Feb. 15, 1927. 1,618,042

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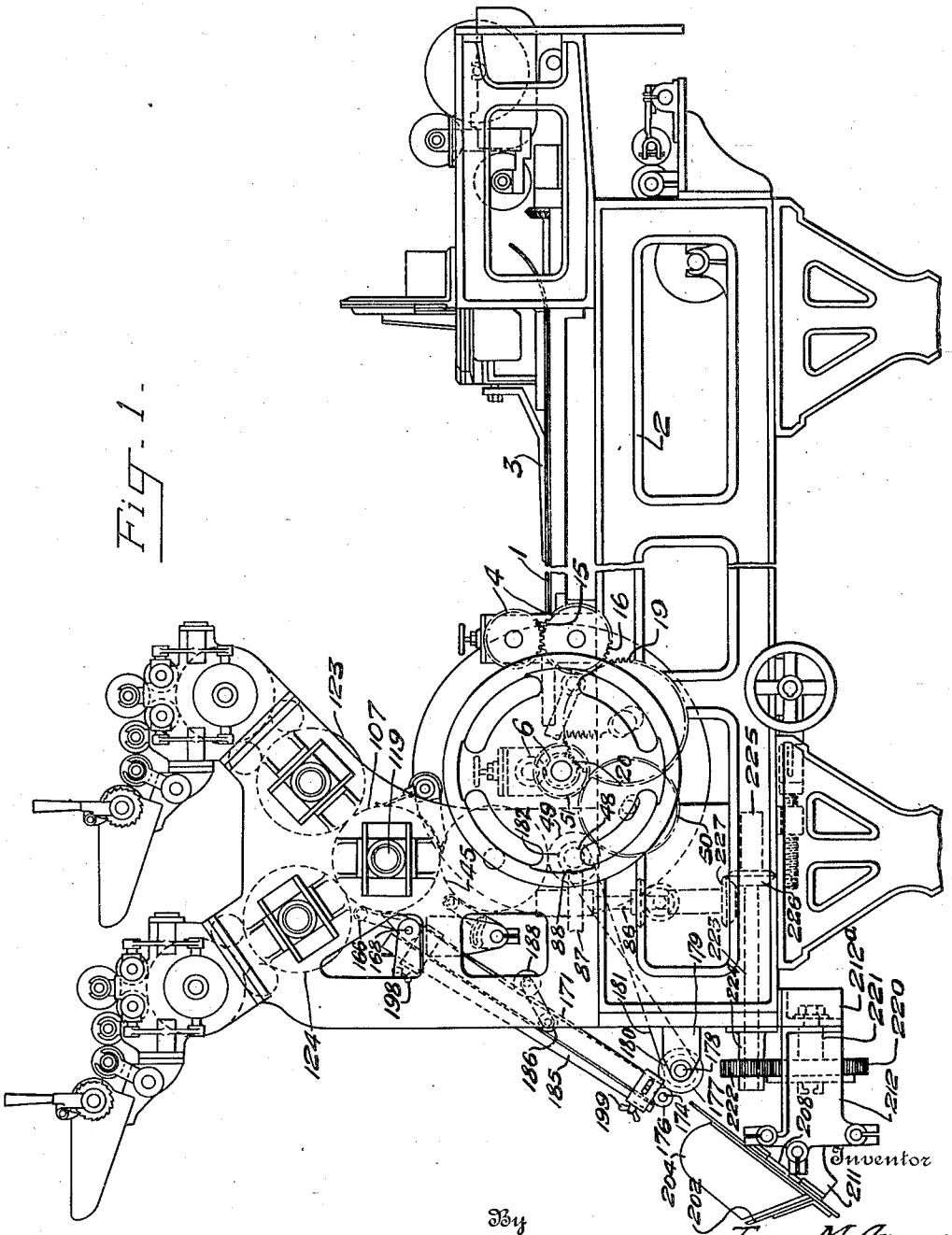
BAG DELIVERY MECHANISM

Original Filed Sept. 30, 1925 5 Sheets-Sheet 1

Fig. 1.



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Original Filed Sept. 30, 1925 5 Sheets-Sheet 2

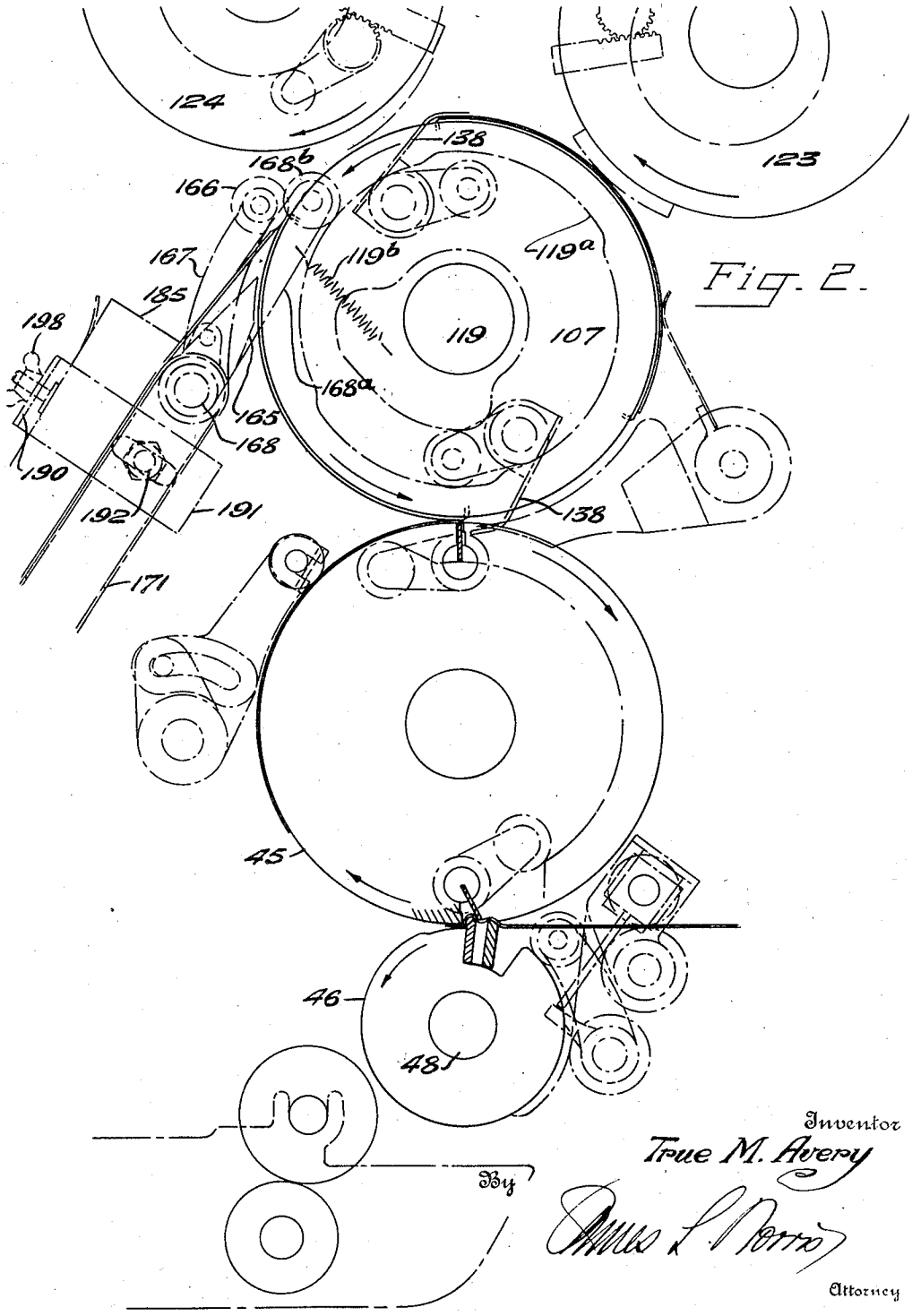

Fig. 2.

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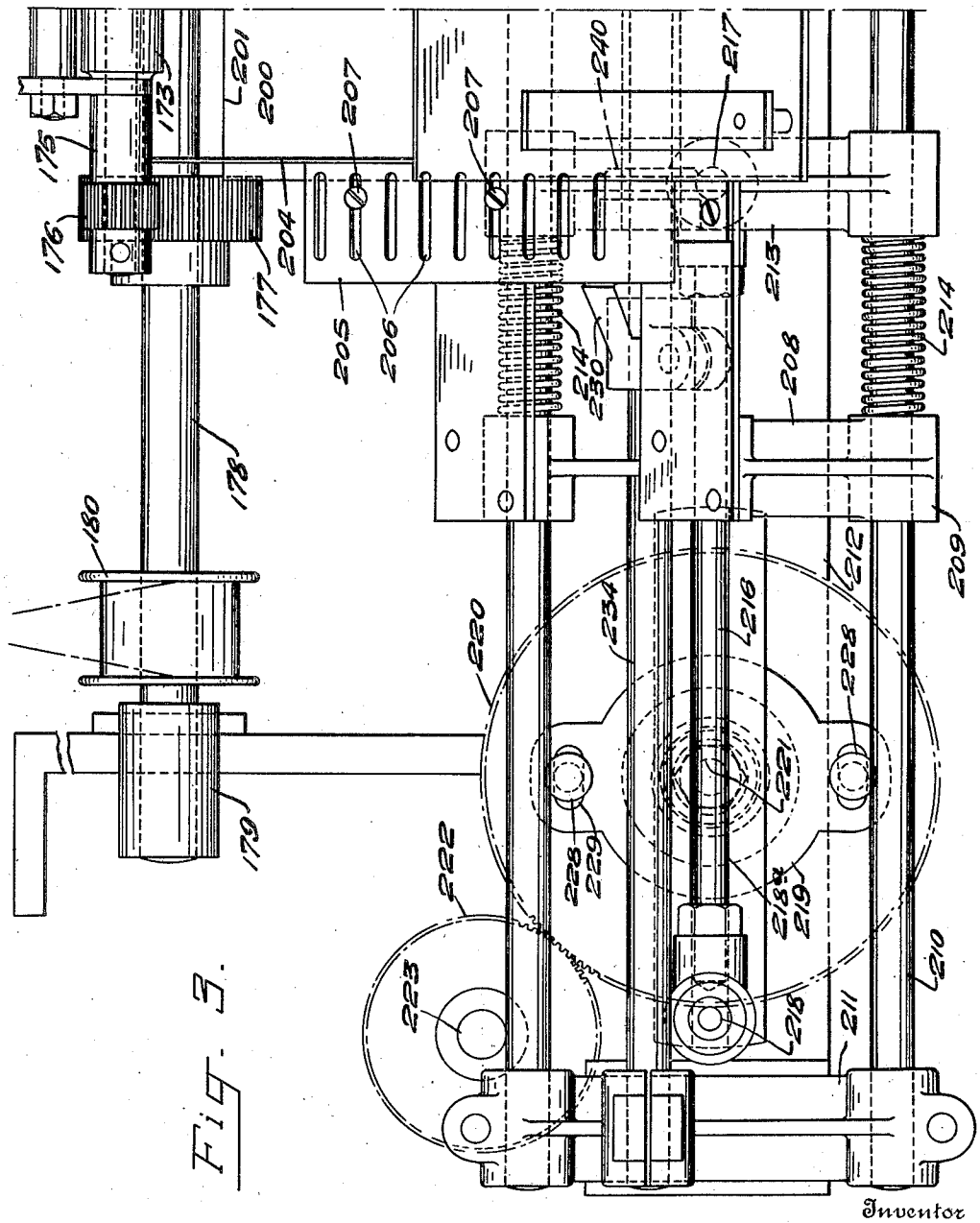

Fig. 3.

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BAG DELIVERY MECHANISM

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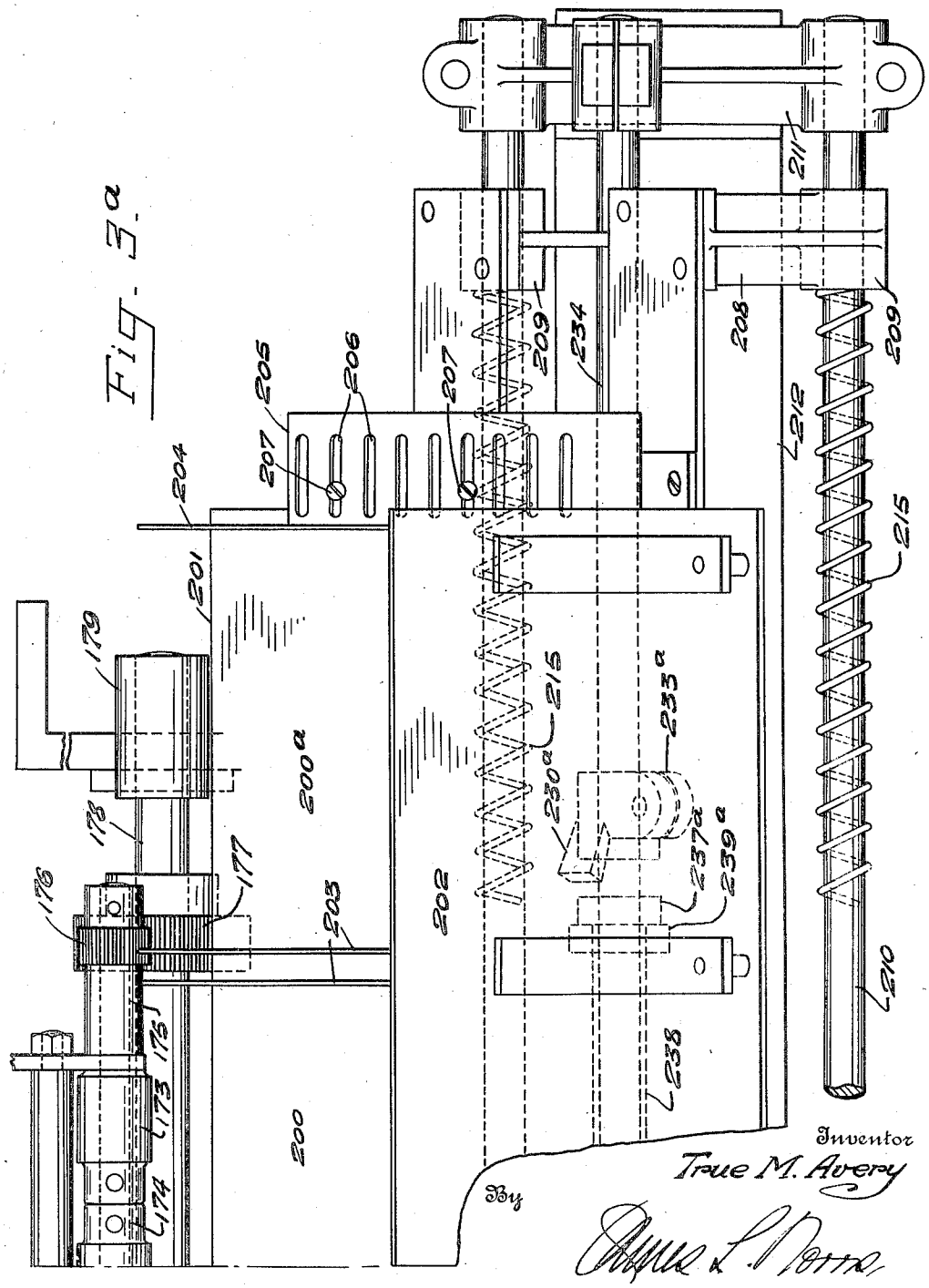
Fig. 3a



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BAG DELIVERY MECHANISM

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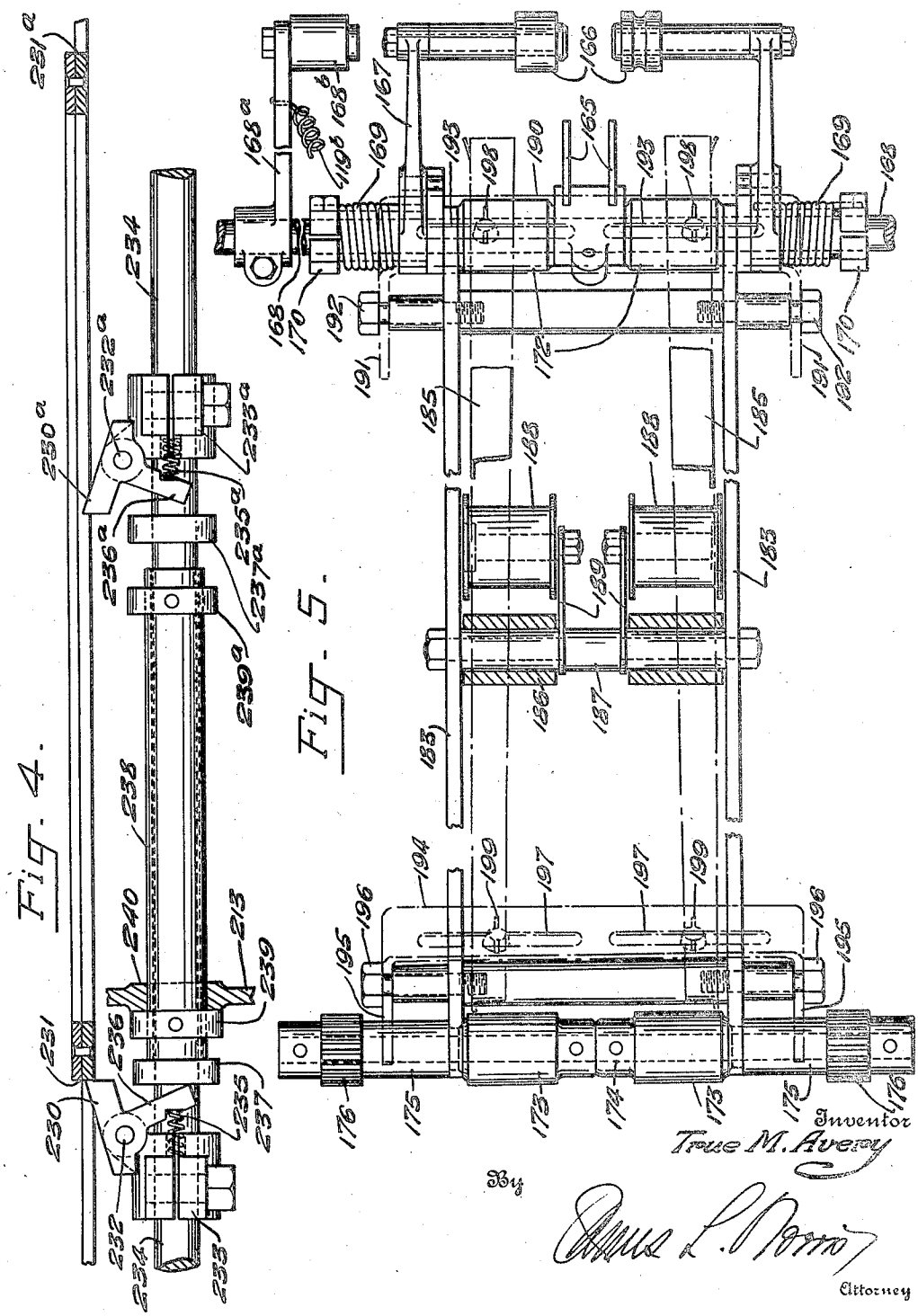

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

TRUE M. AVERY, OF GLENS FALLS, NEW YORK, ASSIGNOR TO UNION BAG & PAPER CORPORATION, OF HUDSON FALLS, NEW YORK, A CORPORATION OF NEW YORK.

BAG-DELIVERY MECHANISM.

Original application filed September 30, 1925, Serial No. 59,668. Divided and this application filed May 18, 1926. Serial No. 110,002.

The present invention relates to improvements in machines for making or making and printing bags and the like, and the primary object of the invention is to provide novel and improved means for stacking the finished bags in piles each of a predetermined or counted number, so that the bags are delivered by the machine in bundles which may be readily removed from the machine ready for packing and shipment. Another object of the invention is to provide stacking and counting mechanism which stacks the bags to alternately form different piles or bundles so that one completed pile or bundle of bags may be removed while the machine continues to operate and to deposit the bags in another pile. Another object of the invention is to provide a novel and improved chute and associated means for delivering the bags to the stacking means. A further object of the invention is to provide means whereby the stacking means and the bag delivery chute are adjustable to accommodate them to bags of different sizes.

The present application is a division of my prior application Serial No. 59,668, filed September 30, 1925.

In the accompanying drawings:—

Figure 1 is a side elevation of a combined bag-forming and printing machine corresponding to that shown in my prior application referred to and which embodies the present invention;

Figure 2 is a diagrammatic view of the bag-forming and printing portions of the machine showing the means which delivers the printed bags therefrom;

Figures 3 and 3ª illustrate, respectively, the left-hand and right-hand ends of the bag-stacking portion of the delivery mechanism whereby the finished bags are stacked in piles each of a predetermined or counted number;

Figure 4 is a detailed view of the triggers and controlling mechanism whereby the delivery mechanism is caused to operate to stack the finished bags in alternate piles; and

Figure 5 is a detail view of the bag-delivery chute or conveyor which conducts the finished bags from the printing or bag-making portion of the machine to the stacking mechanism;

Similar parts are designated by the same reference characters in the several views.

Counting and delivering mechanism embodying the present invention is applicable generally to machines for making bags or the like wherein it is desirable to bundle the bags or other articles in piles each of predetermined or counted number, the invention being especially applicable to machines for making bags or for making and printing bags. The invention is shown in the present instance as applied to or forming part of a combined bag-making and printing machine of the type shown and described in my prior application hereinbefore referred to and to which application reference is made for a complete understanding of the machine.

The machine as shown may be described briefly as comprising a former 1 which extends longitudinally of the main frame 2 and is adapted to receive a flat strip of paper which is fed thereto and folded around it by a folding device 3 in a manner well known to those familiar with bag-making machines of this general class. The paper tube is fed continuously along the former by a pair of draw rolls 4 which grip the paper tube between them, and the portion of the paper tube which has been advanced beyond the former is gripped at predetermined intervals by the pinch rolls 6. While the paper tube is held by these pinch rolls, it is severed to form the bag sections by a breaker arm in the well known manner. The lower pinch roll shaft may be utilized as the main or driving shaft from which the various parts of the machine are driven, the draw roll shafts being connected by gears 15 and 16 and the gear 16 being driven from the lower pinch roll shaft through a gear 19 which meshes with a pinion 20 fixed on the lower pinch roll shaft.

The severed bag sections are delivered from the pinch rolls 6 to upper and lower folder rolls 45 and 46 which are provided with means to nip and fold the leading end

of the bag section to form the bottom fold thereon, these rolls rotating at equal peripheral speed in the directions indicated by the arrows in Fig. 2, and the nipped bag section is carried by the rotation of the upper folder roll 45 to a point opposite to an impression roll 107 which carries grippers 138, the leading folded end of the bag section being received and gripped by these grippers, immediately following which the nipped end of the bag section is released from the upper folder roll 45, and rotation of the impression roll 107 while the bag section is gripped thereon carries the bag section past printing rolls 123 and 124 which are driven in the direction of the arrows in Fig. 2. A detailed description of these operations is contained in my prior application referred to, to which reference is made for a complete understanding thereof. The lower folder roll shaft 48 has a driving gear 49 fixed thereon, and this driving gear receives its motion from a gear 50, the latter meshing with a gear 51 which is fixed on the main or lower pinch roll shaft. The upper and lower folder rolls, the impression roll, and the printing cylinders may be driven by gearing such as that fully shown and described in my prior application referred to.

The finished bags are received from the impression roll 107 by a chute. For this purpose, doffers 165 may be employed which extend into close proximity to the surface of the impression roll, and a pair of rubber or other relatively yielding rollers 166 are provided which bear on the bag at points beyond the ends of the doffers. These rollers are pressed yieldingly against the impression roller by a spring 119^b which is connected to an arm 168^a fixed on the shaft 168 which carries the arms 167 on which the rollers 166 are mounted, the spring 119^b holding the roller 168^b on the end of the arm 168^a against a suitably shaped cam 119^a fixed on the shaft 119 of the impression roll. The rollers 166 are preferably capable of acting independently of one another. As shown in Figure 5, the arms 167 which support these rollers are loosely or rotatably mounted on the shaft 168 and separate springs 169 which are interposed between the arms 167 and collars 170 which are clamped or otherwise adjustably fixed on the shaft 168 act to independently force the rollers 166 into contact with the longitudinal edges of the bag on the impression roll. As the leading edge of a bag on the impression roll approaches the rollers 166, the cam 119^a acting on the cam roller 168^b pushes the rollers 166 away from the periphery of the impression roll and at the same time the doffers 165 which are fixed to the shaft 168 are moved into operative position to effect the transfer of a finished bag from the impression roll to the chute.

The finished bags are delivered by the doffers 165 and rollers 166, or by any other suitable means, to the entrance of a delivery chute which comprises, in the present instance, a pair of endless belts 171 which pass over idler rollers 172 which may be loosely journaled on the shaft 168 at one end of the chute and over driving pulleys 173 on a shaft 174 which is mounted in bearings 175 at the opposite or lower end of the chute. These travelling belts provide a surface on which the printed bags may rest and with which they may travel during their discharge from the machine. The shaft 174 to which the belt driven pulleys 173 are fixed may be driven by gears 176 fixed thereon and arranged to mesh with gears 177, the latter being fixed on a shaft 178 which is mounted in bearing brackets 179 located at the delivery end of the machine, the shaft 178 being provided with a belt pulley 180 to receive a driving belt 181 which passes over a belt pulley 182 which is fixed on the lower folder roll shaft 48. The chute may have side members 183 to connect the shafts 168 and 174 and to support the various parts of the chute, guides 185 being preferably provided at the sides of the chute to prevent lateral displacement of the bags. The intermediate portions of the upper stretches of the travelling belts may be supported by idler rollers 186 which may be mounted on a cross member 187 which connects the side members 183 and intermediate tensioning rollers 188 may also be provided to engage the lower stretches of the belts, these tensioning rollers being shown mounted on arms 189 which are pivoted to swing about the cross member 187.

The guides 185 are preferably adjustable laterally in order to accommodate the chute to bags of different widths. For this purpose, a plate 190 having slotted lugs 191 formed thereon is clamped by the screws 192 to the opposite sides of the frame members 183 toward the upper end of the chute, this plate having transversely extending slots 193 therein, and a similar plate 194 is provided toward the lower end of the chute, this plate having slotted lugs 195 which are adjustably clamped by the screws 196 to the outer sides of the respective frame members 183, this lower plate also having transversely extending slots 197 therein. The guide members 185 extend beneath the slotted portions of the plates 190 and 194, and they carry clamping screws 198 and 199 which are adjustable longitudinally in the respective transverse slots 193 and 197 of the plates 190 and 194 when the screws are loosened, thereby permitting transverse adjustment of the respective guides, and when these screws are tightened, the guides are secured in adjusted position. The guides 185 serve not only to prevent displacement

of the bags laterally from the conveyor belts, but they are flanged, as shown, so that they overhang the lateral edges of the bags on the conveyor belts, and they thus prevent displacement of the bags by movement thereof in a direction away from the bag supporting surfaces of the conveyor belts.

The finished and printed bags are delivered from the lower end of the delivery chute to the stacking and counting mechanism in which they are piled or stacked in condition for removal in convenient form from the machine. The present invention provides bag delivery means which is capable of stacking a predetermined number of bags, the operations of forming the successive piles being controlled automatically.

The bag stacking means, as shown in the present instance, embodies a duplex bag receiver which provides a pair of bag receiving compartments 200 and 200a, this bag receiver being mounted on a carriage which is shiftable in a direction transversely of the delivery chute whereby either one or the other of the bag receiving compartments may be brought into position to receive and stack the bags delivered by the chute. The bag receiver may be constructed in different ways. As shown, it comprises a rear wall or plate 201, which forms the back of both bag receiving compartments, and a bottom plate 202 which forms a stop and support for the bottom edges of the bags as they are delivered into the receiver. The different bag compartments of the receiver are separated by vertical partition plates 203 which may be located midway of the receiver, and the outer side walls of the compartments are formed by plates 204 which are arranged vertically at the front of the rear plate 201 and toward the opposite ends thereof. These end plates 204 are preferably adjustable in a direction toward and from the intermediate partition plates 203 in order to set the width of the compartments to conform with the width of the bags to be handled. For these purposes, each of the end plates 204 may be provided with a laterally extending flange 205 which is adapted to partly overlap and lie flatwise against the face of the rear plate 201, and this flange is provided with a suitable number of longitudinal slots 206 to receive screws 207 which, when tightened, will serve to hold the end plates in adjusted position. It will be observed from Figure 1 that the upper edge of the rear plate 201 of the bag receiver is positioned below and in approximate alinement with the chute, so that it will receive the bags delivered thereby.

The carriage which supports the bag receiver for movement in a direction transversely of the discharge end of the delivery chute whereby one or the other of the bag receiving compartments may be brought into position to receive and stack the bags, comprises, in the present instance, a frame 208 which projects to or beyond the ends of the bag receiver and is formed with bearings 209 which are adapted to slide freely on guide rods 210. These guide rods are fixed at their ends in frame members 211, these frame members being parts of a frame 212 which is bolted or otherwise secured to the adjacent end of the lower portion of the machine as shown in Figure 1, so that the operative relation of the bag-delivery mechanism to the machine from which it receives the bags is properly maintained.

By mounting the bag receiver in the manner described, it may be shifted, by sliding its carriage along the rods 210, to bring either of the bag receiving compartments thereof into position to receive the bags from the delivery chute. For example, in Figures 3 and 3a, the left-hand compartment 200 is shown in position beneath the discharge end of the delivery chute so that this compartment will receive and stack the bags as they are delivered, but by shifting the bag receiver and its carriage toward the left, the compartment 200 will be moved out of bag receiving position and the right-hand compartment 200a will be brought into such position.

Means is provided for automatically shifting the bag receiver to interrupt the discharge of bags into one of the compartments when such compartment has received a predetermined number of bags and to bring the other compartment into position to receive and stack the bags, and such means is so constructed that it will effect the shift of the bag-receiver with such rapidity that the delivery of the bags from the machine will not be interrupted or interfered with. As shown, such means comprises a cross-head 213 and compression springs 214 and 215 which are interposed, respectively, between the opposite sides of the cross-head and the carriage. The compression springs 214, which may be conveniently mounted on the rods 210 in order to support them, are interposed between the left-hand side of the cross head 213 and the left-hand slide bearings 209 of the carriage, while the compression springs 215 are interposed between the right-hand side of the cross-head and the right-hand slide bearings 209. When the cross-head, which is guided on the rods 210 is shifted toward the left or right, it will compress the springs at the respective side thereof, and thereby tend to shift the carriage and the bag-receiver toward the left or right, as the case may be. In Figure 3, the cross-head is shown shifted toward the left, the right-hand springs 215 being then uncompressed while the springs 214 are compressed, and the tendency is for the bag receiver to shift toward the left under those conditions.

The cross-head is moved alternately in left-hand and right-hand directions during the operation of the machine, and preferably this motion of the cross-head is a regular or gradual one. As shown, the cross-head is reciprocated by a connecting rod 216 which is pivotally connected at 217 to the cross-head and is operatively connected to a crank pin 218 which is carried by a crank disk 219, the latter being formed on or attached to a gear 220. This gear 220 is mounted on a stud 221 which is supported on a cross member 212ª of the frame 212, and it meshes with a gear 222 which is fixed on a shaft 223, this shaft being journaled in bearings 224 and 225 on the frame of the machine. The shaft 223 is constantly connected to and driven from a shaft 86 which is mounted in suitable bearings on the frame of the machine and is driven from the lower folder roll shaft 48 through a worm wheel 87 on the upper end of the shaft 86 and a worm 88 on the lower folder roll shaft, the shaft 86 being connected to the shaft 223 by bevel gears 226 and 227. The ratio of the gearing between the lower folder roll shaft and the crank driving gear 220 is such that the gear 220 will make a half revolution which will complete the throw of the cross-head 213 in one direction during the passage of any desired or predetermined number of bags through the machine. For example, if it is desired to stack fifty bags in each pile, the ratio of the gearing between the cross-head driving gear 220 and the lower folder roll shaft would be such that the gear 220 would complete a half revolution during fifty revolutions of the lower folder roll shaft, the latter making one revolution for each bag which passes it. In order to enable timing of the strokes of the bag receiver so that it will reverse its position during the interval between the successive deliveries of two bags, the crank 219 which carries the pin 218 may be secured adjustably to the gear 220 by bolts 228 which extend through circumferential slots 229 formed in the crank member, thus enabling the latter to be rotated to some extent relatively to the gear 210, and in order to provide an ample interval between the successive deliveries of the bags to the receiver for the reversal of the latter, during such interval, the belts 171 of the bag delivery chute are driven at such speed that the speed of the bags will be doubled as they enter the chute from the machine. In order to properly set or adjust the range of movement of the cross-head, the pin 218 may be adjustably secured in a radial slot 218ª in the crank member.

While the cross-head 213 will advance more or less regularly during the passage of the bags through the machine, the bag receiver will occupy a stationary position with one or the other of its bag-receiving compartments in position to receive the bags discharged from the delivery chute until the predetermined number of bags has been received by such compartment, whereby the bag receiver will shift its position quickly to remove the filled compartment and to bring the other compartment into position to receive the bags. Automatic means is provided by the present invention for effecting such operation of the bag receiver. Such mechanism comprises a pair of reversely arranged triggers 230 and 230ª which are arranged to engage, respectively, abutments 231 and 231ª on the carriage or bag receiver. As shown in Figures 3 and 4, the trigger 230 will engage the abutment 231 when the bag receiver occupies its right-hand position, the compartment 200 being then in position to receive the bags from the delivery chute and the receiver is held in this position by the trigger 230. When the bag receiver is shifted to the left or into its left-hand position where the compartment 200ª is beneath the delivery chute to receive the bags therefrom, the trigger 230ª will engage the other abutment 231ª and the bag receiver will thus be held in its left-hand position. The triggers are pivotally mounted at 232 and 232ª on collars or brackets 233 and 233ª which may be clamped or otherwise suitably secured at appropriate points along the length of a rod 234, the latter extending in parallelism with the carriage supporting rods 210 and being secured and supported at its ends in the frame members 211. Springs 235 and 235ª act to yieldingly force the triggers into engaging relation with the abutments 231 and 231ª, respectively these springs acting on the tails 236 and 236ª of the respective triggers. The rod 234 supports a pair of trigger trimming collars 237 and 237ª, and between these collars is mounted a tube or sleeve 238 which is mounted loosely on and is movable freely longitudinally of the rod 234, this tube or sleeve having a limited amount of lost motion or play between the collars 237 and 237ª. The tube 238 has abutment collars 239 and 239ª which are clamped or otherwise secured at proper points of adjustment along the tube or near the ends thereof. The cross-head 213 has a hub 240 which moves loosely and longitudinally over the tube or sleeve 238 between the abutment collars 239 and 239ª.

The operation of the delivery mechanism as described is as follows: Referring to Figures 3, 3ª and 4, it will be noted that the left-hand bag compartment 200 is below the bag delivery chute, the carriage occupying its right-hand position while the crank pin 218 has substantially reached its left-hand position, the cross-head 213 being in consequence shifted into its left-hand position

and the springs 214 being compressed between the cross-head and the right-hand slide bearings 209 on the carriage, so that these springs are acting with a tendency to shift the carriage to the left. The carriage, however, is retained in its right-hand position by the trigger 230 which engages its abutment 231. The parts occupy this position when a pile of bags comprising nearly the full number of bags to be received by the compartment have been delivered thereto, but as the delivery of the bags continues, the crank pin 218 will continue its movement toward the left until it reaches the dead center position, and during this final portion of the movement of the crank pin toward the left, the hub 240 of the cross-head 213 picks up the collar 239 on the sleeve 238 and shifts the tube 238 toward the left, forcing the collar 237 against the tail 236 of the trigger and thereby retracting the latter from the abutment 231. The carriage is thereby released and it will make a rapid stroke toward the left under the influence of the compressed springs 214, and when this left-hand stroke of the carriage has been completed, the other trigger 230^a will latch and engage the abutment 231^a, thereby holding the carriage in its left-hand position.

This shift of the carriage brings the other bag compartment 200^a into position beneath the delivery chute, so that as the bags continue their discharge from the machine they are stacked in this compartment. The other filled compartment 200 which is shifted out of position beneath the delivery chute, will be in a position where the bags may be conveniently removed therefrom, and this compartment will be ready to receive another stack of bags after the carriage has shifted back to its former position. As the bags are delivered into the compartment 200^a, the cross-head 213 will be gradually shifted from the collar 239 to the collar 239^a due to the right-hand stroke of the crank pin 218 during the next half revolution of the driving gear 220 and when the cross-head reaches the collar 239^a, which occurs when the number of bags delivered to the compartment 200^a approaches the predetermined number to be received by it, the collar 239^a is picked up by the cross-head and shifted toward the right in Figure 4, thereby shifting the tube 238 to the right in this figure, and when the cross-head reaches the limit of its right-hand movement, the collar 237^a will have engaged the tail 236^a of the trigger 230^a and rock the same to release it from the abutment 231^a, thereby tripping the carriage and permitting it to shift rapidly toward the right under the influence of the springs 215 which will then be compressed while the springs 214 are uncompressed. The bag filled compartment 200^a is thereby removed from bag-receiving position and the compartment 200 brought into position to receive and stack bags delivered by the chute.

The reversals in the position of the bag receiver to cause the compartments therein to alternately receive the bags takes place automatically during the operation of the machine, the bags are stacked alternately in the different compartments so that the bags may be conveniently removed from a filled compartment while the machine may continue its operation and deliver bags to the other compartment, and the mechanism described may be adjusted so that each pile of bags will contain a predetermined or counted number.

I claim:—

1. In a machine of the class described, a bag delivery chute comprising a frame supporting travelling belts for conveying the bags, brackets supported at the sides and overhanging the upper side of the frame, and guide members mounted on said overhanging brackets and arranged at the side edges of said belts and overlying the latter for guiding the bags during their travel therewith.

2. In a machine of the class described, a bag delivery chute comprising a frame supporting travelling belts for conveying the bags, brackets supported at the sides of the frame and bridging the upper side thereof, guides having portions thereon arranged at the sides of the belts and inturned flanges which overlie the belts, said inturned flanges of the guides being secured to and adjustable laterally on the bridging portions of the brackets to accommodate the guides to bags of different widths.

3. In a machine of the class described, bag delivery means comprising a chute through which the bags are delivered, and a bag receiver having a plurality of compartments, the receiver being reciprocable to bring said compartments successively into position to receive bags from the chute.

4. In a machine of the class described, bag delivery means comprising a chute for discharging bags, a reciprocatory bag receiver having a plurality of bag receiving compartments, and means for shifting the receiver in a direction laterally of the chute to bring another compartment thereof into bag receiving position each time a predetermined number of bags has been delivered.

5. In a machine of the class described embodying means for advancing bags successively therethrough and means for delivering the bags therefrom, a reciprocatory bag receiver having a plurality of bag receiving compartments, means for storing power to shift the bag receiver in either direction to bring one or another of said compartments into bag receiving position, and

means controlled by the bag advancing means of the machine for operating said power storing means to cause the bag receiver to shift its position to bring another compartment into bag receiving position each time a predetermined number of bags has been delivered by the machine.

6. In a machine of the class described, bag receiving means comprising a receiver shiftable to bring different portions thereof into bag receiving position, means for storing power to effect shifting movement of the receiver, means for holding the receiver against movement during said storing of power, and means for releasing the receiver from said holding means to cause the stored power to shift the receiver.

7. In a machine of the class described, a bag receiver shiftable to bring different portions thereof into bag receiving position, power-storing means for shifting the receiver, power-driven means for effecting the storage of power in said power-storing means, means for holding the receiver against movement during such storage of power, and means controlled by said power driven means for tripping said holding means to cause shifting of the receiver by the power-storing means when said power-driven means has been advanced to a predetermined extent.

8. In a machine of the class described, a bag receiver reciprocable to alternately bring different portions thereof into bag-receiving position, reversely acting power-storing means for shifting the receiver, a power-driven reciprocatory member operative to alternately operate said power-storing means to store power therein, and trigger means for holding the receiver against shifting movement during the storage of power in each of said power-storing means, said trigger means being automatically tripped by said reciprocatory member each time it has been reciprocated to a predetermined extent.

9. In a machine of the class described, a reciprocating bag receiver having compartments therein to be positioned alternately to receive bags, oppositely-acting springs for reciprocating the receiver in reverse directions, a reciprocatory member operative alternately on said springs to store power therein to effect the reciprocations of the receiver, and a pair of triggers for holding the receiver in each of its bag receiving positions, said triggers being tripped automatically when said reciprocatory member reaches predetermined positions.

10. In a machine of the class described, a reciprocating bag receiver, springs arranged to act in reverse directions on the receiver to reciprocate it, triggers operative to hold the receiver in its reciprocated positions, a power-driven crank, and a member reciprocated by said crank and operative during each stroke thereof to first store power in one of said springs and to then trip the respective trigger whereby the receiver will be caused to shift its position.

11. In a machine of the class described, a bag receiver having a pair of bag-receiving compartments, the receiver comprising a bottom plate, intermediate partitions projecting upwardly therefrom, and end plates projecting upwardly from the bottom plate, the end plates having slotted flanges which lie flatwise against the bottom plate at the outer sides of the end plates to receive screws which clamp the end plates adjustably in position.

In testimony whereof I have hereunto set my hand.

TRUE M. AVERY.