M. J. BIGELOW, C. C. CADDEN & J. REHAK.

MAIL FEEDING DEVICE.

APPLICATION FILED JAN. 29, 1917.

1,256,975.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 1.

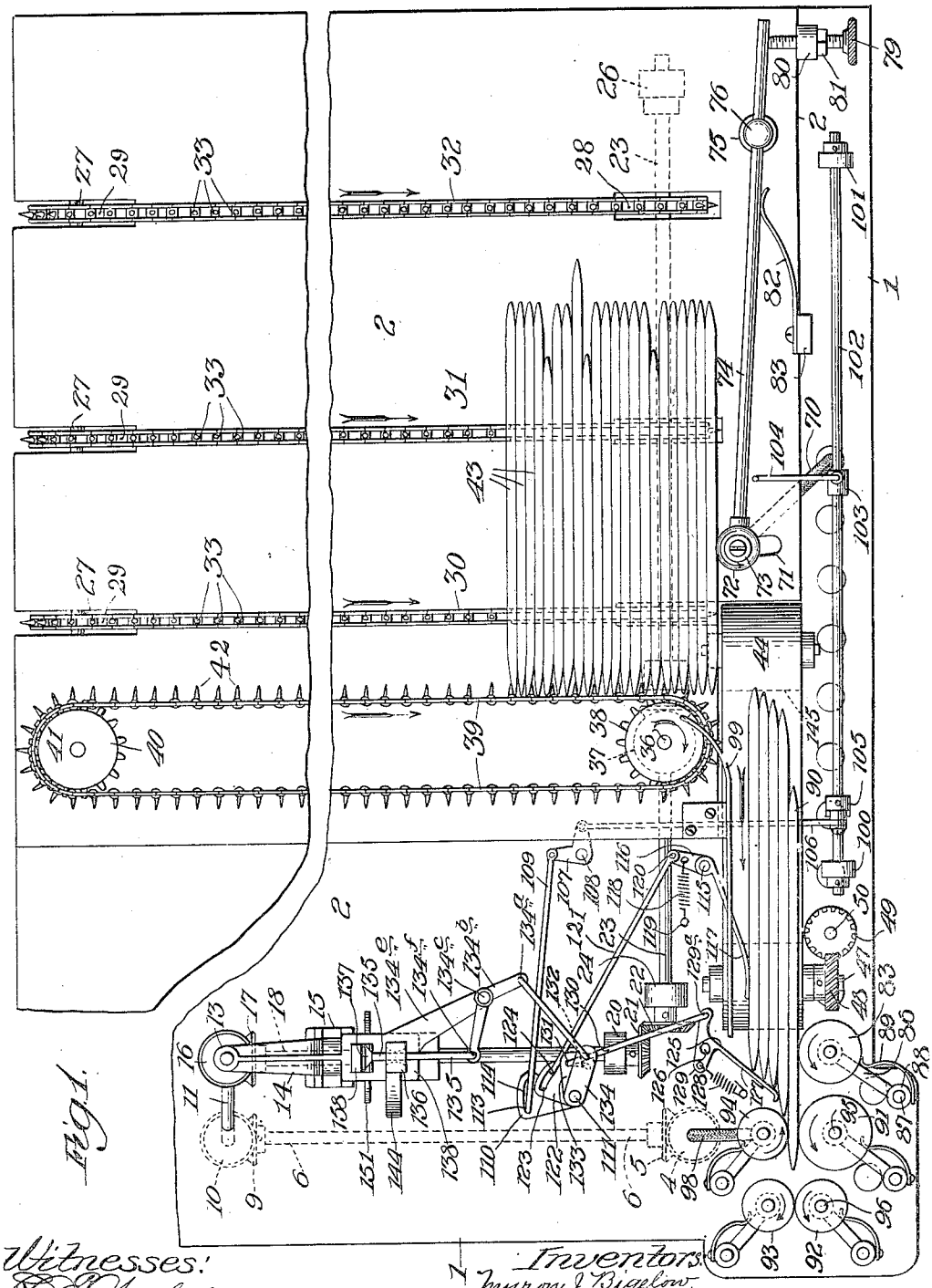


Fig. 1.

Witnesses:
C. C. Taylord.
Chas. A. Buell

Inventors:
Myron J. Bigelow,
Charlie C. Cadden,
James J. Rehak,
By David A. Fletcher, Atty.

M. J. BIGELOW, C. C. CADDEN & J. REHAK.

MAIL FEEDING DEVICE.

APPLICATION FILED JAN. 29, 1917.

1,256,975.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 2.

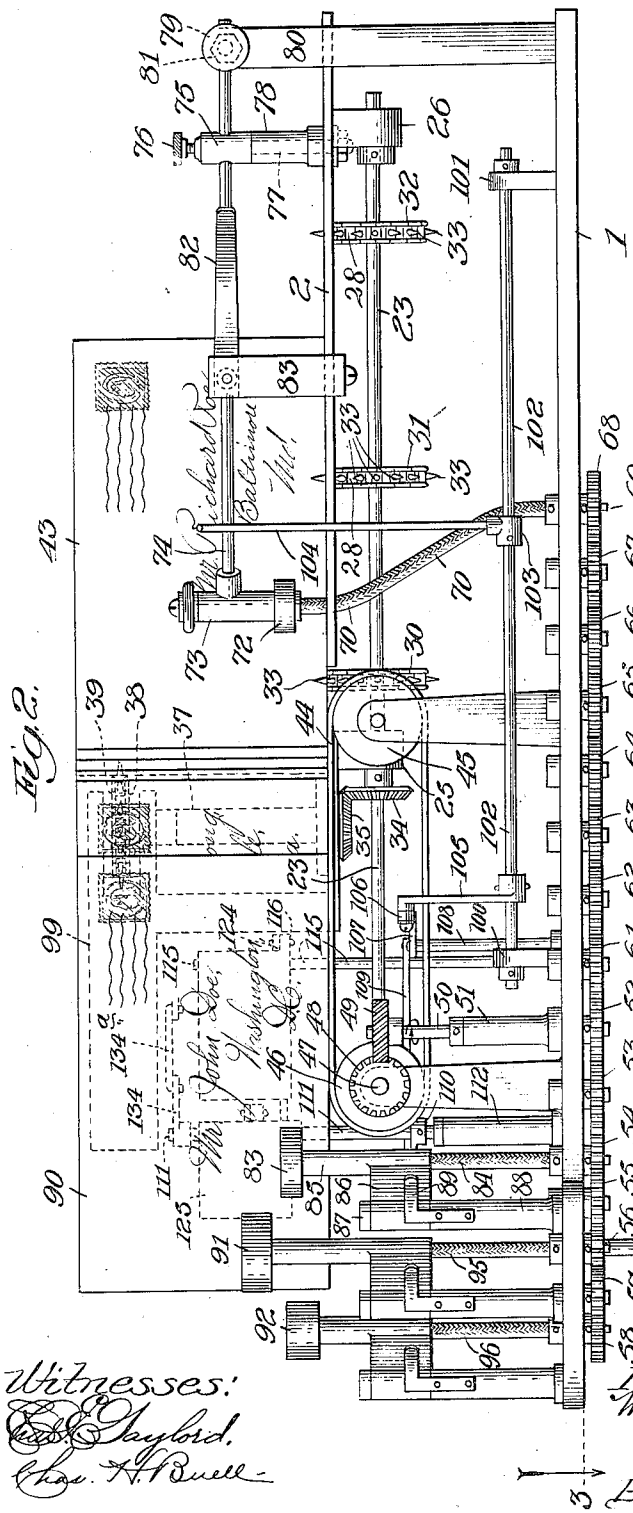


Fig. 2.

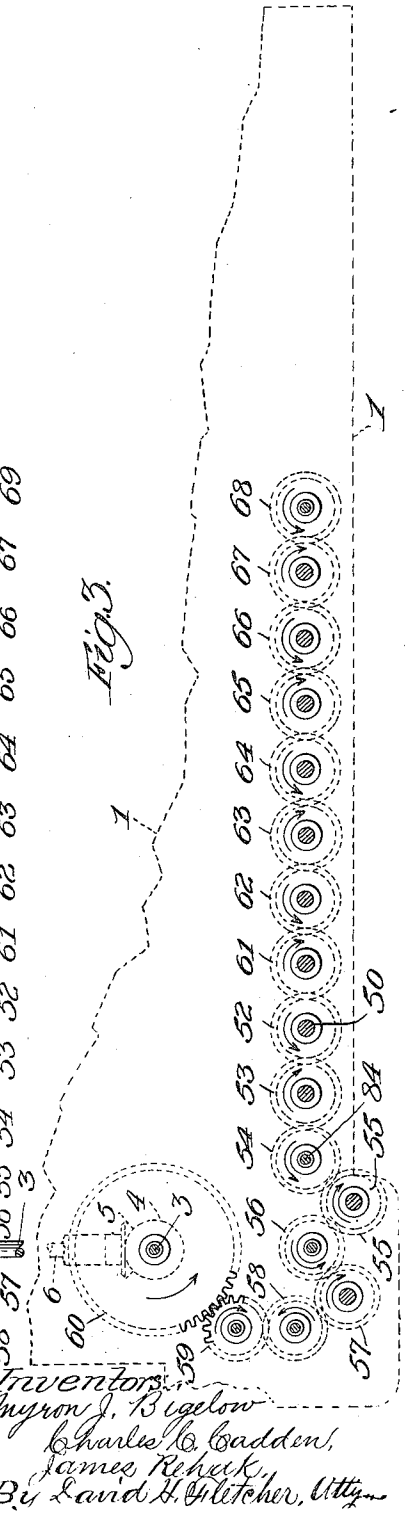


Fig. 3.

Witnesses:
C. E. Gaylord.
Chas. H. Buell.

Inventors:
Myron J. Bigelow,
Charles C. Cadden,
James Rehak,
By David H. Gleicher, Atty.

M. J. BIGELOW, C. C. CADDEN & J. REHAK.

MAIL FEEDING DEVICE.

APPLICATION FILED JAN. 29, 1917.

1,256,975.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 3.

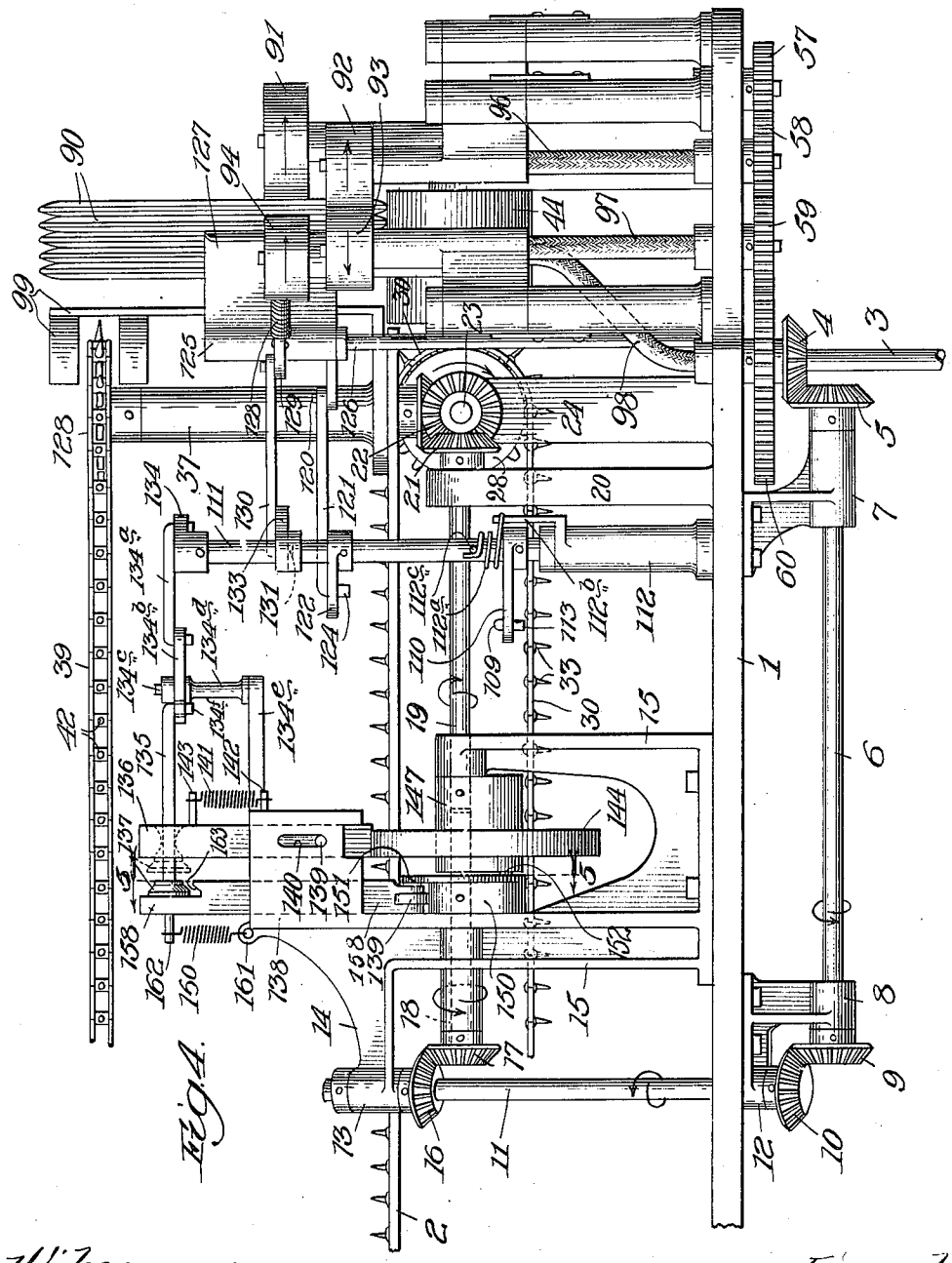


Fig. 4.

Witnesses:
Chas. Gaylord.
Chas. H. Burell

Inventors:
Myron J. Bigelow,
Charles C. Cadden,
James Rehak,
By David A. Fletcher, Atty.

M. J. BIGELOW, C. C. CADDEN & J. REHAK.

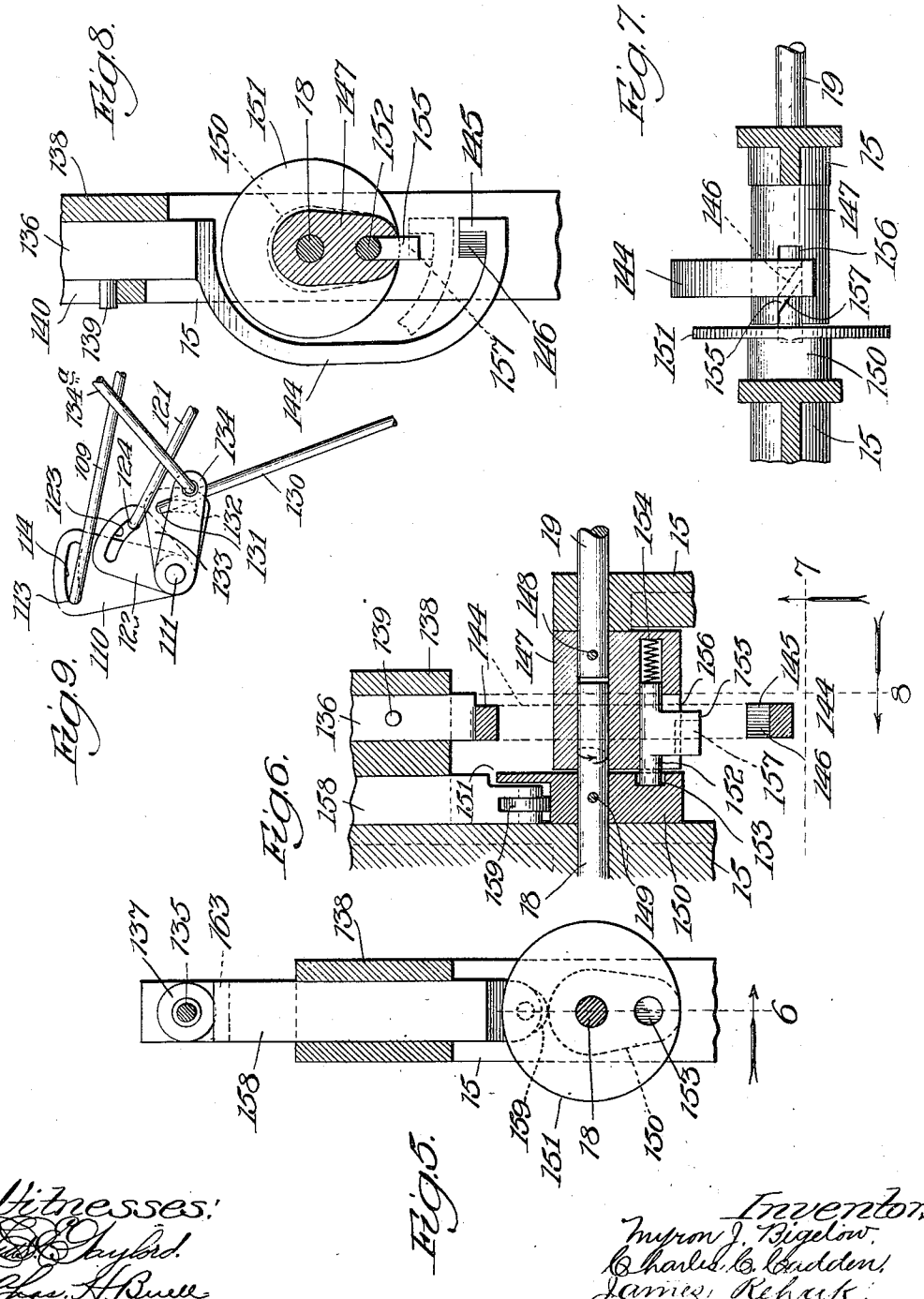
MAIL FEEDING DEVICE.

APPLICATION FILED JAN. 29, 1917.

1,256,975.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 4.



Witnesses:
Geo. Gaylord.
Chas. H. Burell

Inventors:
Myron J. Bigelow.
Charles C. Cadden.
James Rehak.
By David M. Fletcher, Atty.

UNITED STATES PATENT OFFICE.

MYRON J. BIGELOW, CHARLES C. CADDEN, AND JAMES REHAK, OF AKRON, OHIO, ASSIGNORS TO THE MECHANICAL EFFICIENCY COMPANY, OF AKRON, OHIO, A PARTNERSHIP COMPOSED OF B. G. WORK, J. K. MITCHELL, C. A. MUNN, AND C. GEHRING.

MAIL-FEEDING DEVICE.

1,256,975. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed January 29, 1917. Serial No. 145,154.

To all whom it may concern:

Be it known that we, MYRON J. BIGELOW, CHARLES C. CADDEN, and JAMES REHAK, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Mail-Feeding Devices, of which the following is a description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding numerals of reference in the different figures indicate like parts.

Our invention relates to mechanism for feeding mail matter to distributing, classifying, canceling or other analogous machines for handling mail or other similar matter in post offices or elsewhere, and our object, primarily, is to provide simple, cheap, and effective means for automatically controlling the delivery of mail-pieces from a conveyer to suitable feed and separating rolls or like mechanism, so that they may be separately and speedily presented in proper order of succession without obstruction, interference or delay in feeding. A further object incidental to the machine is to provide simple and effective conveying means for conveying stacked and "faced" mail-pieces to feed mechanism in such a way that none of said pieces will become displaced as a result of the tendency of the mass toward displacement.

We are enabled to accomplish said objects by so constructing a mail conveyer as to readily permit manual delivery thereto of the mail matter in bunches of varying size while the conveyer itself will cause the mail pieces of the mass to be divided and held during their conveyance in small independent groups so as to insure each group against displacement, and by further providing in operative combination with said conveyer, automatic controlling means adapted to be actuated by the mail-pieces themselves at different points or stages in their advancement, so that the mail conveying mechanism may be caused to be automatically arrested as a result of the movement of a controller or of any one of a plurality of controllers distributed at predetermined points in the pathway of the mail, so that such controller, regardless of sequence and independent of its fellows, may be brought into action as a result of congestion or irregularity of movement of the mail-pieces at the point at which it is placed to cause an arrest of movement of the conveyer and hold it in abeyance without interrupting the action of the feed-mechanism until the restoration of normal conditions, when the conveyer will again be automatically started and continued in operation until another irregularity is developed requiring the repetition of such controlling action. To these ends, our invention consists in the combination of elements hereinafter more particularly described and definitely pointed out in the claims.

In the drawings,

Figure 1, is a plan of a machine embodying the features of our invention,

Fig. 2, is a front elevation thereof,

Fig. 3, is a section in plan taken upon the line 3—, Fig. 2,

Fig. 4, is a lefthand side elevation,

Fig. 5, is a section upon the line 5—5, Fig. 4,

Fig. 6, is a section upon the line 6—, Fig. 5,

Fig. 7, is a bottom view partly in section, taken upon the line 7—, Fig. 6,

Fig. 8, is a section upon the line 8—, Fig. 6, said Figs. 5, 6, 7 and 8, respectively, being viewed as indicated by the arrows there shown, and

Fig. 9, is a plan view in detail of the link and lever mechanism for controlling the operation of the clutch releasing means through the action of the mail-pieces.

Referring to the drawings, 1, Figs. 1 to 4 inclusive, indicates a horizontally arranged base-plate adapted to be supported in any well known way, not shown, which support forms the main frame of the machine. Rigidly supported above the base-plate by means of suitable standards and in parallel relation thereto, is a secondary supporting plate 2, which is intended to serve mainly as a table for the reception of mail matter placed upon a conveyer as hereinafter described.

Extending downwardly from the frame, Figs. 2 and 4, and mounted in suitable bearings, is a main driving shaft 3, adapted to be connected to a source of power not shown. Geared to the shaft 3 by means of miter gears 4 and 5, as shown in dotted lines in Figs. 1 and 3 and in full lines in Fig. 4, is a rearwardly extended shaft 6,

supported in bearings 7 and 8 attached to the bottom of the bed-plate 1. Connected to the shaft 6 by means of gears 9 and 10, Figs. 1 and 4, is a vertical shaft 11, the lower end of which is supported in a bearing 12, attached to the bed-plate and the upper end in a bearing 13, which is supported upon a bracket 14, extending rearwardly from an upright frame member 15, bolted to the base-plate, but in a different vertical plane from that of the shaft 6. The shaft 11 is therefore inclined laterally from the vertical as shown in Figs. 1 and 4. Keyed to the shaft 11 is a beveled gear 16, which is in mesh with a gear 17, upon a shaft 18, indicated in dotted lines in Figs. 1 and 4 and shown in full lines in Figs. 5, 6, and 8.

The shaft 18 is in alinement with and adapted normally to drive, through suitable clutch mechanism, a horizontal shaft 19, having one end bearing in the frame-member 15 and another in a similar frame bearing member 20.

The shaft 19, through suitable connections to be described, is intended to actuate the conveying mechanism for delivering mail to the feed mechanism and that continuously so long as the mail-pieces are properly delivered and no congestion or displacement occurs to interfere with proper feeding. When, however, from one or another cause, congestion or irregularity occurs and the mail pieces are not properly delivered, a controller interposed between the conveyer and feed mechanism is brought into action for the purpose of releasing the clutch and arresting the movement of the conveyer until the cause of the stoppage is removed; the feed mechanism, in the meantime continuing to run. The description of the construction and operation of the clutch mechanism will, therefore, be postponed until after that of the conveying and feed mechanism when it will be set forth in conjunction with that of the controlling means by which it is controlled.

A beveled gear 21 upon the shaft 19, is arranged to drive a like gear 22 mounted upon a horizontal shaft 23, Figs. 1, 2 and 4, arranged parallel to the front of the machine, which constitutes the main driving shaft of the conveying mechanism, said shaft being mounted in bearings formed in supports 24, 25 and 26, respectively, the former being extended upwardly from the plate 1 and the others downwardly from the plate 2.

A like shaft 27, Fig. 1, is supported in suitable bearings beneath the table 2 at the rear of the machine and parallel to the shaft 23. Three sprocket-wheels 28 and 29 are mounted upon each of the shafts 23 and 27 for the reception of sprocket chains 30, 31 and 32, respectively, which are arranged to pass in grooves so as to extend slightly above the upper surface of the table 2, as shown. Each of said chains is provided with a series of outwardly extended spikes or projections 33 for engaging the edges of mail-pieces, as hereinafter described, the chains 30 and 31 being spaced for the reception of short letters, while the three combined are intended for long ones. The chains are intended to extend from the rear to the front of the table so as to convey a stack of indefinite length.

Mounted upon the shaft 23, is a beveled gear 34 which is in mesh with a gear 35 upon the lower end of an upright shaft 36, inclosed and having bearings in an upright support 37 attached to the table 2. A sprocket-wheel 38, is attached to the upper end of the shaft 36, which wheel is connected by means of a sprocket chain 39 with a like wheel 40 upon the rear of the machine mounted upon a stud 41. The chain 39 is provided with projections 42, extending horizontally therefrom. Said chain is located above and in a vertical plane parallel to that of the chain 30 and spaced apart therefrom as shown. The several chains are adapted to be driven in unison from the rear to the front of the table so that mail-pieces 43, may be stacked thereon as shown with their lower edges upon the chains 30 and 31 and their ends against the chain 39. The projection or spikes upon all the chains are placed at like distances apart, the spaces being such as to provide for a limited number of mail-pieces between them. The ends of the letters being in engagement with the pins 42, it follows that each separate group is supported independently of all the others so that they cannot fall flatwise or in an inclined position upon the table, but will all be supported in vertical planes.

The forward end of the chain conveyer is in operative proximity to a mail-piece path arranged at right angles to the direction of movement of the conveyer over which the mail pieces are intended to be conveyed to the feeding mechanism. Arranged in said path and having its upper surface flush with that of the table, is an endless belt conveyer 44, mounted upon drums 45 and 46, supported in horizontal bearings. The drum 46 is provided with a shaft 47, having a gear 48 upon its outer end in engagement with a gear 49 upon the upper end of a vertical shaft 50, Figs. 1, 2 and 3, supported in bearings in an upright stud 51, rigidly attached to the frame-plate 1. Said shaft has a gear 52, upon its lower end which is connected through a train of gears, 53, 54, 55, 56, 57, 58 and 59, beneath the plate 1, with a driving gear 60, upon the main driving shaft 3, Figs. 3 and 4. The gear 52 is also connected with and serves in turn to drive a train of gears 61, 62, 63, 64, 65, 66, 67 and 68, mounted upon short shafts, as

shown, supported in bearings in the frame-plate. The shaft 69, Fig. 2, to which the gear 68 is attached, is connected to a flexible shaft 70, which is extended upwardly through a slot 71, Fig. 1, in the table 2 and connected with a feed-roll 72, at the forward end of the conveyer, which roll it is adapted to drive in the direction indicated by the arrow shown in Fig. 1. The upper end of said flexible shaft is supported in a sleeve bearing 73, which sleeve is in turn mounted upon the end of a horizontal arm 74, said arm being passed through a bore in a head 75, in which it may be rigidly held by means of a set-screw 76, so as to provide for longitudinal adjustment. The head is pivotally supported upon a shaft 77 indicated in dotted lines in Fig. 1, and loosely fitted into a bore in a stud 78, rigidly attached to the table. The movement of the arm 74 is adjustably limited in one direction by means of a set-screw 79, passed through the upper end of a post 80, said set-screw being provided with the usual lock-nut 81. A flat spring 82, having one end attached to a vertical support 83, rigidly secured to and extending upwardly from the front of the table 2, has its free end arranged to bear against the arm 74, so as to press the feed roller 72 against the foremost mail-piece 43, of the pack, which is adapted to be advanced by the conveyer, in order to feed said mail-piece endwise in the mail-piece path formed by the conveyer-belt 44, to the feed and separating rollers in the manner indicated in Fig. 1.

The feed and separating mechanism may consist of any well-known type arranged in the usual way; and in the example illustrated, consists of the following described elements: A feed roll 83, is mounted upon a flexible shaft 84, driven by the gear 54. The upper end of said shaft has a bearing in a sleeve 85, supported by an arm 86, having one end pivoted at 87 in a vertical bore formed in a rigid post 88. A spring 89 attached to said post is arranged to press against the arm 86, so as to press the feed roll 83 with a yielding pressure against the foremost mail-piece 90, of those advanced from the main pack. Supplemental feed rolls 91 and 92 arranged upon the same side of the letter path, an opposing feed roll 93, located upon the opposite side of said path, and a separating roll 94, opposite the roll 91 are all yieldingly mounted upon swinging spring-pressed arms in the same manner as the roll 83; the roll 91 being driven by a flexible shaft 95 connected with the gear 56, the roll 92, by a like shaft 96, driven by the gear 58, the roll 93, by a like shaft 97, Fig. 4, driven by the gear 59, and the separating roll 94 being driven by a like shaft 98, in operative connection with the main driving shaft 3. It will, of course, be noted that the shaft 98 is driven in an opposite direction from the others for the purpose of actuating the separating roll 94, in the usual well known way, to retard all but the foremost mail-piece and insure separation.

The foregoing comprises a complete description of the mechanism contemplated by us for conveying mail pieces sidewise in a mass or stack to a given point and then moving them endwise in successive order to and through a feeding mechanism. The operation and results of the mechanism so far set forth is as follows:

The mail-pieces are "faced" and bunched and the ends adapted to contact with the conveyer chain 39, made even with each other by tapping them upon a table, when the entire bunch is placed upon the conveyer so that the end of each mail-piece will be in a vertical plane. The pack is then pushed against the chain 39, so that the projections 42 thereon will pass between mail-pieces and separate them into small groups as heretofore stated, each of which will be independently supported in a vertical plane. The projection 33 upon the chains 30, 31 and 32 contribute to this result and as the chains are all actuated in unison, each mail-piece is retained in its proper position as long as it is actuated by the conveyer chains. When a given mail-piece is advanced to the front its face is brought into contact with the continuously and positively driven feed-roll 72 when an endwise movement is initiated thereby and it is advanced longitudinally upon the conveyer belt 44. A curved stationary shield 99, Fig. 1, serves to guard the mail-pieces against displacement. The space above the feed-belt may be termed the "throat" of the feeding mechanism and should be wide enough to enable a small number of mail-pieces, say four or five of average thickness, to be admitted thereto. If the foremost mail-piece is properly advanced and the others retarded until it is engaged by the several feed rolls in advance of the feed-belt 44, it will go through, as it should, separately from the others; but if congestion occurs from any cause two or more mail pieces may be caused to pass at once or they may jam in the throat so as to be injured by the moving mechanism. The difficulty suggested is a serious one and in order to overcome it we have devised and combined with the conveying and feed mechanism described, as heretofore suggested, certain automatic controlling elements adapted to be brought into action to arrest the movement of the conveying mechanism and hold it in abeyance until the proper conditions are restored. These controllers are, in the example illustrated, located at three points, viz: one in the path of the moving conveyer pack, one between that and the separating or retarding roll and one in close

proximity to said roll; each of said controllers being connected through intermediate connections with an element common to them all, adapted to be moved by either one of the series to release a clutch and arrest the conveyer movement as above stated. Said controller and clutch mechanism will now be described.

Supported in bearings formed in studs 100, 101, Figs. 1 and 2, upon the front of the bed-plate, is a horizontal rock-shaft 102, upon which is rigidly mounted a sleeve 103, from which is extended upwardly an arm 104, the upper end of which is located in the path of movement of, but at a predetermined distance in advance of the normal position of the arm 74, so that an excessive movement of the latter toward the front of the machine as a result of the pressure of the mail pack against it will cause the arm 104 to be actuated and the rock-shaft 102 to be tilted toward the front. An upwardly extended arm 105 is rigidly attached by means of a hub to the shaft 102. The upper end of said arm is connected by means of a link 106, to one arm of an elbow lever 107, Figs. 1 and 2, pivoted to a post 108, extending upwardly from the bed-plate. The other arm of said elbow lever is connected by means of a link 109 to the outer end of an arm 110 rigidly attached to a vertical rock-shaft 111, Figs. 1, 2, 4 and 9, which is pivotally mounted in a bearing in an upright post 112, rigidly attached to the base 1. The shaft 111 is yieldingly held in a normal position by means of a coiled spring 112^a having one end attached to a stationary arm 112^b upon the post 112 and the other to a pin 112^c upon said shaft. The end of the link 109, is bent downwardly at right angles as best shown at 113, Fig. 4, and is caused to enter a curved slot 114, in the arm 110 adapted to permit a movement of the arm independently of that of the link, for the purpose hereinafter stated. The arm 104, with the connections mentioned for tilting the rock-shaft 111 upon its pivot constitutes one of the controllers or variators of which there are three in all, each of which is adapted, independently of its fellows, to rock said shaft for the purpose of releasing a clutch mechanism. These controllers and their connections will now be described. Pivoted upon a vertical post 115, Figs. 1 and 2, is a guard or controlling member, or finger, representing in effect an elbow lever, generally designated by 116, which is provided with a curved and widened flat portion 117, arranged to project through an opening in the guard 99 into the mail-piece path as clearly shown in Fig. 1, to engage the innermost mail-piece and press it outwardly against its fellows so that the foremost one will be caused to contact with the feed rolls. A coiled spring 118 serves to connect the short arm of said elbow lever with a stud 119, Fig. 1, to cause the part 117 to extend normally into the mail-piece path, so as to be moved back by an excess of mail-pieces. The end of the short arm of said lever is connected at 120 by means of a link 121, also shown in Figs. 4 and 9, with an arm 122, rigidly attached to the rock-shaft 111. Said arm corresponds in form and purpose to the arm 110 and is provided with a curved slot 123 into which the downwardly bent end 124 of the link 121 is loosely projected. The remaining controller generally designated by 125, is of an elbow-lever shaped type somewhat varied in form. Said device is pivoted upon a vertical stud 126, and is provided with a broad flat presser arm 127, arranged to extend sufficiently into the mail-piece pathway to intercept and engage any mail-pieces which may be fed therein in excess of what may be properly received and cared for by the feed rolls. A coiled spring 128 serves to connect an arm 129 of the device with a stud upon the frame so as to cause the part 127 to be yieldingly held in the mail-piece path. A link 130, has one end jointedly connected to an arm 129^a, while a downwardly bent end 131 is arranged to enter a slot 132, in an arm 133 corresponding to the arms 110 and 122, and rigidly attached to the rock-shaft or pivot-post 111. An arm 134, rigidly attached to the upper end of said rock-shaft, has its outer end jointedly connected by means of a rod 134^a upon one arm of an elbow-lever 134^b pivoted at 134^c to a stud 134^d to the end of an arm 134^e, rigidly attached to the bracket 138. The opposite end of said elbow-lever is jointedly connected at 134^f, in a manner to permit a limited universal play, to a rod 135, the opposite end of which is projected loosely through a bore in the upper end of a clutch releasing member 136, Figs. 1, 4, 6 and 8, so as to slide longitudinally therein,—a beveled head 137 being rigidly attached to the free end of said rod for the purpose hereinafter stated. Said clutch releasing member is disposed vertically and is slidably fitted in a bearing formed in a bracket 138, said bracket being integral with the upright frame member 15, better shown in Fig. 4. The member 136 is limited in its downward movement by means of a pin 139, secured thereto and adapted to work in a slot 140 in the bracket. A coiled spring 141, Fig. 4, having its lower end attached to a pin 142, upon the bracket and its upper end to a like pin 143, upon the member 136, serves to hold the latter in a normal position as shown in said last named figure. A bent arm 144 is extended downwardly from the lower end of the part 136, said arm having an upward projection or finger 145, upon its lower end provided with a beveled contact face 146, which is below but in the vertical plane of

the shaft 19 for the purpose of engaging and actuating a clutch member as hereinafter set forth. An enlarged clutch sleeve member 147 has a longitudinal bore therein for the reception of the shaft 19 to which said sleeve is rigidly secured by means of a pin 148, Fig. 6. The shaft 18 is also loosely extended into said bore. Attached to the latter shaft by means of a pin 149, is an eccentric cam 150 which is provided with a circular disk portion 151, upon the face adjacent and in immediate proximity to the member 147. Slidably mounted in a bore formed in the latter is a clutch-bolt 152, adapted to enter a bore 153 in the part 151. A coiled spring 154, Fig. 6, tends to thrust the bolt forward into locking engagement with said bore. A projection or boss 155 is extended downwardly through a slot 156 formed in the part 147, said extension being provided with a beveled contact face 157 when the latter is lifted to an abnormal or engaged position.

Slidably mounted in an upright bearing in the bracket 138 above the cam 150, is a reciprocating actuator 158, having a friction roller 159 upon its lower end adapted to bear against the cam 150. A coiled spring 160, Fig. 4, has its lower end attached to a lug 161 and its upper end to a pin 162 upon the part 158, so as to hold the friction roller 159 in continuous contact with the acting face of the cam. The upper portion of the part 158 opposite the head 137 is cut away to form a notched offset 163 adapted to engage the head 137 when the latter is in an abnormal position.

The operation of the controlling and clutch mechanism is as follows: As stated, the shaft 18 is adapted and intended to be rotated continuously in the direction indicated by the arrow shown in Fig. 4, at the same time the spring 141, tends to hold the clutch releasing member 136 in its lowermost or disengaged position, so that the beveled part 146, is held out of the path of movement of the part 157, thereby leaving the clutch bolt 152 free to be held by the spring 154 in locked engagement with the recess 153. It will thus be seen that both shafts 18 and 19 are normally in operation. As a result of the continuous rotation of the cam 150 the member 158 is reciprocated but only as an idler except when the head 137 is moved into its pathway which can only be done as a result of a movement of the mail-pieces of one or another of the automatic controllers.

The gearing for driving the conveyer mechanism is intended to be so timed as to deliver mail-pieces to the feed mechanism at a slightly faster rate than they can be disposed of by the latter and the stripping-roll 72, is designed to be driven at a rate somewhat greater than that of the advance feed-rolls. Owing to the varying character of the mail-pieces, some of which are thick and others thin, some long and some short, some flimsy and others stiff, with envelops having varying surfaces such as smooth or rough, and in varying conditions from dry to damp and often wet, as they are when collected in stormy weather, the problem of feeding is rendered complex and difficult. Sometimes, in damp weather, slight bits of mucilage upon the surface will cause two or more pieces to adhere sufficiently to prevent stripping. In such case, instead of one, a number of mail-pieces may be advanced from the pack to the feeding mechanism and the finger 117 will be pushed back as indicated in Fig. 1, against the action of the retaining spring 118, thereby causing the short arm to pull upon the link 121, actuate the arm 122 and cause it to rock shaft 111, against the tension of the spring 112^a, and, through the movement of the arm 134 thereon link 134^a and elbow-lever 134^b to move the rod 135 longitudinally and thereby push the head 137 into an abnormal position directly over the continuously reciprocating member 158. As the latter is lifted by the action of the cam 150, the offset 163 will engage the head 137 and lift it, thereby lifting the member 136 and bringing the beveled part 146 into the path of the counterpart beveled portion 157 on the projection extending downwardly from the bolt. As the shaft 19 is rotated the bolt 152 will be withdrawn and the clutch released, thereby arresting the movement of the conveying mechanism and permitting it to rest until the mail-pieces in the throat of the feed mechanism are advanced by the feed rolls when the finger 117 will be restored to its normal position by the action of the spring 118. It will be noted that the slot 114 in the arm 110 and slot 132, in the arm 133, permit said arms to be moved without affecting the links 109 and 130, so that the post 111 may be rotated by any one of the links 109, 121 or 130, independently of the action of the others, said post being held in a normal position by means of the coiled spring 112^a. When the rock-shaft 111 is thus restored to its normal position, the head 137 is also restored to its normal or inoperative position out of the path of movement of the part 158, as indicated in dotted lines in Fig. 4, the part 136 is moved downward by the tension of the spring 141, and the part 145 of the clutch mechanism, removed from the path of the part 155, whereupon the bolt 152, being released, is pressed against the face of the disk 151 until the recess 153 is in registration therewith when it enters said recess, thereby causing the shaft 119 to resume its rotation. The purpose of the disk-like face 151 is to obviate conflict between the bolt and cam 150.

Should the foremost mail-pieces of the

conveyer pack be unduly advanced before being forwarded by the stripping roll 72, the latter will be pushed forward thereby and will cause the arm 74 to engage the arm 104, so as to rock the shaft 102, and thus, through the action of the arm 105, link 106, elbow-lever 107, link 109 and arm 110, rotate the post 111 and throw the clutch out of engagement in the manner described. The same result, in turn may be caused by an excessive pressure of the mail-pieces against the controller 127.

It should be kept in mind in studying the action of the controllers and their connections that the arms 110, 122 and 133 are shown in abnormal positions and so held by the link 121 which is in the right hand end of the slot 123. When, however, the congestion of mail-pieces from the feeding throat is relieved, so as to permit the controller 117 to reverse its position, that of the link 121 will also be reversed and it, with the links 109 and 130, as well as the shaft 111 will stand at normal, the restoration of the latter being caused by the action of the spring 112ª. The restoration movement of the shaft will be just sufficient so that all of the link connections will stand in the ends of their respective slots nearest to the controllers where they will remain as long as the latter stand in their several normal positions unmoved by the mail-pieces. It will thus be seen that the purpose of the slots is to permit any one link to be actuated to rotate the shaft 111 independently of the others. Nor is this construction inconsistent with the movement of all three of the controllers at once should the disposition of the mail-pieces be such as to cause it.

While we have referred to the stack of mail-pieces as being "edged" or made substantially even before being placed upon the conveyer. We do not thereby wish to imply that they are or can be so in practice. Hurried operators necessarily leave them imperfect and the varying length and thickness of letters tend toward confusion. Some are held up by friction so that their lower edges fail to touch the surface over which they are moved; when, however, they leave the main stack and enter the secondary or small stack where they are advanced to the feed-rolls, the pressure is released, they are loosened up and each is free to contact with the feed belt. This enables the mechanism to act upon and control them individually.

The means described for accomplishing the results specified may be varied without departing from the spirit of the invention and we do not limit ourselves to the specific construction shown.

Having thus described our invention, we claim:

1. A device of the class described, comprising, in combination, a feed mechanism, actuating means therefor, a conveyer for delivering mail-pieces thereto while supporting them upon their edges, conveyer actuating means for arresting the movement of said conveyer and controlling means located in the mail-piece path between said conveyer and feeding mechanism, in position to be actuated by the moving mail-pieces, for actuating said arresting means whenever irregularity of movement, congestion or displacement of the mail-pieces occurs in the mail-piece path.

2. A feed regulating device for controlling the delivery of mail-pieces from a conveyer to feeding mechanism, comprising, in combination, feed mechanism, actuating means therefor, a conveyer for collectively moving mail-pieces thereto in bunches in which said mail-pieces stand side by side, means for actuating said conveyer in harmony with the movement of said feeding mechanism, means for arresting the movement of said conveyer and controlling means adapted to be actuated by the movement of the mail-pieces delivered from the conveyer for actuating said arresting means when an excess of mail-pieces are advanced at a given point in the mail-piece path.

3. A device for the purpose specified, comprising, in combination, continuously driven feed mechanism for feeding mail-pieces in successive order in a given path, a conveyer for advancing mail-pieces thereto in stack form upon their edges, means for actuating said conveyer, normally engaged means for operatively connecting said actuating means with a source of power, a controller located in the mail-piece path between said conveyer and feed mechanism to be actuated by the pressure against it of an excess of mail-pieces and means for operatively connecting said controller with said normally engaged connecting means to disconnect the latter from its source of power until the number of excess mail-pieces are sufficiently reduced by the action of the feeding mechanism to permit the reëngagement of said connecting means.

4. A mail feeding device in which is combined, feed mechanism in operative connection with a source of power, conveying means for conveying mail-pieces upon their edges in stack form to the feed mechanism in a path at an angle to that at which the mail-pieces are to be delivered to said feed mechanism, a feed-roll located at the forward end of the conveyer path to engage the foremost mail-piece of the pack and advance it endwise toward the main feed mechanism, a clutch mechanism interposed between the primary source of power and the conveyer driving means, to cause the arrest, when disengaged, of said driving means, controlling means located in the mail-piece

path for causing the disengagement of said clutch when abnormally moved by an excess of mail-pieces against it, and means for yieldingly holding said controlling means in a normal position.

5. A mail feeding device in which is combined feeding means in operative connection with a source of power, conveying means for conveying mail-pieces upon their edges in stack form to said feed mechanism in a path at an angle to that at which the mail-pieces are to be delivered to said feed mechanism, a feed-roll located at the forward end of the conveyer path to engage the foremost mail-piece of the pack and advance it endwise to the main feed mechanism, arresting means interposed between the primary source of power and the conveyer driving means to cause the arrest of said driving means, controlling means for actuating said arresting means when abnormally moved by an excess of mail-pieces against said controlling means and means for causing the action of said conveyer driving means to be resumed when the controller is restored to its normal position by the disposal of said excess mail-pieces.

6. A mail-feeding device comprising, in combination, a feed-mechanism, a conveyer for delivering mail-pieces upon their edges in a stack form to said feed-mechanism at a rate not less than the maximum capacity of said feed-mechanism, means for actuating the same, a stripping feed member in the path of said conveyer mounted upon a substantially vertical axis for advancing the foremost mail-pieces to the feed-mechanism, means for continuously actuating said feed member faster than the speed of the main feed-mechanism, means for arresting the movement of the conveyer actuating means, and controlling means located between said conveyer and feeding mechanism, to be moved from a normal position by an excess of mail-pieces contacting therewith for actuating said arresting means.

7. A mail-feeding device comprising, in combination, feed-mechanism, a conveyer for moving mail-pieces thereto, means for supporting said mail-pieces upon their edges, means for normally actuating said conveyer, means for arresting the movement of said normally actuated means, means adapted to be actuated by the presence of an excess of mail-pieces in the mail piece path for bringing said arresting means into action and means for again starting said conveyer actuating means when said excess of mail-pieces is relieved.

8. A mail feeding device comprising, in combination, a feed mechanism, a conveyer for moving mail-pieces thereto, means upon said conveyer for supporting the mail-pieces of the pack in substantially vertical planes while conveyed thereon, means for normally actuating said conveyer, means for arresting the movement of said conveyer, and means adapted to be actuated by an excess of mail-pieces in the mail-piece path for bringing said arresting means into action.

9. A mail-feeding device, comprising, in combination, mail-feeding means, means for actuating the same, a conveyer for advancing mail-pieces thereto, means upon said conveyer for independently supporting said mail-pieces in separate self-sustaining groups, each group being held and advanced in a substantially vertical plane independently of its fellows, means for normally actuating said conveyer, means for successively advancing mail-pieces endwise to the feed mechanism, means for arresting the movement of the conveyer and means, in position to be actuated by an excess of mail-pieces contacting therewith for actuating said arresting means and holding the same under arrest until the excess mail-pieces causing such arrest are successively advanced by the feed-mechanism.

10. A mail-feeding device, comprising, in combination, feeding means in operative connection with a source of power, means for advancing mail-pieces thereto, means for supporting said mail-pieces upon their edges, means for operatively connecting said advancing means with a source of power, independent means located in advance of said conveyer to be actuated by the pressure of mail-pieces thereon, means for yieldingly holding the same in normal positions and means for connecting the same with the source of power of said mail-piece advancing means to arrest its action.

11. A mail-feeding device, comprising, in combination, feeding means in operative connection with a source of power, means for advancing a mass of mail-pieces upon their edges thereto, a normally engaged clutch mechanism for operatively connecting the same with a source of power, yielding means for causing the engagement thereof, means located in the mail-piece path normally in position to permit the passage of a limited number of mail-pieces without causing abnormal displacement, yielding means for holding the same in a normal position and means for operatively connecting the same with said normally engaged clutch to cause the disengagement of the latter when said controller is moved to an abnormal position by an excessive pressure of mail-pieces against it.

12. A mail-feeding device, comprising, in combination, feed mechanism, means for advancing mail-pieces thereto, said means comprising a plurality of endless chains arranged to be moved in predetermined planes, said chains being provided with upwardly extended projections spaced apart for engaging the lower edges of a stack of mail-

pieces, a supplemental chain having lateral projections for engaging the ends of said mail-pieces to hold them in substantially vertical planes, means for actuating said chains in unison, means for arresting their movement and means in the mail-piece path between said conveyer and feeding-mechanism in position to be actuated by the pressure of excess mail-pieces in said path for actuating said arresting means.

13. A mail-feeding device, comprising, in combination, feed-rolls mounted upon substantially vertical axes in operative proximity to a mail-piece path, a plurality of endless chains, arranged in substantial parallelism, to be moved along a support, said chains being provided with spaced projections for engaging the lower edges of a stack of mail-pieces, an auxiliary chain having projections for extending between mail-pieces at one end of the stack to support them uprightly, sprocket-wheels and shafts for actuating said chains in unison, to move a stack of mail-pieces in a path substantially at right angles to the mail-piece path between said feed-rolls, means for actuating said chains in unison, means for arresting said actuating means, a controlling member, means for yieldingly holding the same in a normal position in the mail-piece path in advance of said chains, and means for operatively connecting said member with said arresting means for arresting the movement of the chains, when said member is moved to an abnormal position by an excess of mail-pieces.

14. In a mail-feeding device having feeding means, actuating means therefor, a plurality of sprocket-chains mounted upon sprocket-wheels having substantially horizontal axes for moving mail-pieces in stack form along a support, said chains having spaced projections for engaging the lower edges of said mail-pieces, an auxiliary sprocket-chain mounted upon sprocket-wheels having substantially vertical axes, said chains having projections thereon for extending between mail-pieces at one end of the stack to support them in upright positions, and means for actuating said chains in unison.

15. A mail-handling device having feed members, means for moving mail-pieces in stack form to bring the foremost mail-piece adjacent to the mail-piece path leading to the feed members to enable it to be advanced longitudinally therein, comprising a plurality of parallel sprocket-chains mounted upon sprocket-wheels having substantially horizontal axes for moving mail-pieces along a supporting surface, said chains having spaced projections for engaging the lower edges of a stack of mail-pieces, an auxiliary sprocket-chain mounted upon sprocket wheels having substantially vertical axes, said chain having projections thereon for extending between mail-pieces at the end of the stack to support them in upright positions, means for actuating said chains in unison, and means for advancing the foremost mail-piece endwise toward the feed-rolls.

16. A mail-handling device, comprising, in combination, feeding means in operative connection with a source of power, means for conveying mail-pieces in stack form to move the foremost mail-piece in operative proximity to a path leading to said feed-rolls, a continuously actuated stripping roll mounted upon a forwardly movable shaft at the forward end of said conveyer path, means for yieldingly holding said roll in a normal position, a movable controller arm in position to be moved into an abnormal position as a result of the forward movement of the stripping roll when pressed forward by an excess of mail-pieces, means for yieldingly holding said controller arm in a normal position, driving mechanism for actuating said conveyer, means for causing the intermission of said dividing means and means for connecting the same with said controller-arm.

17. A mail-feeding device, comprising, in combination, feeding means, means for actuating the same, means for advancing mail-pieces in a stack form to move the forward end of the stack into operative proximity to a path leading to said feeding means, a continuously actuated stripping roll mounted upon a flexible shaft at the forward end of said conveyer path to successively move mail-pieces endwise to said feeding means, a swinging arm for supporting said shaft, means for holding said arm in a normal position, a controller arm yieldingly held in a normal position in advance of said swinging arm to be actuated by a forward movement of the latter, conveyer driving mechanism, arresting means therefor and means for connecting the same with said controlling arm.

18. A mail-handling device, comprising, in combination, feeding means, means for advancing a mass of mail-pieces thereto in stack form, means for normally actuating said advancing means, a yielding normally engaged clutch for connecting the same to a source of power, clutch releasing means, means for holding the latter in an operative position, a plurality of movable controlling fingers located at predetermined points along the mail-piece path, in advance of said conveyer, separate means for yieldingly holding each finger in the mail-piece path, and means for connecting each controlling finger with said clutch releasing means to independently actuate the same.

19. A mail-feeding device, comprising, in

combination, feed mechanism, a conveyer for moving a mass of mail-pieces thereto in stack-form, means for normally actuating said conveyer, a yielding normally engaged clutch for connecting the same to a source of power, clutch releasing means, a rock-shaft, means for yieldingly holding the same in a normal position, means for connecting the same to said clutch releasing means, a plurality of movable controlling fingers located at predetermined points along the mail-piece path in advance of said conveyer, separate means for yieldingly holding each finger in the mail-piece path, and separate means for connecting each finger with said rock-shaft to enable the same to be independently rocked by any given finger.

20. In a mail feeding device the combination of primary and secondary conveyers, the first for advancing a main stack of mail to be fed, the second arranged at an angle thereto and formed to permit the loosening of the mail-pieces advanced from the first to enable each to adjust itself independently of its fellows, stripping means for successively advancing mail-pieces from the first to the second stack and separating and feeding means in operative proximity to said secondary stack.

21. A device of the class described, comprising, in combination, feed mechanism, means for advancing mail-pieces thereto at a rate in excess of the capacity of said feed-mechanism, means for actuating said advancing means, means for arresting the movement thereof, means adapted to be actuated by the presence of an excess of mail-pieces in the mail-piece path for actuating said arresting means, and means for again starting said advancing means when congestion in the advancing mail-pieces is relieved by the action of the feed mechanism.

22. In a mail feeding device the combination of a magazine for a supply of roughly stacked mail-pieces, mail-handling mechanism to be fed with the said mail-pieces, separating and feeding means to feed said letters individually to the same and a holder to contain a relatively small stack of said mail-pieces and to be fed from the magazine and to aline and prepare and present the same to said separating and feeding means and a propelling member to advance mail-pieces from said magazine to said holder.

23. In a mail-feeding device the combination of a conveyer for the supply of mail-pieces, means for separating mail-pieces and feeding the same individually to mail-handling mechanism, mechanism to form a relatively small stack of letters between the mail supply and said separating and feeding means and to present the pieces of said stack uniformly to the same and a power driven feed roll to advance the said mail-pieces from the supply of mail-pieces on said conveyer to said small stack substantially as shown and described.

24. In a mail-feeding device the combination of a magazine for a supply of roughly stacked mail-pieces, mail-handling mechanism, means to separate letters and feed the same individually to said mechanism and a holder to receive a relatively small stack of mail from said magazine and prepare and present the same uniformly to said separating and feeding means and a propelling means to advance letters from the magazine to said holder.

25. A mail-feeding device in which is combined feed mechanism in operative connection with a source of power, conveying mechanism for conveying mail-pieces in stack form to the feed mechanism in a path at an angle to that at which the mail-pieces are to be delivered to said feed mechanism, a positively driven feed roll located at the forward end of the conveyer to engage the foremost mail-piece of the stack and advance it endwise toward the main feed mechanism ahead of any of the other letters in the stack.

26. In a mail-handling device a conveyer for moving mail-pieces in stack form, comprising a link belt conveyer arranged on driving and idler wheels having substantially horizontal axes for moving the stack of mail-pieces, projections on said conveyer to support the mail-pieces in upright positions to form said stack, means for actuating said conveyer to move the stack to the delivery point of the conveyer, and a controller connecting with said arresting means and located to be operated by the advance of the stack to the delivery point to cause said arresting means to stop further advance of the stack beyond the said delivery point.

27. In a mail-feeding device the combination of a conveyer for the main stack of mail to be fed, a conveyer for a secondary stack, means to advance letters variously positioned at the face of the main stack into the secondary stack in consecutive order and predetermined position and letter separating and feeding means to receive the said letters from the secondary stack and separate and feed the same individually.

28. In a mail-handling device a conveyer for moving the mail-pieces in stack form comprising a plurality of chains mounted on supporting surfaces and wheels having substantially horizontal axes, for moving mail-pieces in stack form, projections on said chains to engage the mail-pieces in the stack to support them in upright positions, means for actuating said chains in unison, means to arrest said actuating means and a controller located at the delivery point

of said conveyer to control said arresting means and arranged to be operated by the advance of the stack to said delivery point to stop the further movement of said conveyer.

29. In a mail-feeding device the combination of a conveyer for a supply of roughly stacked mail-pieces, a set of separating and feeding means to separate letters and feed the same individually to mail-handling mechanism and a device between said roughly stacked mail and said means to cause the formation of a relatively small stack from pieces received from the main stack, means to correct the alinement of the letters as received from the main stack and means to present the same uniformly to said operating and feeding means and means to strip letters from the first stack and pass them to the second stack in consecutive order.

30. In a mail-handling apparatus, means for feeding a stack of mail-pieces, means for supporting the same upon their edges in said stack, mechanism to receive letters from said stack and separate and discharge them one by one and movable fingers to engage with the letters passing from said stack to said mechanism and operating to control the means for feeding said stack to said mechanism and the rate at which the stack is fed.

31. A mail-feeding device, comprising, in combination, feed rolls, means for actuating the same, means for conveying mail-pieces in stack form to move the foremost mail-pieces into operative proximity to a path leading to said feed rolls, a stripping roll mounted at the forward end of said conveyer path, means for yieldingly holding said roll in a normal position, a controller connection actuated by the forward movement of the stripping roll when pressed forward by the excess of mail-pieces, driving mechanism for actuating said conveyer, and means operated by said controller connection to arrest the said driving mechanism and stop further pressure of the stack against said stripping roll.

32. In a mail-handling apparatus, means for feeding a stack of mail-pieces, means for supporting the same vertically in said stack, mechanism to receive letters from said stack and separate and discharge the same one by one and a movable finger to be operated by said stack to control the said means for feeding to govern the rate at which the stack is fed.

33. In a mail-handling mechanism, the combination of means for feeding a supply stack of letters, means for supporting the letters in said stack upon their edges, means for separating letters from said stack and maintaining them in a small secondary stack, means to take letters from said secondary stack and separate them and discharge them one by one, and controlling means to be actuated by said secondary stack to control the feeding of the supply stack to maintain a limited number of letters in the secondary stack.

34. In a mail-handling mechanism the combination of means for moving a stack of letters upon their edges, means for feeding letters from the stack in small quantities to a small secondary stack, mechanism to separate and feed letters individually and means to present said secondary stack to said mechanism.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses, this 19th day of January, 1917.

MYRON J. BIGELOW.
CHARLES C. CADDEN.
JAMES REHAK.

Witnesses:
C. A. GILLILAND,
P. F. MEKEAL.