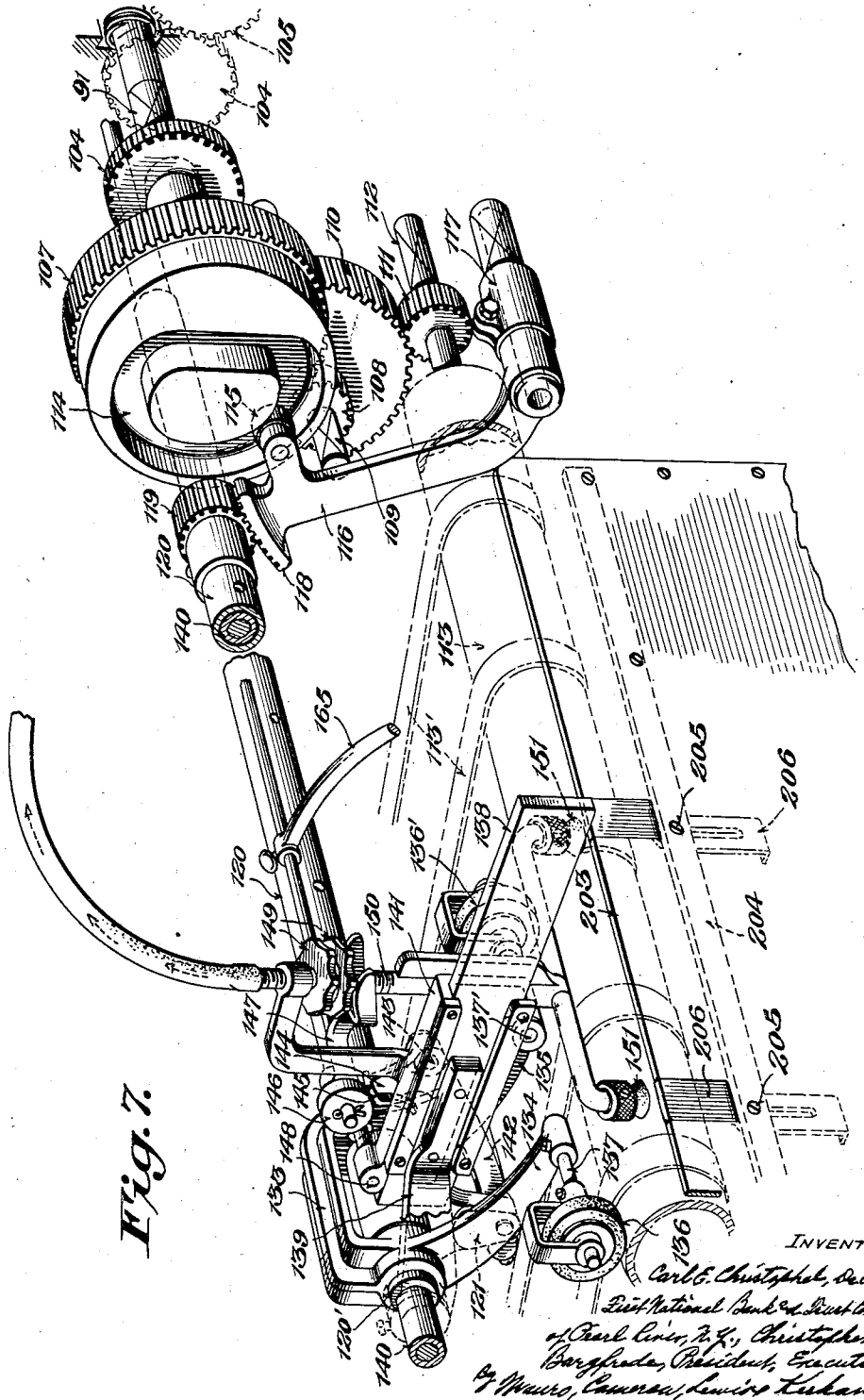


Fig. 7.

INVENTOR
Carl E. Christophel, Deceased,
First National Bank & Trust Company
of Pearl River, N.Y., Christopher
Bargfreder, President, Executor,
By Munro, Cameron, Lewis & Kirkam
ATTORNEYS.

Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 5

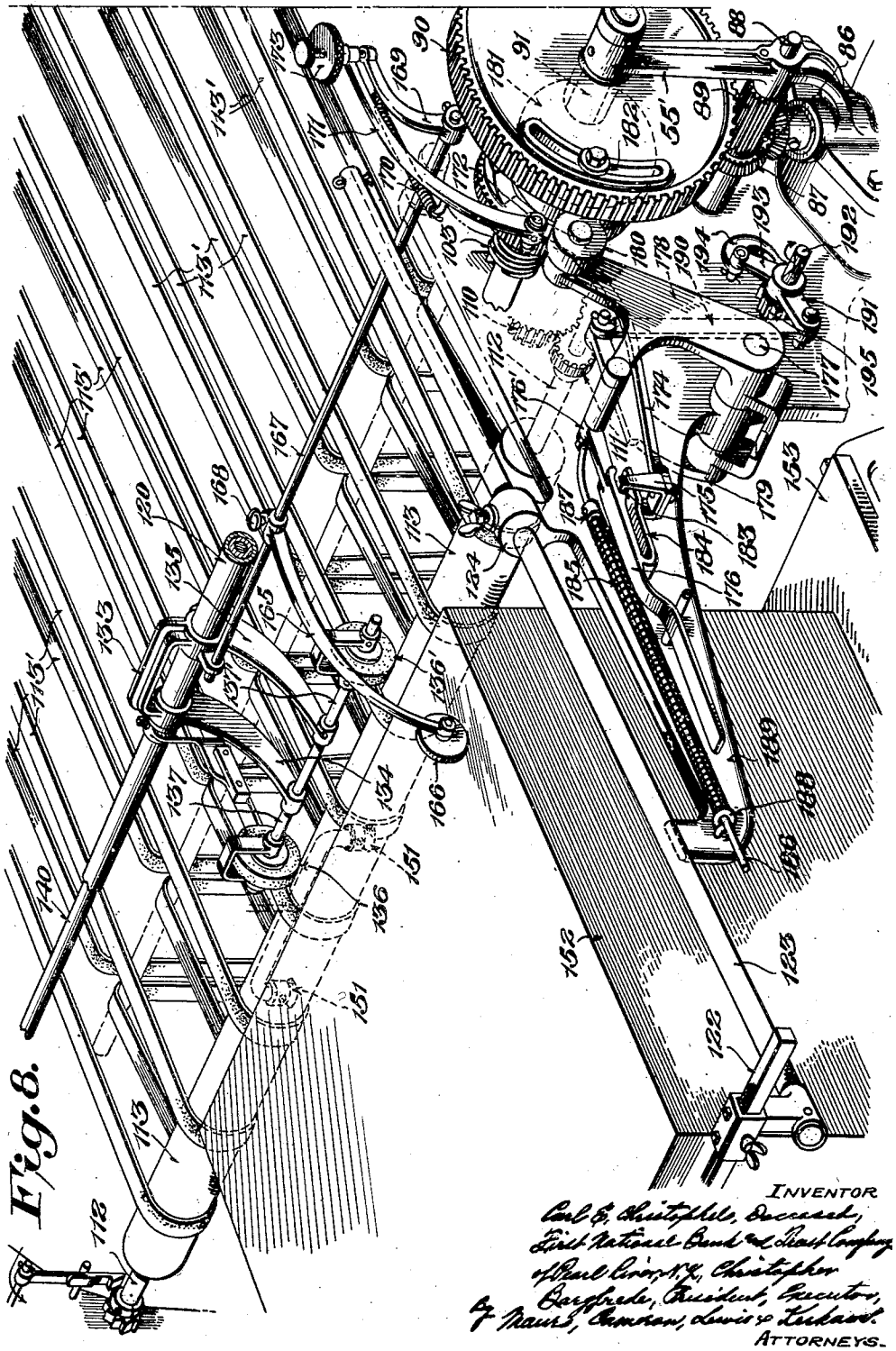


Fig. 8.

INVENTOR

Carl E. Christophel, deceased,
First National Bank of Pearl River, N.Y., Christopher Bergrede, President, Executor,
By Mann, Harrison, Lewis & Lockwood.

ATTORNEYS.

Dec. 9, 1930. C. E. CHRISTOPHEL 1,784,335

SHEET FEEDING DEVICE

Original Filed Aug. 14, 1924 6 Sheets-Sheet 6

Fig. 9.

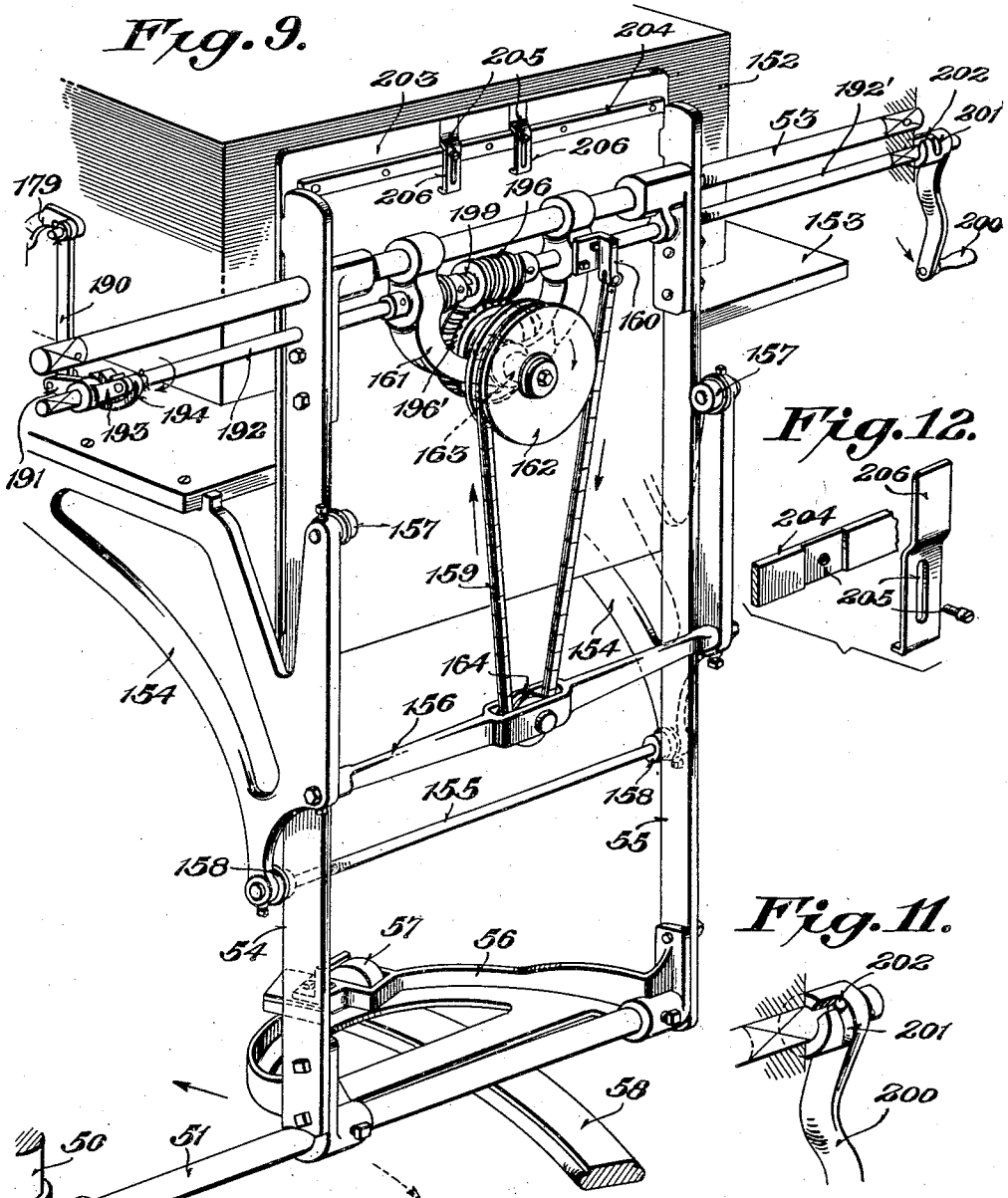
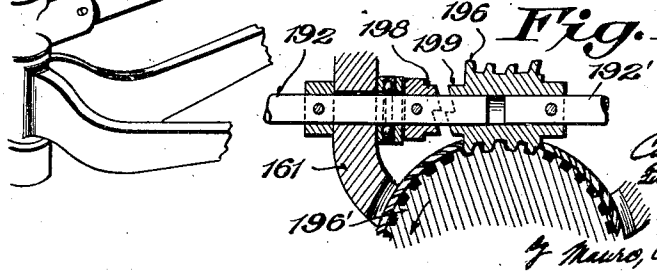


Fig. 12.

Fig. 11.

Fig. 10.



INVENTOR

Carl E. Christophel, deceased,
First National Bank & Trust Company
of Carl River, N. J., Christopher
Bergfreda, President, Executor,
by Munro, Cadwalader, Lewis, & Kerkam,

ATTORNEYS

Patented Dec. 9, 1930 1,784,335

UNITED STATES PATENT OFFICE

CARL E. CHRISTOPHEL, DECEASED, LATE OF PEARL RIVER, NEW YORK, BY THE FIRST NATIONAL BANK AND TRUST COMPANY OF PEARL RIVER, NEW YORK, EXECUTOR; SAID CHRISTOPHEL ASSIGNOR TO DEXTER FOLDER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SHEET-FEEDING DEVICE

Original application filed August 14, 1924, Serial No. 732,046, and in Great Britain August 10, 1925. Divided and this application filed January 3, 1927, Serial No. 158,770. Renewed May 21, 1930.

The present invention is an improvement in feeders particularly adapted for use in association with printing presses, but adapted for use in any association where such a device is desirable.

One of the objects of this invention is to accurately maintain the top of the sheet pile at a predetermined height and to effect this by a simplified, durable and efficient mechanism. Heretofore this mechanism has embodied a plurality of independently operated rotating cams subject to independent adjustment. One of these cams was for the purpose of operating the elevator ratchet and the other was for the purpose of elevating the governor roller in timed relation with the feeding mechanism of the forwarder. The present object has been obtained by the provision of a simplified construction in which the first mentioned cam has been retained and the cam for elevating the governor roller during the sheet feeding movement has been connected to the control element, so that in the movement of the latter, when the pile is to be elevated, the governor roller will be automatically raised to avoid interference with the proper forwarding of the sheet by the forwarding mechanism.

Another object of this invention is to provide a pile elevating mechanism which may be manually and automatically elevated and lowered, and which may be manually operated in an expeditious manner without any preliminary disconnection or rearrangement of any of the parts. Heretofore, in order to lower the pile support manually, it has been necessary to disconnect and readjust various parts of the pile elevating mechanism, which was objectionable in the time necessarily consumed for this work, and also because of the complicated mechanism necessarily employed. The present object has been attained in one aspect by the provision of a two-part shaft which, in the automatic operation, functions as a single unitary shaft but which, when the support is to be lowered manually or otherwise, is operated so that the part that turns the driving mechanism is automatically disconnected from the part that carries the ratchet, which latter is engaged by the feeding pawl during the automatic operation of the device.

Other objects of this invention will be apparent as this description proceeds, and in order to more clearly understand the invention, reference may be had to the accompanying drawings illustrating one embodiment of the inventive idea, and wherein—

Fig. 1 is a side view of a printing press of the flat-bed variety with which is associated a feeder embodying the present invention;

Fig. 2 is a detail of means for locking the feeder frame to the press;

Fig. 3 is a perspective view with some of the parts separated and others omitted, illustrating the driving connections from the intermediate press gear to the front and rear end of the feeder;

Fig. 4 is a detail showing the drive from the intermediate press gear to the power distributing point at the pivot about which the feeder swings, the clutch on the cam shaft being shown in dotted lines;

Figs. 5 and 6 are details of the clutch as shown in dotted lines in Fig. 4;

Fig. 7 is a perspective view of sheet forwarding mechanism and the means for operating the same;

Fig. 8 is a perspective view illustrating the automatic pile governor control;

Fig. 9 is a perspective view of the pile support, together with means for elevating and lowering the pile;

Fig. 10 is a sectional detail showing the two members of a pile elevating clutch disconnected, and a separable two-part shaft;

Fig. 11 is a detail showing a pin and cam slot connection for disconnecting the two parts of the clutch shown in Fig. 10; and

Fig. 12 is a detail of a pile control guide.

Referring to the drawings, wherein like reference numerals indicate like parts throughout the several views, it is pointed out that the present application is a division of copending application Serial No. 732,046, filed August 14, 1924, and that the invention is shown, for the purposes of illustration, in association with a printing press of the well known flat-bed type. The feeder is, however, adapted for various other uses and purposes.

Feeder mounting: Figs. 1, 2, 3 and 6

In the particular embodiment illustrated in the drawings, the feeder is mounted on a frame which is pivoted to one of the side frames of the printing press. This pivot is preferably in the form of a vertical stationary shaft 50, and the frame of the feeder comprises a plurality of transverse members 51, 52, 53 and 140, and vertical members 54 and 55, which latter are carried by the member 51 and connected to the member 53. The lowest transverse member 51 has a bracket 56 connected thereto in which is mounted a roller 57 that rides on a track 58 projecting from the rear frame of the press. The feeder is thus swung about the stationary vertical shaft 50 with little effort, from its position in association with the press to a position as remote from the same as desired, so that easy access is had to the rear of the press for placing the forms on the bed of the press or for making corrections and alterations to the form. The feeder frame is so constructed and arranged that it will stand at any desired place along the track to which it may be moved, but means are provided for locking the feeder in association with the press when sheets are to be automatically fed from the pile to the impression cylinder.

This locking mechanism (see Fig. 2) consists generally of a recessed casting 59 secured to one of the side frames of the press, which casting has associated therewith a sleeve 60 adapted to be rotated by a hand piece 61 and which sleeve is provided with a recess 62 that is adapted to register with a recess 63 in the casting. When it is desired to lock the press, the recesses 62 and 63 are brought into register and the feeder is swung into position in association with the press so that one end of the stay shaft 52 will pass into said registered openings. Sleeve 60 is then rotated to bring opening 62 out of register with opening 63 in the casting 59 so that an imperforate part of the sleeve 60 opposes the removal of the shaft 52 from the casting.

Feeder drive: Figs. 1, 3, 4, 5, 6 and 8

The various parts of the sheet-engaging, feeding and control mechanisms are preferably driven from the press or other device to be fed, and as herein illustrated, the drive of the various parts of the feeder is effected from the intermediate gear 64 which is driven from any suitable source of power 65 by a belt 66, and a pulley 67 which is mounted on a shaft 68 carrying a pinion 69 that meshes with and drives said intermediate gear 64. This intermediate gear 64 meshes with and drives the cylinder gear 70 mounted on a shaft 71 on which the impression cylinder 72 is carried.

The drive of the feeder is effected through gear 73 that meshes with the intermediate gear 64. Gear 73 has compounded therewith a bevel gear 74 that meshes with a bevel gear 75 mounted on one end of a shaft 76 provided with two universal connections 77 and 77'. The other end of said shaft is provided with a gear 78 that drives the front end of the feeder through a Bowden wire 79 and gears 80 and 81, the gear 80 being an idler mounted on a stub shaft 82. Adjacent the gear 78 is a bevel gear 83 that meshes with a bevel gear 84 mounted on the lower end of a short vertical shaft 85 which projects through a gear casing 50' that is pinned to shaft 50 by a pin 50''. This gear casing 50' is provided with a suitable cover plate (not shown) and also with an extended portion 51' (Fig. 4) that projects into a bracket 52' and which normally rests on a shoulder 53' on said casing. The bracket 52' is secured to the feeder frame, and bolted to said bracket 52' is a bracket 55' in which a short transverse shaft 88 and a cam shaft 91 have bearings.

The upper end of shaft 85 carries a miter gear 86 which meshes with a miter gear 87 mounted on the short transverse shaft 88. This shaft 88 carries an elongated pinion 89 with which meshes a large gear 90 mounted on the cam shaft 91 of the feeder. The cam shaft 91 has also mounted thereon a two-part clutch, one part 92 being keyed on the shaft 91 and the other part 93 being loose thereon, the gear 90 being compounded with the part 93. The clutch is adapted to be opened manually, or by the operation of calipering mechanism such as disclosed in copending application Serial No. 158,771, filed January 3, 1927, to disconnect the driving mechanism of the feeder. The drive of the mechanism at the rear end of the feeder is normally effected through the clutch by means of gear teeth 94 provided on the periphery of clutch part 92, which gear teeth mesh with an elongated pinion 95 mounted on a short stub shaft 96, with which pinion there is compounded a bevel gear 97 that meshes with a bevel gear 98 carried by one end of a Bowden wire 99. The other end of this Bowden wire carries a pinion 100 that meshes with a gear 101 carried by a shaft 102 on which is mounted the separator mechanism of the feeder, as hereinafter described.

The clutch member 92 is spring pressed toward the right by a spring 103 that tends normally to hold said member in clutched relation with its companion member 93. This spring encircles the cam shaft 91. Adjacent said spring and carried by the shaft 91 is a gear 104. This gear meshes with a gear 105 carried in a casing 106, which casing encloses the valves that control the distribution of air to the separator, forwarder and air blast, as disclosed in copending application Serial No. 158,769, filed January 3, 1927.

Adjacent gear 104 is a gear 107 that meshes with a pinion 108 carried by a stub shaft 109,

which stub shaft also carries a gear 110 that meshes with a pinion 111 carried by a shaft 112. The shaft 112 carries the feed roller 113 around which the conveyor tapes 113′ pass that deliver the sheets from the feeder to the instrumentality fed thereby. Compounded with gear 107 is an internal cam 114 in which engages a roller 115 carried by an arm 116 pivoted on a hollow bushing 117 mounted on the frame of the machine. The arm 116 is provided at its free end with a toothed sector 118 that meshes with a gear 119 mounted on a tube 120 to which is fixed a depending arm 121 through which is transmitted motion to the forwarding device, all as more fully hereinafter described.

It will therefore be seen that, when the clutch 92, 93 is opened, either manually or automatically, all of the feeder mechanism, including the separator, forwarder and the means for driving the air valves will be disconnected.

Sheet separating mechanism: Figs. 1 and 3

The mechanism for separating successive sheets from the pile may be of any suitable or desired character so long as it will efficiently and surely separate the sheets in order that the same may be fed forward to the printing press or other instrumentality. It is preferred, however, that the sheet separating mechanism disclosed in Patent No. 1,475,621, dated November 27, 1923, be employed. Dependent upon the size of the sheets that are to be fed, one or more of such mechanisms may be utilized. If two are employed, they are preferably mounted one near each corner of the sheet pile though, if desired, they may be moved closer together, as is preferably the case when cardboard is being fed. As here shown, the separating mechanism or mechanisms is or are mounted on a transverse rod or tube 122 which is carried by two longitudinally disposed rods, one of which is indicated at 123, the longitudinally disposed rods in turn being carried by the side frames of the feeder. These longitudinal rods may be adjusted lengthwise of the machine at 124 so that the separating devices may be moved nearer to or farther away from the forwarding devices. As disclosed in Patent No. 1,475,621 above referred to, there is preferably employed a rotary platen 125 which is driven through suitable gearing from shaft 101. Cooperating with this rotary platen is the sheet-straightening means in the form of a combing wheel 126 which is also suitably rotated. The gearing that drives the platen 125 from the shaft 101 may be enclosed in a casing (not shown) which, together with the platen 125 and the combing wheel 126, may be held in an elevated position out of operative engagement with the sheet pile. This is desirable when thicker cardboard is being fed or when the separation is being effected solely by means of the collapsible sucker 131.

After the topmost sheet is separated from the pile either by the action of the collapsible sucker 131, or by the cooperative action of the platen 125 and the sheet straightening means or combing wheel 126, air is preferably introduced beneath said topmost sheet through the hollow foot clamp 132 to complete the separation of the sheet.

Sheet forwarder: Figs. 1, 3, 7 and 8

After the sheet is separated from the pile, it is seized along its forward edge by the forwarding device which moves the sheet from the pile onto the conveyor 113′. Preferably, there is employed a forwarder of the general type disclosed in application Serial No. 599,359, filed November 6, 1922, in which there is disclosed a suction mechanism which, by suitable connections, is lowered into engagement with the top sheet of the pile, then elevated and then reciprocated along a track to deposit the sheet on the feed roller and associated conveyor. As herein shown, a housing 133 is loosely mounted on tube 120 and is provided with arms 134 and 135 in which are carried rollers 136 and 136′ that rest upon and are rotated upon the feed roller 113, the rollers 136 and 136′ being adjustably mounted upon transverse pins 137 and 137′ carried by the arms 134 and 135, respectively. The rollers 136 and 136′ may be swung away from the feed roller 113 for the purpose of removing a sheet or for any other reason. A horizontal track 138 is carried by a bracket 139 keyed or otherwise secured on the transverse frame member 140 adjacent the end 120′ of tube 120. This transverse frame member 140 preferably consists of a tube which is fixedly mounted in the side frames of the feeder and projects through the tube 120. The track 138 is preferably fixedly secured so that it has no vertical movement, though in some embodiments it may be found desirable to mount the track 138 or housing 133 so that it may move with the latter.

A carriage 141 is reciprocated along track 138 through the arm 121 fixedly secured to the tube 120, the arm 121 being positioned on said tube between the arms 134 and 135. The lower end of the arm 121 is connected to a link 142, which link is secured to the carriage at 143. An arm 144 integrally connected to link 142 is provided with a cam surface 145 that engages a roller 146 carried by an arm 147 pivoted at 148 on the carriage 141. The free end of arm 147 engages adjusting nuts 149, 149 threaded on a tube 150 that carries sucker mouths 151, 151 of the forwarder. Through the connections described, it will be understood that, as the tube 120 is oscillated back and forth from cam 114 as heretofore described, the carriage 141 will be reciprocated along track 138 and simultane-

ously the sucker mouths 151, 151 will be elevated and depressed. The particular sequence of operations is that, after the uppermost sheet is separated, the sucker mouths 151, 151 are first lowered into engagement with the separated sheet, then elevated to raise the sheet, then the carriage is moved forwardly toward feed roller 113, the sheet being introduced between said feed roller and the rollers 136 and 136′ cooperating therewith. The carriage is then reciprocated back toward the sheet pile, the sucker mouths 151, 151 are again lowered into engagement with the top sheet of the pile and the sequence of operations is repeated.

Automatic control of pile elevating mechanism: Figs. 4, 7 and 8

The pile is automatically elevated so that the uppermost sheet thereof is always presented to the separating mechanism in the desired manner and at the desired place. The pile of sheets indicated at 152 is carried by a support 153 which is mounted on a pair of brackets 154, 154 that are connected by cross-rods 155 and 156, said brackets being provided with rollers 157 and 158 that engage the uprights 54 and 55 to facilitate the raising and lowering of the pile 152 and the pile support 153.

A chain 159 is secured at one end to an angle piece 160 mounted on a bracket 161 that is carried by the cross-rod 53. This bracket 161 carries a spool 162 mounted on a driven stub shaft 163 on which the other end of said chain is wound. The chain 159 passes around an idler roller 164 carried by the cross rod 156. The spool 162 is rotated in a clockwise direction (as seen in Fig. 9) to elevate the pile, and is rotated in a counter clockwise direction to lower the pile.

The pile may be elevated automatically and may be elevated and lowered manually. The means whereby automatic elevation of the pile is effected is controlled through a governor arm 165 on the free end of which is mounted a roller 166 that engages the topmost sheet of the pile. The other end of the arm 165 is carried by a rod 167 on which it is adjustable angularly and longitudinally by means of a set screw 168. The rod 167 is mounted at one end in the housing 133 of the forwarder mechanism and at the other end in the side frame of the feeder. On the end of the rod adjacent the side frame of the feeder is mounted an arm 169, the free end of which tends to move upwardly through the action of a spring 170, one end of which spring is connected to the arm 169 and the other end of which is anchored to one arm of a lever 171 pivoted at 172 to the side frame of the feeder. The arm 171 carries an adjustable screw 173 which bears on the free end of arm 169 so that a fine adjustment of the height of the governor roller may be effected. The other arm 174 of the lever 171 is provided with a hook 175. This hook normally constitutes a stop to prevent the elevation of the pile. When, however, the pile has been lowered a predetermined distance, an arm or control member 176 that passes through the hook 175 and which is normally held stationary thereby will no longer be stopped by the same.

The particular construction whereby this is effected embodies a U-shaped casting pivoted on a stub shaft 177, said casting having two arms 178 and 179. The arm 178 carries in its free end a roller 180 that engages a cam 181 carried on the inner surface of gear 90. This cam may be actuated with respect to the arm 178 by means of a pin and slot connection 182. Projecting forwardly from the arm 178 is the control member 176 which is provided with a catch 183 that normally engages the hook on the control member 176, and said control member is also provided with a cam 184 which engages the hook 175, as will be more fully hereinafter described. A spring 185 encircles a rod 186 which is connected to the control member 176 at 176′, one end of said spring reacting against a collar 187 on said rod and the other against an eyelet 188 carried in the side frame 189 of the feeder. This spring 185 tends to hold the roller 180 in engagement with the cam 181 and to maintain the catch 183 in engagement with the hook 175. Further, in view of the fact that the point 176′ is in a horizontal plane slightly higher than the pivot point 172, the spring 185 acts during the normal operation to depress the far end of the lever 171 to periodically elevate the governor roller 166.

To the free end of the arm 179 is connected one end of a link 190, the lower end of which is connected to one arm of a bell-crank lever 191, loosely pivoted on a pile elevating shaft 192, the other arm 193 of which bell-crank lever carries a pawl 194 that is adapted to engage a ratchet 195 fixedly secured to the driving or power shaft 192. Rotation of the shaft 192 in a clockwise direction, as seen in Fig. 8, effects an elevation of the pile support 153, by means of the rotation of the spool 162 through a worm 196 engaging a worm wheel 196′ fixedly mounted on shaft 163 (Fig. 9).

During the normal operation of the feeder, the cam 181 bears against the roller 180 sufficiently to counteract the pressure of the spring 185 to relieve the engagement of the catch 183 with the hook 175, so that if the roller 166 should be lowered the hook 175 could disengage itself from the catch 183, in which event the spring 185 would force the arm 178 and the roller 180 rearwardly so that the latter would follow the cam 181. Further, in this event, the arm 179 would swing downwardly, lowering the link 190,

swinging the bell-crank 191 on its pivot 192 and raising the pawl 194 the distance of one ratchet tooth. Therefore, as the arm 178 was forced to the left (as seen in Fig. 8) by the cam 181, the shaft 192 would be rotated in a clockwise direction the distance of one tooth of the ratchet 195, thus elevating the pile support 153 a corresponding distance. As this elevation of the pile support is effected, the catch 183 would again be automatically engaged with the hook 175.

It is necessary that the operation of the governor roller 166 in raising and lowering should not interfere with the operation of the forwarding suckers 151, 151 in removing the sheet from the top of the pile. Heretofore, the elevation of the governor roller to obviate this possibility has been effected by a separate cam, to time this action so as not to interfere with that of the forwarder. This required independent attention and adjustment and additional parts. In the present device, the cam surface 184 on the member 176 has been provided so that, as the arm 178 and the control member 176 move backwardly to follow the cam as the governor roller is lowered, the necessary elevation of the governor roller to permit of the removal of the sheet by the forwarder will be effected by the cam surface 184 engaging the top of the hook 175, thereby, through the connections described, elevating the roller 166 from the uppermost sheet of the pile.

It is pointed out that the two-arm lever pivoted at 172 is so fulcrumed as to be rocked during the normal operation of the device by the spring 185 to remove the governor roller from the pile. The weight of the roller 166 lowers it onto the pile when the cam 181 forces the roller 180 to the left.

Independent elevation and depression of pile support: Figs. 8, 9, 10, 11 and 12

As heretofore described, the pile is automatically elevated under the control of the governor roller 166. It is necessary to lower the support to replenish the pile and to raise the pile to the proper feeding position. It is desirable that this be accomplished rapidly and effectively. Heretofore, in lowering the support, it has been necessary to disconnect the feeding means, such as the pawl 194 and the ratchet 195. By the present invention means are provided whereby it is unnecessary to disconnect these operative parts at any time, either when the support is being lowered or when it is being raised. This simplifies the construction and operation of the device and obviates the danger of any breakage.

This end is secured by making the shaft 192 separable and preferably in two parts, one part carrying a clutch member 198 and the other part 192′ carrying a clutch member 199, which latter is formed integrally with the worm 196. Each of these shaft parts is journaled in separate bearings on the bracket 161 and one of the uprights 54, 55, the inner opposed ends of said shaft parts extending into the bracket from its opposite sides transversely of the stub shaft 163, and the clutch members 198, 199 being fixed on said inner ends of the said shaft parts between said sides of the bracket, as clearly shown in Fig. 9. The clutch members 198 and 199 have cooperating jaws so that, during the normal automatic operation of the device to elevate the support, the shaft functions as a one-piece shaft. When it is desired to lower the support, the part 192′ of said shaft is disconnected, preferably by moving it longitudinally to uncouple the clutch, thereby permitting the part 192 of the shaft to remain stationary. Under these conditions, rotation of the part 192′ of the shaft will operate to rotate the spool 162 in counterclockwise direction to lower the support 153. The uncoupling of the shaft members 192 and 192′ is effected by means of a handle 200 or other suitable mechanism that engages the end of the shaft 192′. This handle is provided with a cam groove 201 that engages a pin 202 carried by the end of the shaft 192′. When the handle 200 is moved in the direction of the arrow (Fig. 9), the initial movement of the handle will, through said cam and pin connection, effect a longitudinal displacement of the shaft 192′, thus uncoupling the clutch 198, 199, and the continued rotation of said handle will lower the pile support as described. Reverse rotation of the handle will elevate the pile support, but in this reverse rotation the two parts of the shaft will turn as a unit, the ratchet simply rotating idly under the pawl. The end thrust exerted at the worm 196 will hold the clutch members in engagement even though the pressure is not being exerted against the flat engaging faces of the clutches. It will be understood that the lowering or raising might be effected through suitable power connections in place of the handle 200. A plate 203 against which the rear of the pile of sheets rests, is provided with a transverse strip 204 on which are mounted, by pin and slot connections 205, 205, a pair of plates 206, 206 which may be vertically adjustable to compensate for different heights and sizes of sheets, if desired.

While one expression of the inventive idea has been heretofore described and illustrated in detail, it is to be understood that the invention is not limited thereto, and that the inventive idea may be embodied in various mechanical expressions within the limits of the appended claims.

What is claimed is:—

1. In combination, a governor roller, a pile elevating mechanism, a control member cam operated in one direction and spring-oper-

ated in the opposite direction, connections between said roller and said member, and a cam surface movable with said member and adapted to actuate said connections during the pile elevating operation to relieve the pressure of said roller on the pile.

2. In combination, a governor roller, a control member, connections between the governor roller and control member, a spring associated with the control member and acting to periodically elevate the governor roller during the normal operation of the machine, and a cam operating to elevate the governor roller during the pile elevating operation.

3. In combination, a governor roller, a control member, connections between the governor roller and control member, a spring associated with the control member and acting to periodically elevate the governor roller during the normal operation of the machine, and a cam carried by the control member.

4. In combination, a governor roller, pile elevating mechanism, a control member cam operated in one direction and spring-operated in the opposite direction, connections between said roller and member including a pivoted lever normally connected to said member and adapted to be automatically disconnected therefrom, and a cam carried by said member and adapted to elevate said roller through said connections when said member and lever are disconnected.

5. In combination, pile elevating mechanism, means for successively forwarding the topmost sheet from the pile, a governor roller adapted to engage the pile, a control member cam operated in one direction and spring-operated in the opposite direction, connections between said roller and member and a cam carried by said member and adapted to actuate said roller to relieve the pressure thereof on the pile while the sheet forwarding means is operating during the pile elevating operation.

6. In combination, a governor roller, a pile elevating mechanism, a control member, connections between said roller and said member including a pivoted lever normally connected to said member and being adjustable with respect to said roller, and a cam carried by said member and adapted to elevate said roller through said connections.

7. In combination, a governor roller, a pile elevating mechanism, a control member, connections between said roller and said member including a shaft on which said roller is mounted, an arm carried by said shaft, a pivoted lever normally connected to said member and being adjustable with respect to said arm, and a cam carried by said member and adapted to elevate said roller through said connections.

8. In a pile elevating mechanism, a frame, a pile support movable therealong, and means for moving the pile support along the frame consisting of a single flexible connection therebetween located centrally of said frame between its opposite sides, and mechanism for lengthening and shortening said connection.

9. In a pile elevating mechanism, a frame, a pile support movable therealong, a driven member carried by the frame and located centrally thereof between its opposite sides, means for driving said member, and a single flexible element passing around a part of said pile support located in substantially vertical alinement with the driven member, said flexible element having one end connected with said frame and its opposite end connected with said driven member.

10. In a pile elevating mechanism, a frame, a pile support movable therealong, a power shaft and a stub shaft both carried by the frame centrally of the opposite sides thereof and extending transversely of each other, driving connections between said shafts, a spool mounted on the stub shaft, and a single chain or the like passing around a part of said pile support located in substantially vertical alinement with said driving connections, said chain having one end connected with said frame and its opposite end connected with said spool.

11. In a pile elevating mechanism, a frame, a pile support movable therealong, a driven member mounted on the frame centrally between the opposite sides thereof, means for driving said member, an idler member mounted on said pile support in substantially vertical alinement with the driven member, and a single flexible element passing around said idler member and having its opposite ends secured to said frame and said driven member respectively.

12. In a pile elevating mechanism, a frame, a pile support movable therealong, a driven spool mounted on the frame centrally between the opposite sides thereof, an idler roller journaled on the pile support below the spool and in substantially vertical alinement therewith, and a single flexible element passing around the idler roller and having one end connected with the spool and the other end anchored to said frame at a point above said idler roller.

13. In a pile elevating mechanism, a frame, a pile support movable therealong, a bracket or the like carried on the frame centrally between the opposite sides thereof, a driving shaft and a driven shaft extending transversely of each other and both having bearings on said bracket, gearing interposed between said shafts and operatively connecting them together, a spool mounted on the driven shaft, an idler member mounted on said pile support below the spool and in substantially vertical alinement therewith, and a single chain or the like passing around the idler member and having one end con-

nected with the spool and the other end anchored at a point above said idler member.

14. In a pile feeding mechanism, a frame, a sheet support movable therealong, two alined normally connected shaft parts for moving the sheet support and having separate bearings on and located centrally between opposite sides of said frame respectively, means for rotating both of the shaft parts as a unit to move the sheet support along the frame in one direction, and means for separating said shaft parts including an element adapted to rotate one shaft part only to move said sheet support along the frame in the opposite direction.

15. In a pile elevating mechanism, a frame, a pile support movable vertically therealong, two alined normally connected shaft parts for moving the pile support and having separate bearings on and located centrally between opposite sides of said frame respectively, means for rotating the shaft parts as a unit to elevate the pile support, and means for disconnecting the shaft parts including an element adapted to rotate one of the same only and lower the pile support.

16. In a pile elevating mechanism, a frame, a pile support movable vertically therealong, bracket-like means supported on and located centrally between opposite sides of the frame, two alined normally connected shaft parts for moving the pile support and having separate bearings on said bracket-like means and the opposite sides of said frame respectively, means for rotating the shaft parts as a unit in one direction to elevate the pile support, and means for disconnecting the shaft parts including an element for rotating one of the same only in the opposite direction to lower the pile support.

17. In a pile feeding mechanism, a frame, a sheet support movable therealong, bracket-like means supported on and located centrally between opposite sides of the frame, two alined normally connected shaft parts for moving the sheet support and having separate bearings on said bracket-like means and the opposite sides of said frame respectively, automatically operated means for rotating both of said shaft parts as a unit to move the sheet support along the frame in one direction, and manually operated means for rotating the shaft parts as a unit to move the sheet support along the frame in said direction, said manually operated means being adapted to disconnect the shaft parts and rotate only one of the same to move the sheet support along the frame in the opposite direction.

18. In a pile feeding mechanism, a frame, a sheet support movable therealong, a separable two-part shaft for moving the sheet support and rotatably mounted on opposite sides of the frame, a bracket supported on and located centrally between said sides of the frame and providing separate bearings for the inner opposed ends of said shaft, cooperating clutch elements arranged between opposite sides of said bracket and secured to said inner opposed ends of the two-part shaft respectively, means for rotating the shaft as a unit to move the sheet support along the frame in one direction, and a single means for longitudinally displacing one part of the shaft in its bearings to disengage said clutch parts, rotate said shaft part, and move the sheet support along the frame in the opposite direction.

In testimony whereof said executor, by its president, has signed this specification.

[L. S.] FIRST NATIONAL BANK AND TRUST COMPANY OF PEARL RIVER, NEW YORK,

By CHRISTOPHER BARGFREDE,

President,

Executor of the Estate of Carl E. Christophel, Deceased.