May 4, 1943. S. C. HERBERT 2,318,073

MECHANISM FOR PREPARING POSTAL MATTER

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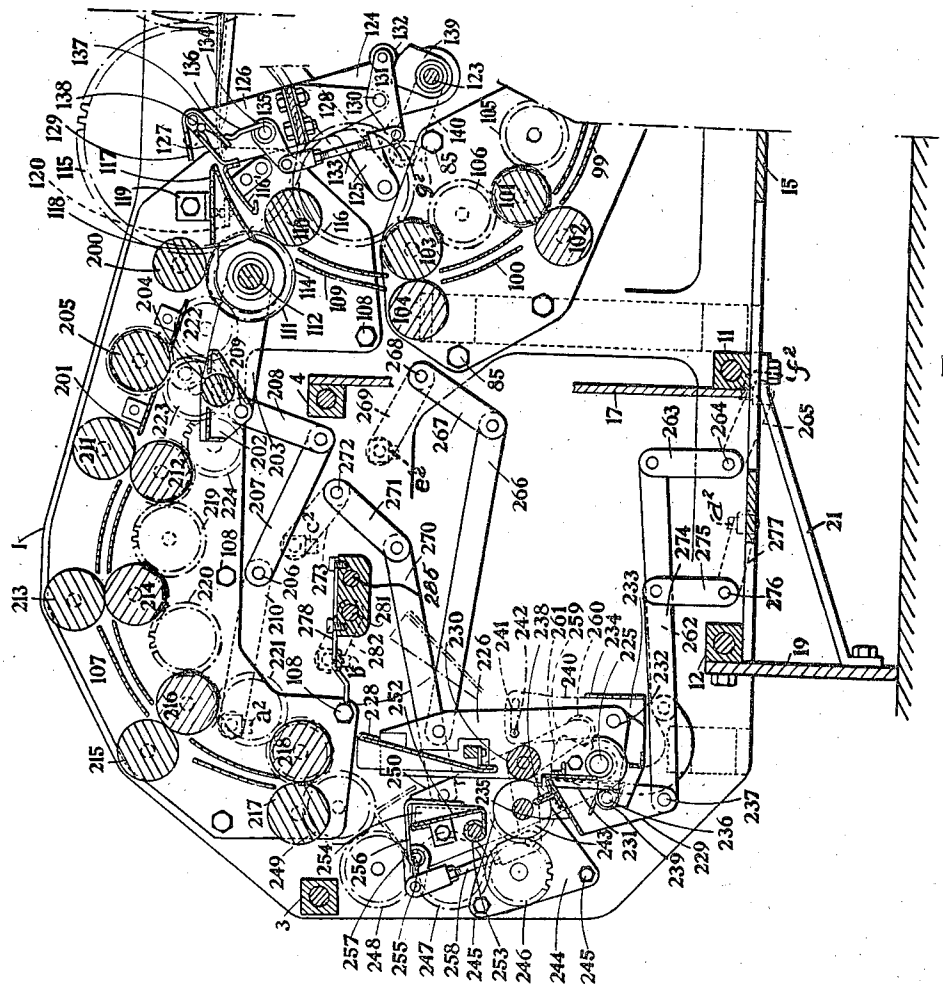


Fig. 1.

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MECHANISM FOR PREPARING POSTAL MATTER

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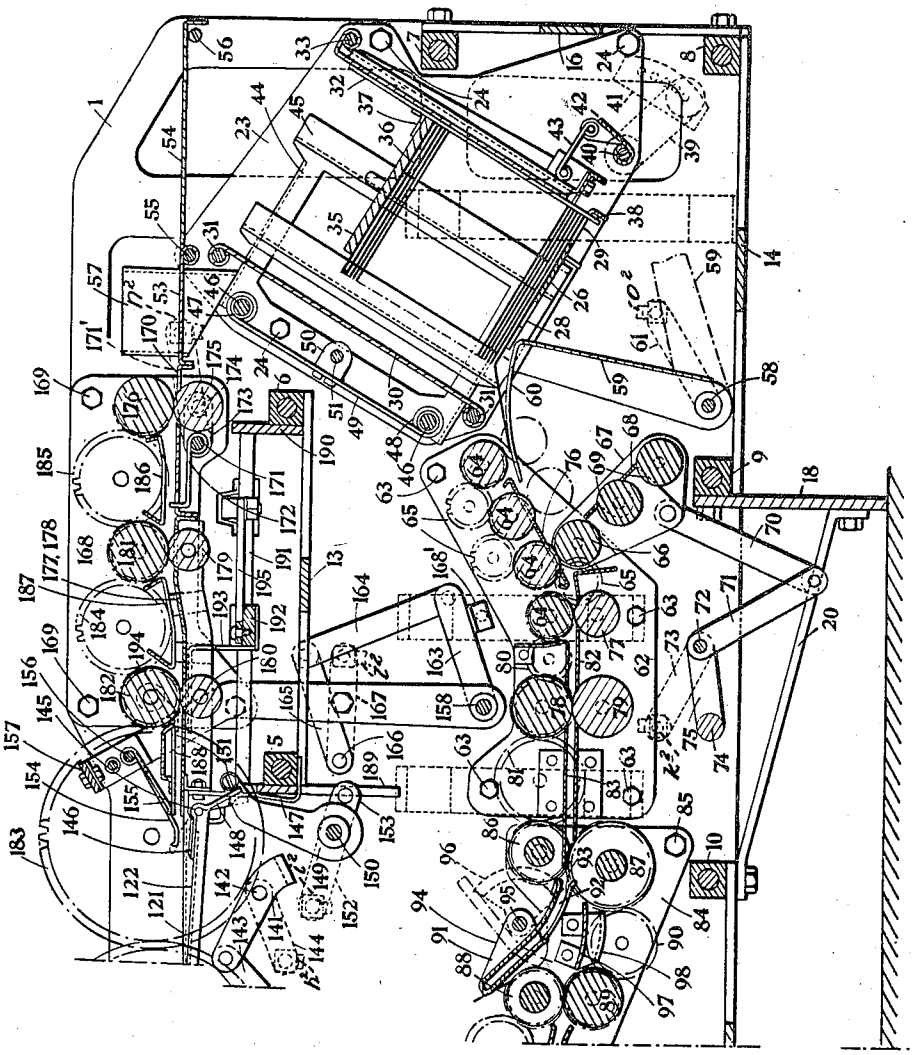


Fig. 2

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MECHANISM FOR PREPARING POSTAL MATTER

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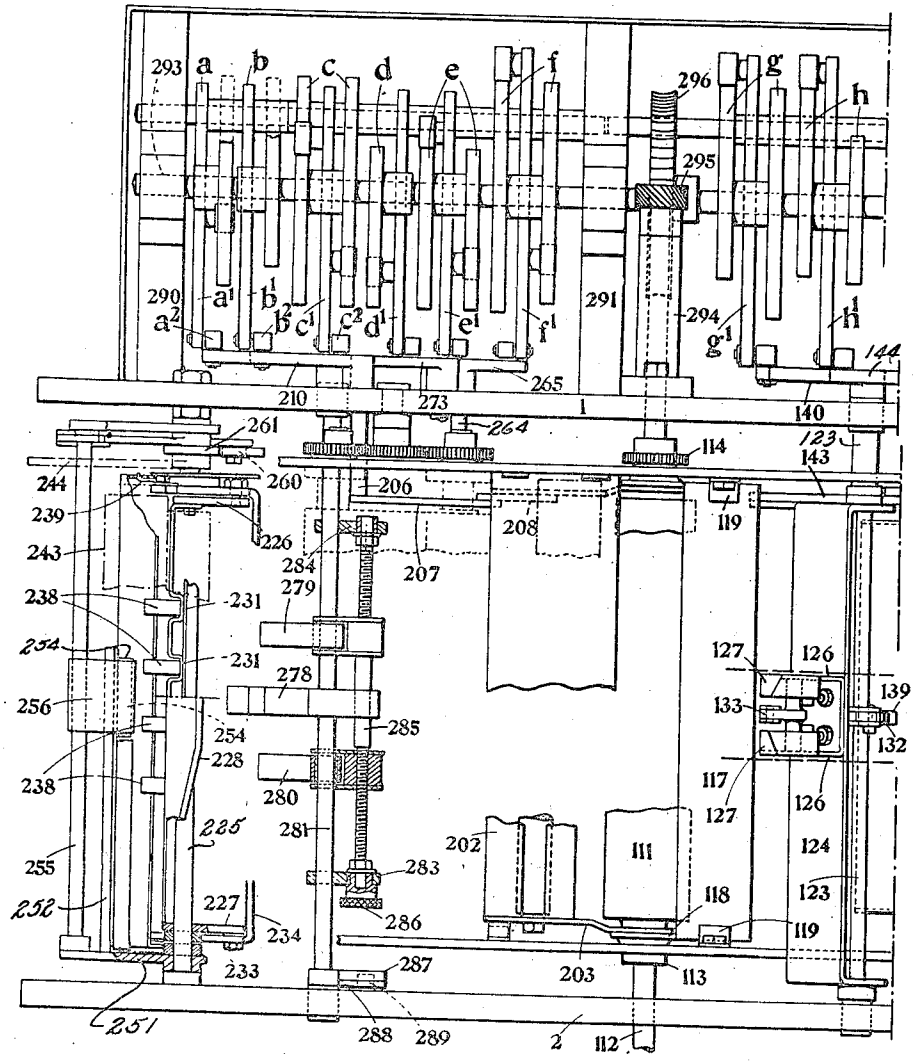


Fig. 3

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MECHANISM FOR PREPARING POSTAL MATTER

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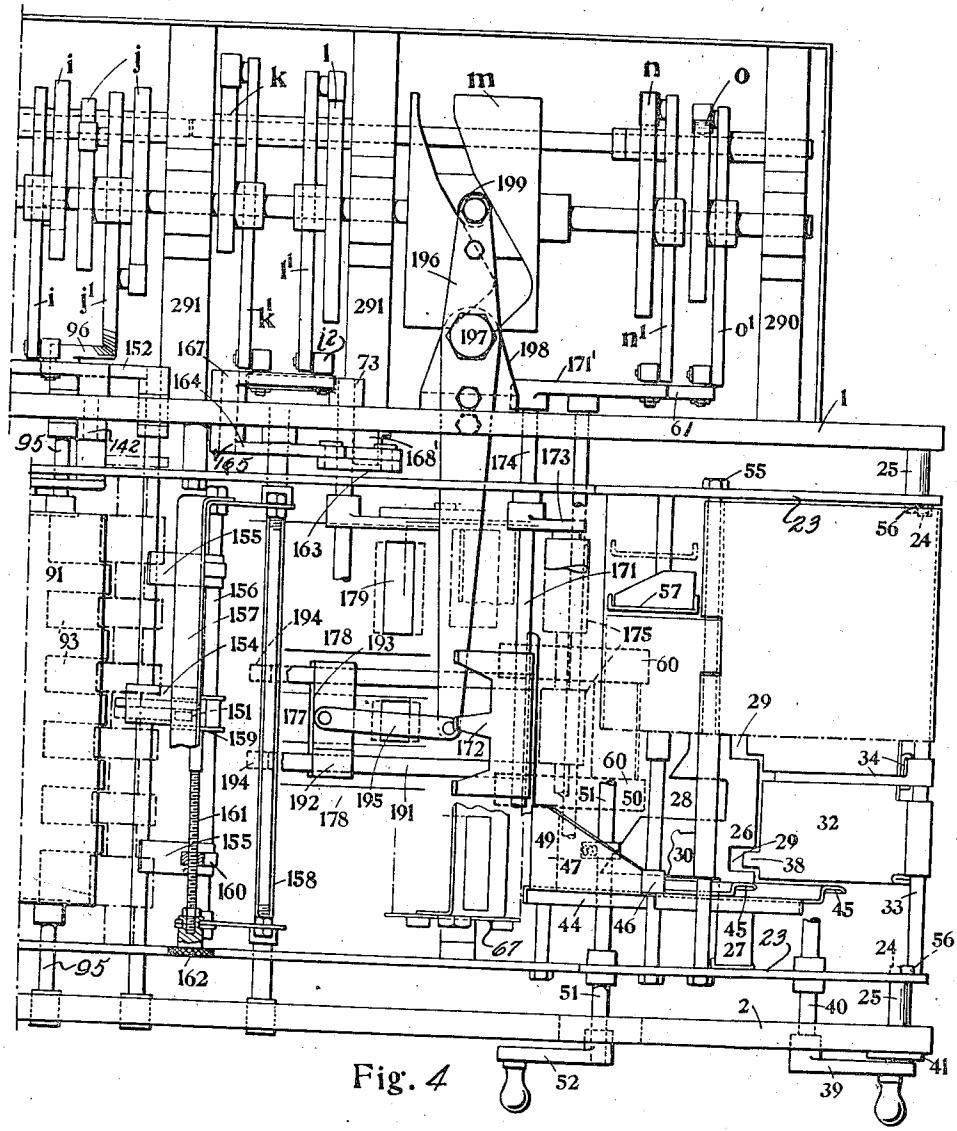


Fig. 4

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MECHANISM FOR PREPARING POSTAL MATTER

Filed April 25, 1939 13 Sheets-Sheet 5

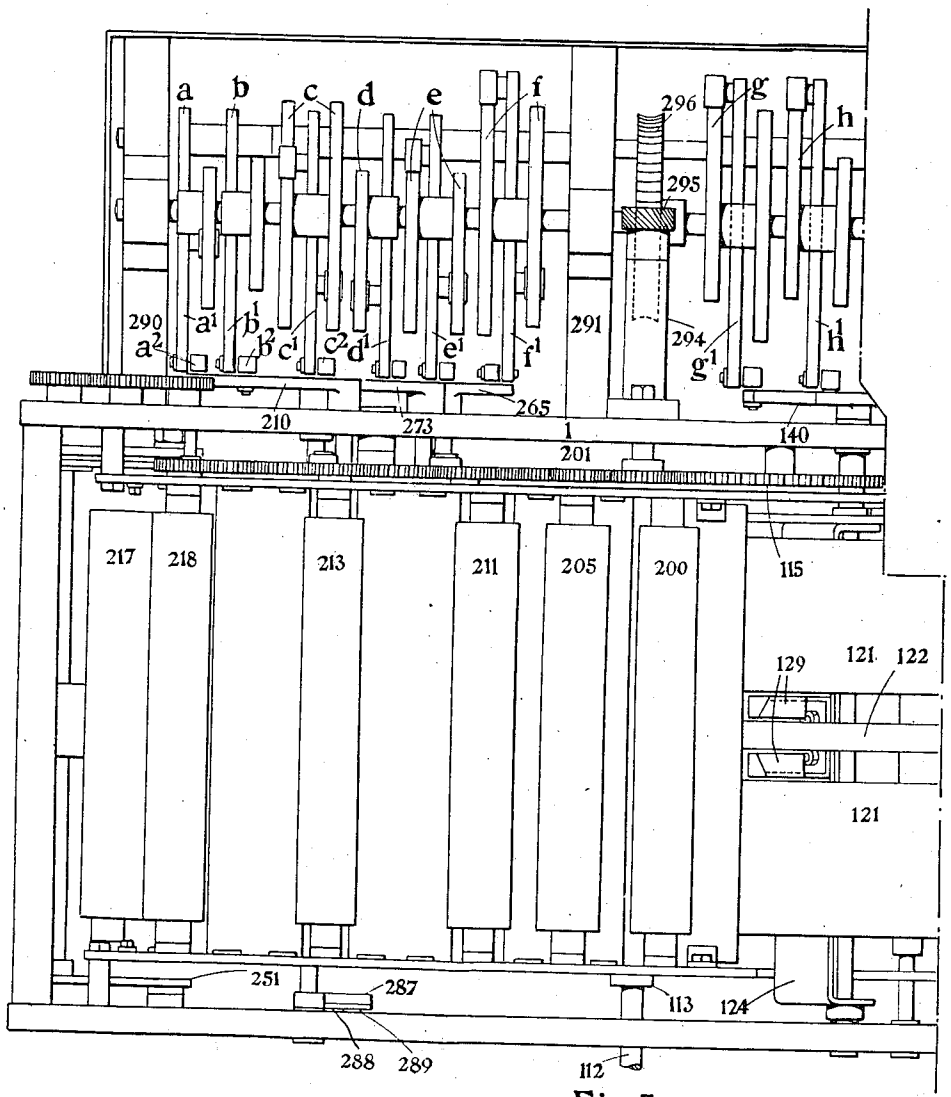


Fig.5.

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MECHANISM FOR PREPARING POSTAL MATTER

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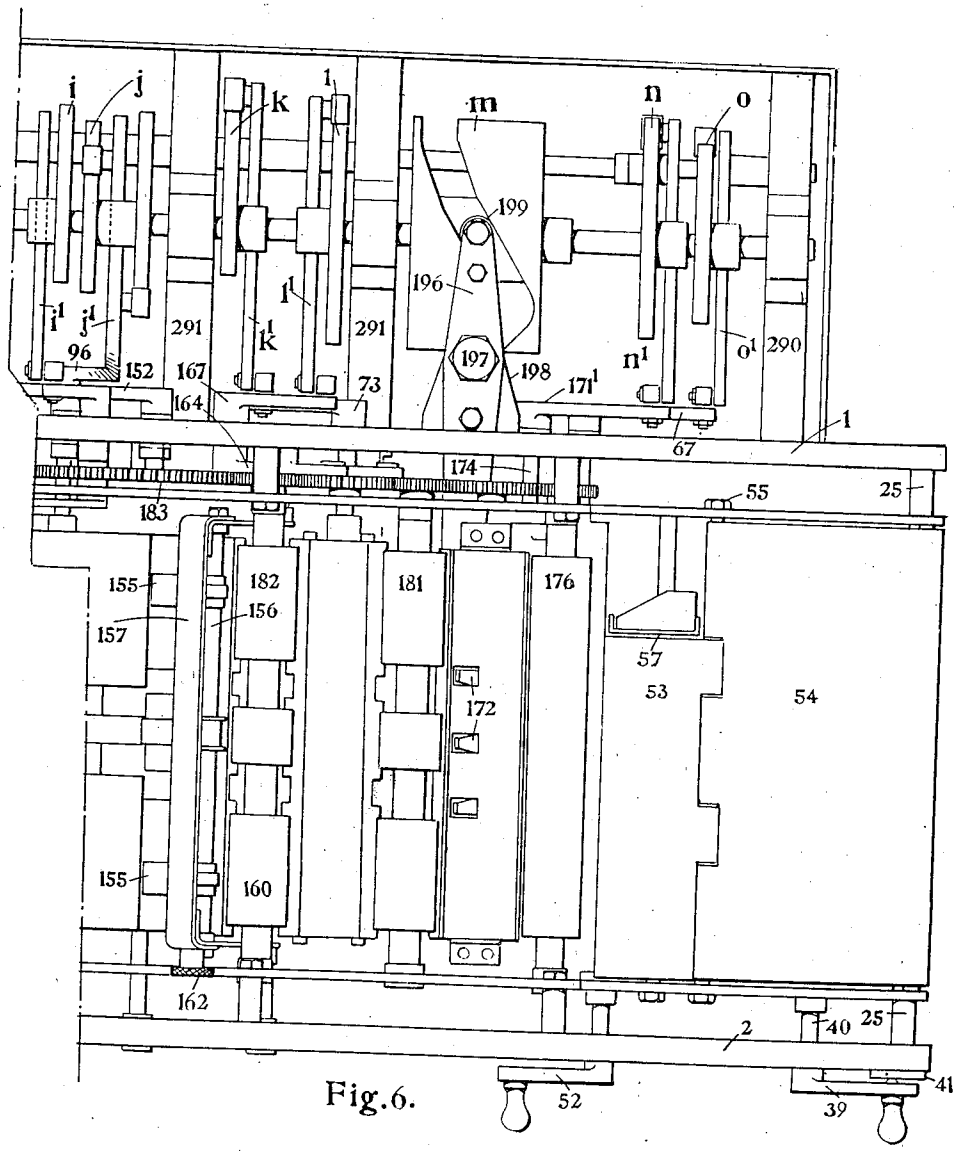


Fig.6.

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MECHANISM FOR PREPARING POSTAL MATTER

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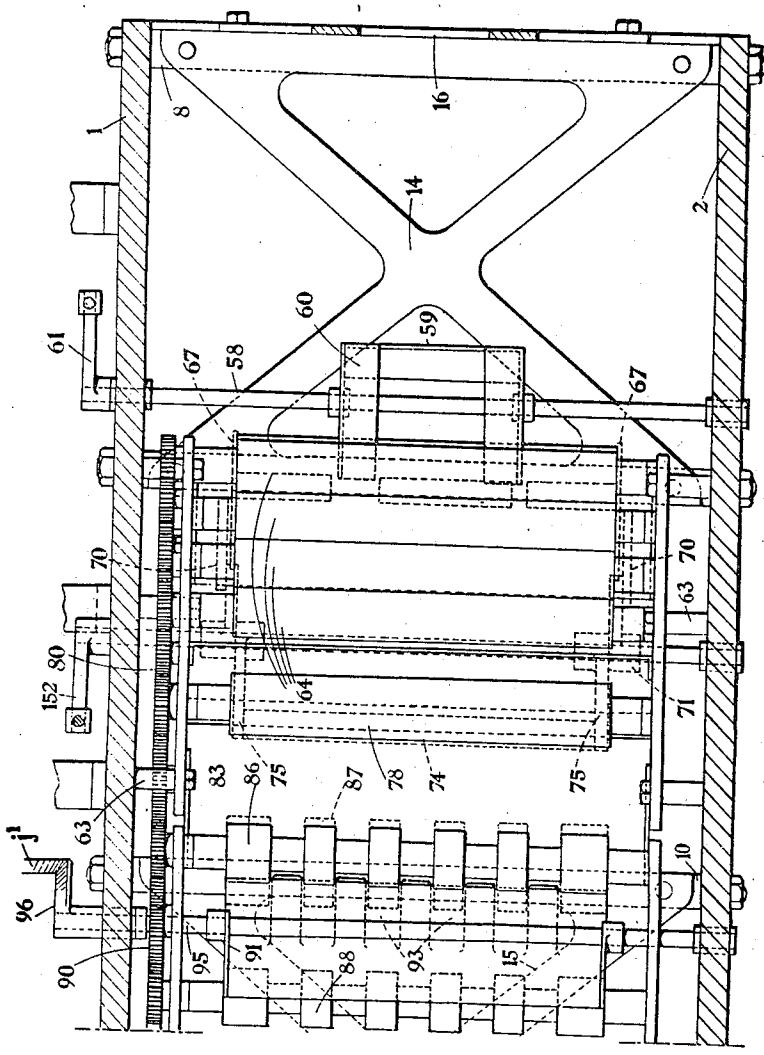


Fig. 7.

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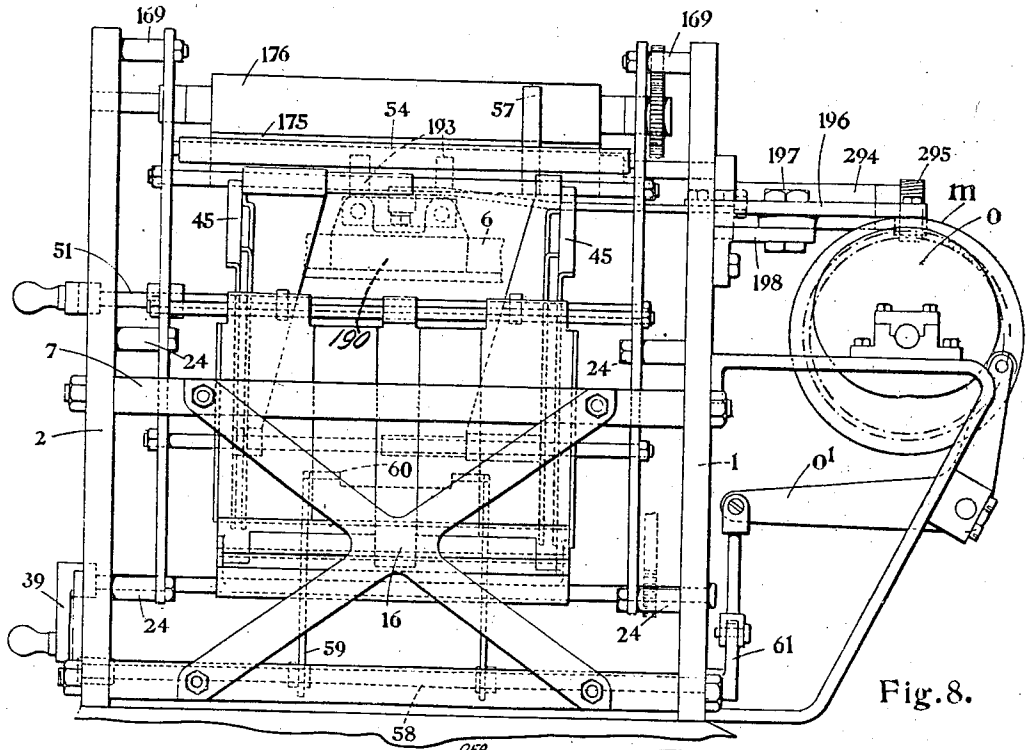


Fig. 8.

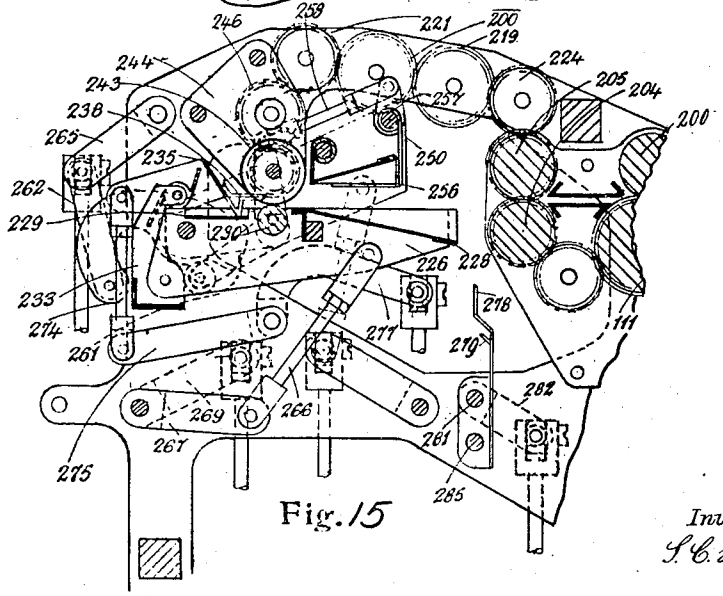


Fig. 15

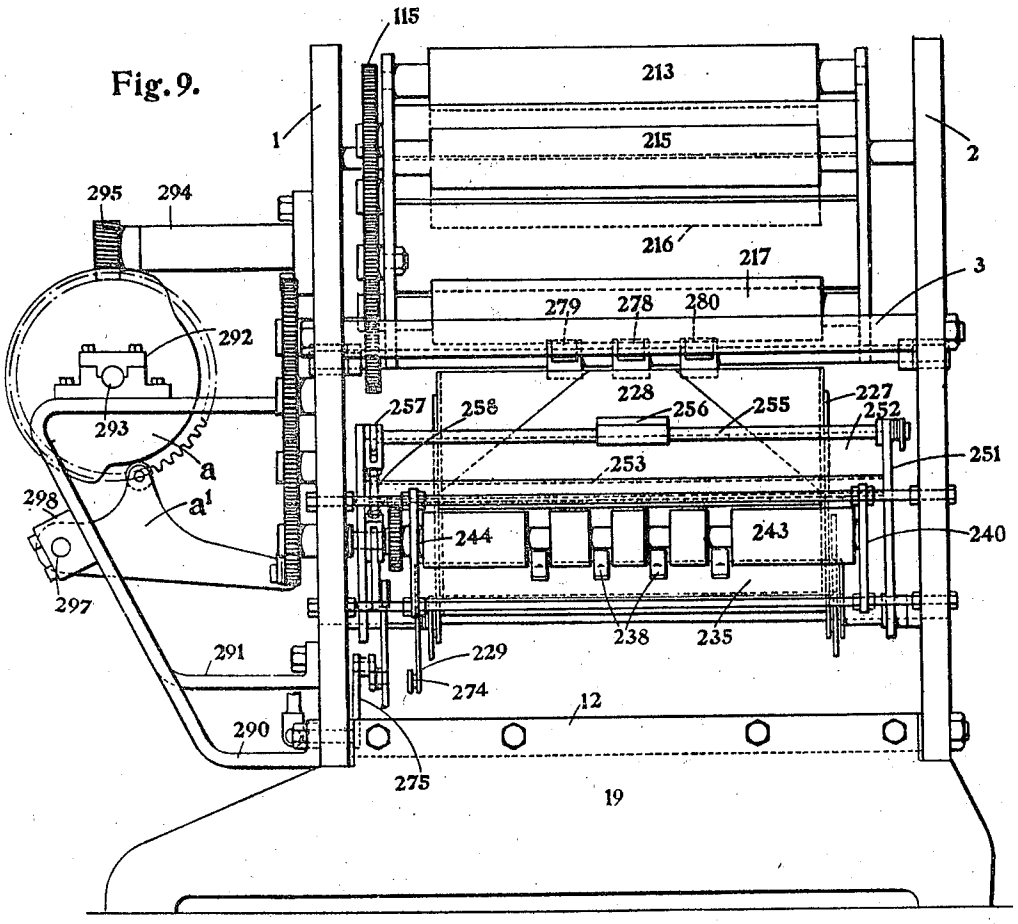
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MECHANISM FOR PREPARING POSTAL MATTER

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Fig. 9.



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MECHANISM FOR PREPARING POSTAL MATTER

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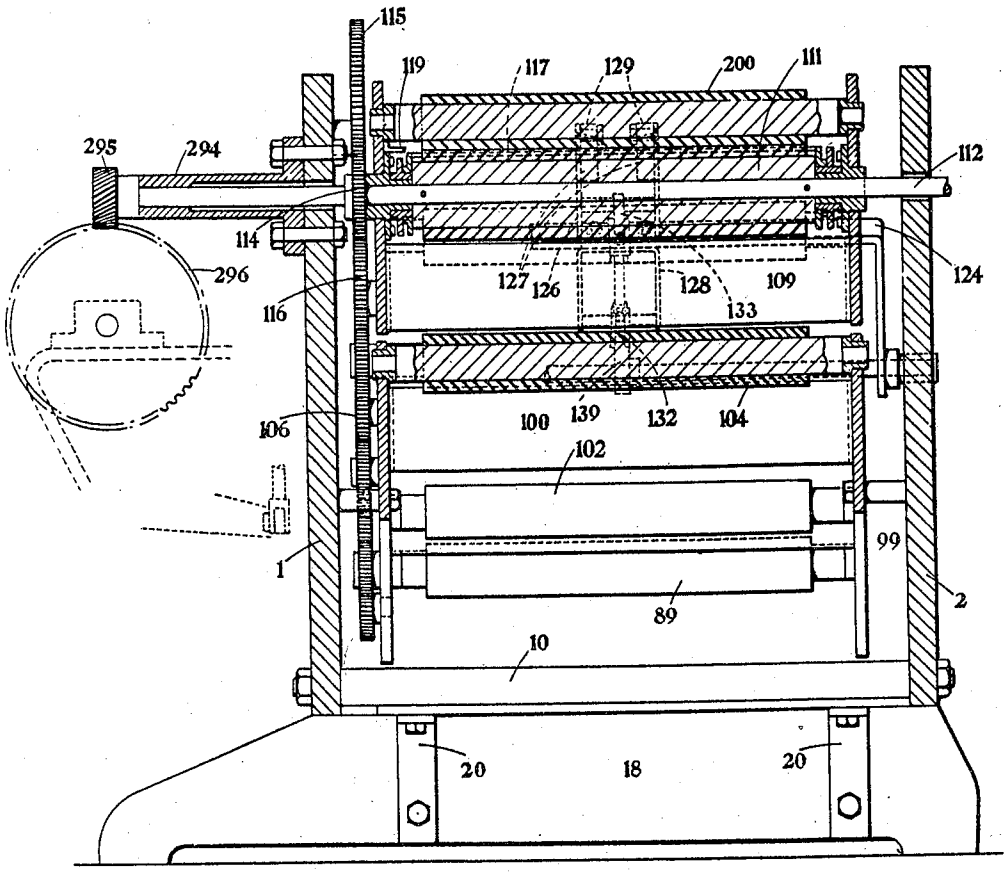


Fig. 10.

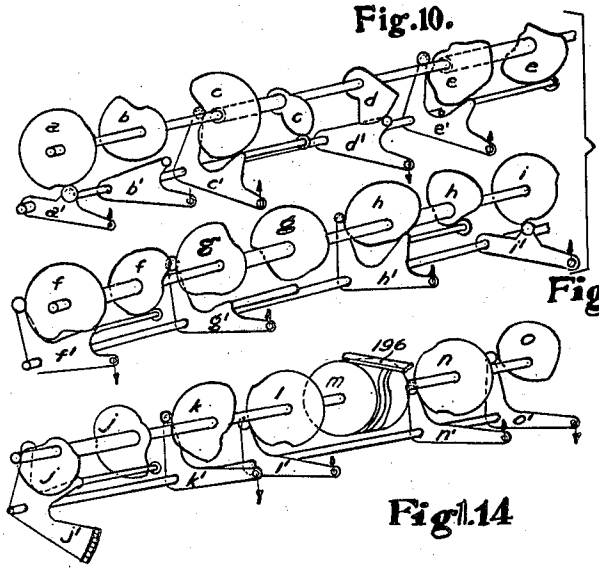


Fig. 13

Fig. 14

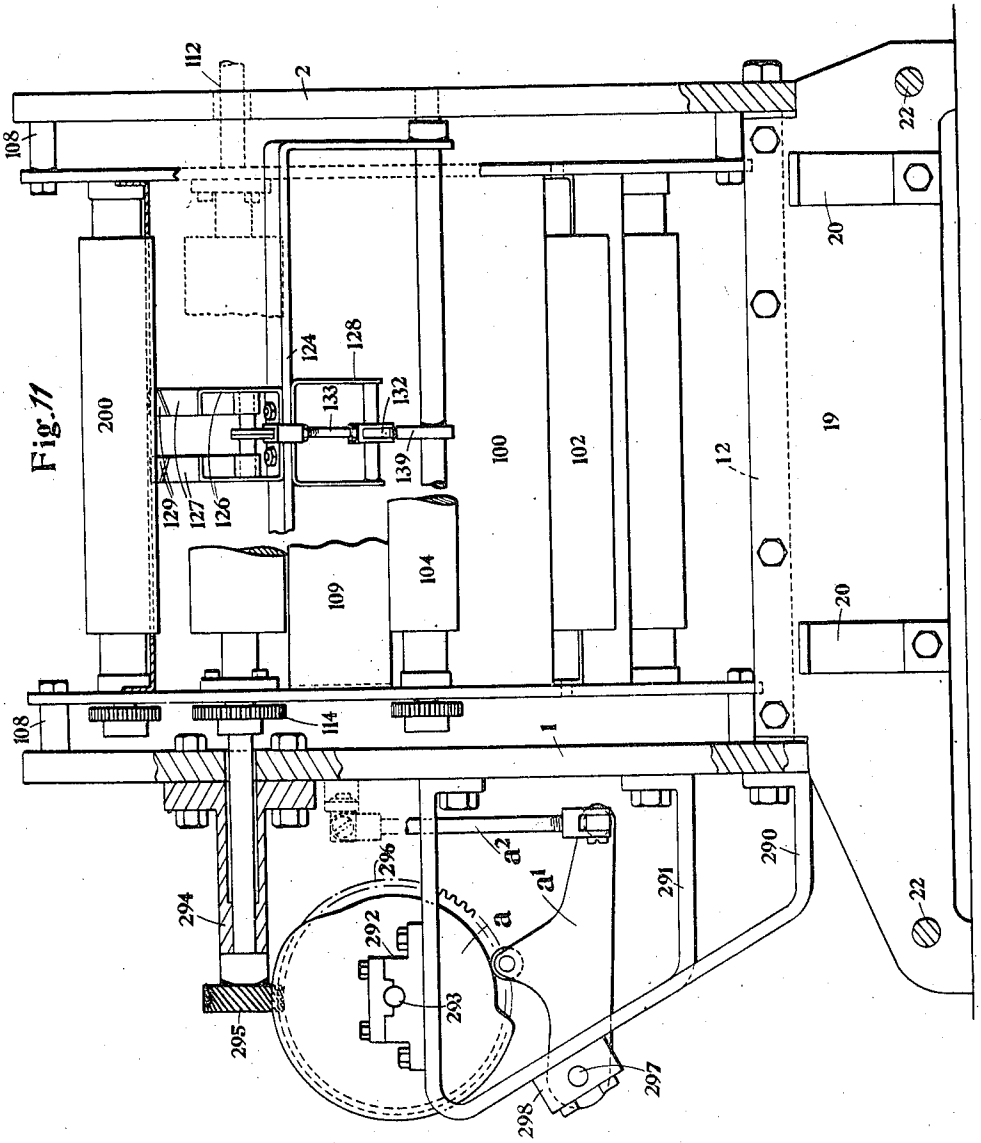
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MECHANISM FOR PREPARING POSTAL MATTER

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Fig. 11



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MECHANISM FOR PREPARING POSTAL MATTER

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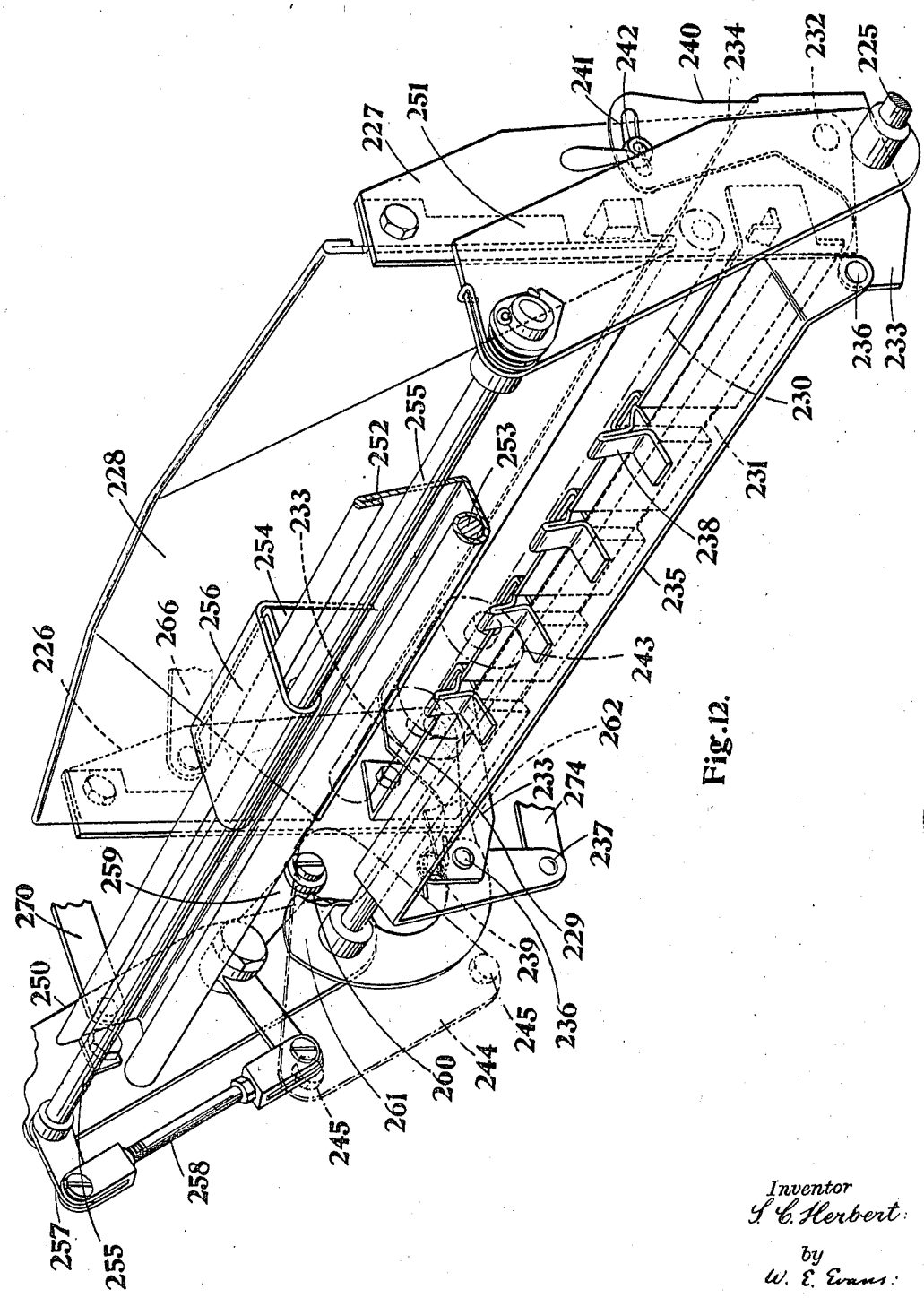


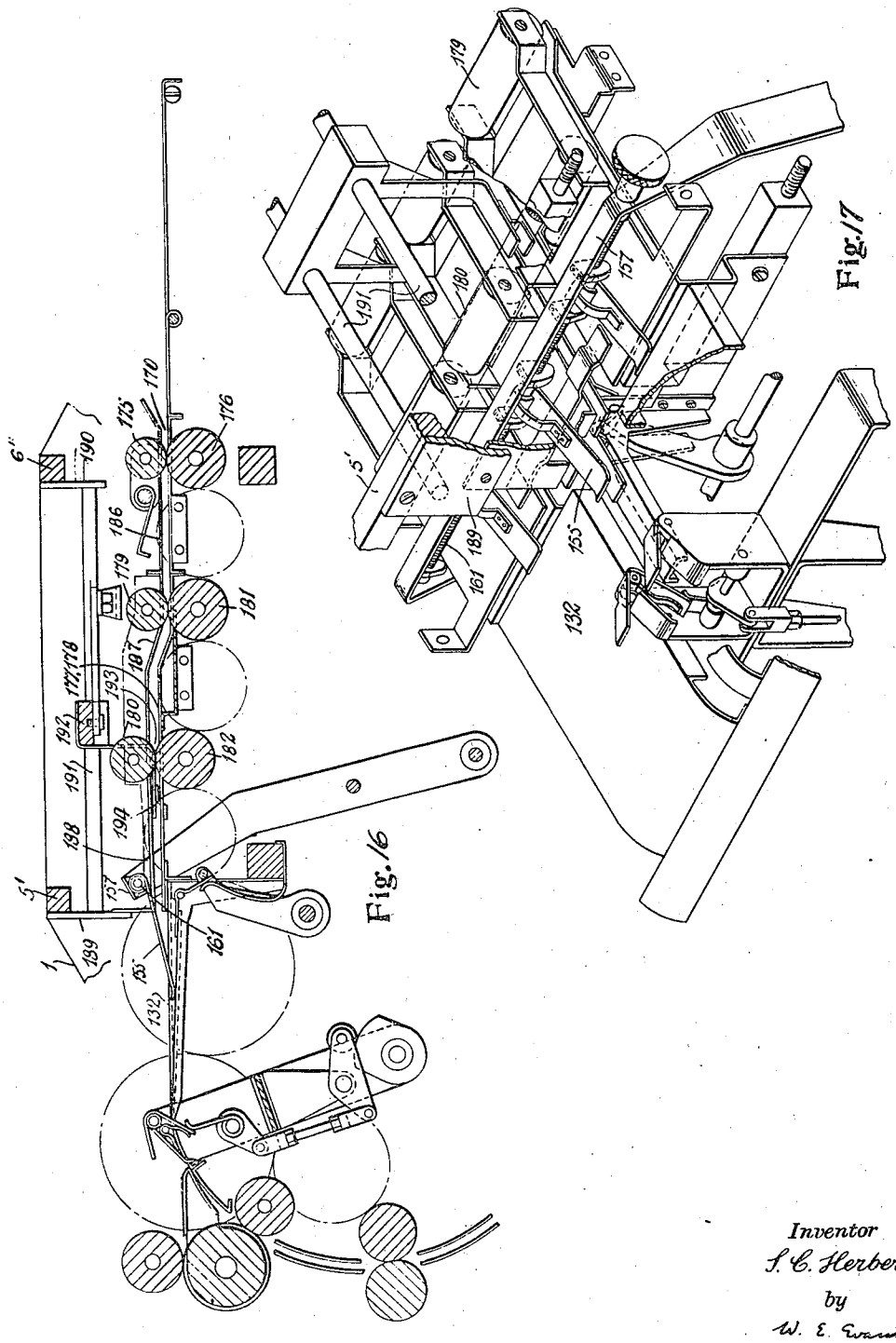
Fig.12.

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MECHANISM FOR PREPARING POSTAL MATTER

Filed April 25, 1939 13 Sheets-Sheet 13



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Patented May 4, 1943

2,318,073

UNITED STATES PATENT OFFICE

2,318,073

MECHANISM FOR PREPARING POSTAL MATTER

Stanley Charles Herbert, Nunhead, London, England

Application April 25, 1939, Serial No. 269,923
In Great Britain April 25, 1938

16 Claims. (Cl. 93—6)

This invention relates to mechanisms for preparing postal matter and more especially to mechanism that is adapted to insert circulars and like matter into the enclosing envelopes and to fold inwards the flaps of the envelopes.

The invention has for its main object to provide mechanism that will draw from a pile the required envelopes in succession, feed them to a position at which the corresponding circular or other matter is presented, insert the said circular or other matter into the envelope and turn the flap of the envelope into the envelope ready for despatch, the series of operations being carried out automatically.

According to the invention there is provided a magazine for the envelopes and a feed table for the circulars or other postal matter and mechanism whereby the envelopes are removed singly from the magazine by the flaps, and fed forward to a position in which the opening of the envelope is presented to the corresponding circular or other postal matter which in the meantime has been fed forward, the envelope being distended for the insertion of the circular or the like and being then again moved upon its path to other mechanism for the insertion into it of the flap and thence to the final delivery position.

According to the invention, moreover, the mechanism may be provided to straighten out the flap into alignment with the envelope, in the removal of the envelope from the magazine. It may further be provided to reverse the flap to the front of the envelope before the latter is passed to the position at which it receives the circular or other postal matter, whereupon the flap is rotated for insertion into the envelope.

The mechanism by which the sequence of movements of the envelopes and the circulars is effected may be varied in accordance with the requirements of different applications and where necessary the mechanism may be provided to be adjustable for the purpose of operating upon envelopes of differing sizes and circulars or other postal matter of differing sizes.

The envelope magazine may be provided to receive a pile or pack of envelopes positioned upon a table, shelf or like member at the lower end of the magazine; the pile or pack of envelopes may be retained upon the said table by a presser member, such as a lightly applied spring finger or fingers or a light weight adapted to follow the decreasing pile of enevelopes as the envelopes are successively withdrawn from the magazine. The table or the like is preferably constructed to permit the flap of the lowermost envelope to extend downwardly below it.

The magazine may be adjustable for differing sizes of envelope and for the purpose one or more of the walls of the magazine may be adjustable of position. Such adjustment may be effected, for example, by the mounting of the wall so that it is capable of a pivotal movement or of movement parallel to itself under the action of an adjusting mechanism such as a link and an eccentric or crank that is adjustable.

Similarly, the spring finger or fingers or the weight serving to feed the pile or pack of envelopes downwardly, where present, may be provided to be adjustable in elevation in accordance with the number of envelopes included in the pile.

The envelopes are withdrawn individually from the magazine by rotating or oscillating feed members having a path of movement such that the downwardly extending flap of the lowermost envelope in the pile or pack is engaged and the envelope thereby drawn from the magazine and fed to the first of a number of pairs or series of pairs of guide rollers distributed along the path which the envelope is required to follow to the filling position.

At or adjacent the filling position the envelope is engaged by mechanism, such as grippers, by which, if necessary, it may be carried into the filling position and by which it is detained during the insertion of the circular or other postal matter and while so detained it is distended by one or more distending elements having an oscillatory or other suitable movement and that are positioned or are so moved that they enter the envelope as it arrives at the filling position, the envelope being maintained distended for a period sufficient to enable the circular or other postal matter to be engaged by positively actuated inserting elements and carried thereby into the envelope.

After the envelope has been filled the operation of inserting the flap follows. The mechanism may be such that the flap may be turned and inserted into the envelope while the latter is detained in the filling position and if necessary while it remains distended for the insertion of the circular or other postal matter immediately after the withdrawl of the inserting elements. It is, however, preferred to cause the filled envelope to continue its progress along its path of travel to a final position of rest at

which the flap is inserted into the envelope. For this purpose the gripper or like mechanism or other suitable mechanism may return the envelope along the path by which it arrived at the filling position to a position at which it is diverted by suitable means to a path leading to the said final position. Alternatively, the envelope on leaving the filling position may be caused to progress forwards in continuation of the path by which it arrived at the filling position and to be thus led to the final position for the insertion of the flap.

At the final position the envelope is received into a cradle in which it is held during the time that mechanism provided for the purpose is caused to rotate the flap about the upper edge of the envelope for insertion. Such mechanism is advantageously of a form which in turning the flap exerts pressure also towards the inner surface of the front of the envelope, while at the same time distending elements or catches that may form part of the cradle are caused to engage the rear portion of the envelope and to distend it while the flap is pressed home within the envelope.

The cradle in which the envelope is positioned as hereinbefore described is advantageously formed with means whereby the surface upon which the envelope rests may be withdrawn for the final delivery of the filled envelope. Thus, the cradle may be provided with bottom elements which in synchronism with the remaining parts of the mechanism are caused at the appropriate moment to withdraw from the support of the envelope.

Where it is required to reverse the flap of the envelope withdrawn from the magazine so that it rests on the front surface of the envelope the flap may be diverted into a pocket or a series of strip-like guides forming a pocket mounted upon a pivotal axis transverse to the path of the envelope and adapted for a rotary or oscillatory movement through a considerable angle such that in the forward travel of the envelope between the pairs of guide rollers the flap is bent rearwardly. The mechanism may be such that the said pocket or series of strip guides reaches the limit of the rotary or oscillatory movement at the moment when the body of the envelope has been fed forward to a further set of feed rollers which then engage the mouth of the envelope and complete the folding back of the flap. The envelope with the flap folded rearwardly then proceeds along the path of travel to the filling position under the action of the gripper or like mechanism which advantageously engages the forward edge of the mouth of the envelope. When the envelope leaves the filling position the flap may be again turned into alignment with the front portion of the envelope by the mechanism by which the envelope is diverted from the path of travel by which it arrived at the filling position.

The invention is illustrated by way of example in the accompanying drawings.

Figures 1 and 2 together form a longitudinal sectional elevation of an apparatus comprising the several mechanisms required to carry out the operations according to the invention.

Figures 3 and 4 together represent a plan partly in section of the apparatus shown in Figures 1 and 2.

Figures 5 and 6 together form a complete plan of the apparatus.

Figure 7 is a sectional plan illustrating the envelope feed mechanism and the flap turning mechanism.

Figure 8 is an end elevation of the magazine end of the apparatus.

Figure 9 is an end elevation of the envelope discharge end of the apparatus.

Figure 10 is a cross-sectional elevation taken on the line 10—10 of Figure 1, viewed in the direction of the arrow.

Figure 11 is a sectional end elevation of the apparatus on a slightly enlarged scale.

Figure 12 is a perspective view of the flap tucking mechanism.

Figures 13 and 14 are diagrammatic representations of the cam and cam lever mechanism by which the several mechanisms of the apparatus are operated from a common drive.

Figure 15 is a sectional elevation of a modified construction of the flap tucking mechanism.

Figure 16 is a sectional elevation of a modified construction of the postal matter transfer mechanism.

Figure 17 is a perspective view corresponding to Figure 16.

In carrying the invention into effect according to the particular construction illustrated in Figures 1 to 14 of the accompanying drawings, there is provided a machine having mechanism adapted to withdraw the envelopes by the flaps from a magazine, reverse the flaps onto the fronts of the envelopes, feed the envelopes so prepared to the filling position, simultaneously to feed the postal matter previously folded to the filling position, distend the envelopes, insert the postal matter, return the flaps into alignment with the fronts of the envelopes, and subsequently tuck them into the envelopes in front of the postal matter before ejecting the envelopes.

The several mechanisms thus required are grouped upon a main frame comprising main frame plates 1 and 2, of openwork formation to reduce weight and to afford accessibility to the parts of the mechanisms. The said main frame plates are spaced apart and connected together by tie-bars 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, of square cross-section, connected in turn by horizontal diagonal bracing plates 13, 14, 15, and similar vertical bracing plates 16, 17. The main frame plates are supported upon transverse foot-plates 18, 19 respectively secured to the tie-bars 9 and 12 and braced by angular bracings 20 and 21 to the tie-bars 10 and 11. They are further tied together by two tie-rods 22. The main frame so provided serves for the reception within it of other frames that support the various mechanisms, while the frame plate 1 has fitted to it on the exterior an auxiliary frame for the support of the cam shaft and the co-operating bell-crank levers that are provided for the operation of the several mechanisms.

At the one end of the main frame there is provided the table for the postal matter, hereinafter termed "letters," and below it the magazine for the envelopes. The magazine is built up upon open frame plates 23 that are supported on the inner sides of the respective main frame plates 1 and 2 by bolts 24 and suitable distance sleeves or members 25. The bottom of the magazine is a sheet metal plate 26 of a width considerably less than the spacing of the frame plates 23, downwardly flanged at the sides and at the rear and provided at the rear with lateral extensions 27 flanged upwardly at the ends to receive bolts by which the plate may be secured to the frame

plates 23. The forward edge of the plate 26 is cut to an angle approximating to that of the flap of an envelope, as the envelopes are intended to be piled upon the plate with the flaps downwardly so that the flap of the first envelope is free of the plate 26. The forward edge of the plate is formed with slots 28, two in number, while the rear edge is formed with three slots 29 on the inner side of the rear flange. The front of the magazine is formed by a plate 30 of a width the same as that of the plate 26 and supported at the required disposition by bolts 31 received into the frame plates 23. The rear of the magazine is formed by a plate-like fitting 32 that is pivotally suspended from a bolt 33 extending between the frame plates 23. The fitting is of the same width as the bottom plate 26. It is formed with two longitudinal channels 34 of L-shaped cross-section oppositely directed, so that the middle section of the fitting overlaps the channels and is carried by a relatively narrow portion of the fitting. The purpose of the channels is to constrain the movement of a weight 35 adapted to be disposed upon the pile of envelopes 36, the weight being provided with hooks 37 of a form suitable to engage the channels. The fitting is further provided with downwardly extending lugs 38 to be received into the slots 29 of the bottom plate 26, for the purpose of limiting the possible movement of the fitting about the bolt 33. The movement of the fitting is controlled by a crank handle 39 secured to a spindle 40 having bearings in the plates 23 and extending to the outer side of the main frame plate 2, where the handle 39 engages over a dial plate 41 secured to the plate 2 and provided with a series of depressions with any one of which a spring catch in the handle will engage according to the particular position given to the handle. A plate-like crank arm 42 fixed to the spindle 40 is connected to the fitting 32 by a plate-like link 43 in such manner that the movements of the handle 39 are transmitted to the fitting 32. In this way the back of the magazine is adjusted according to the size of the envelopes. For the adjustment of the width of the magazine there are provided two movable side plates 44 each of which has two bearing surfaces 45 adapted to butt against the envelopes and formed either as an addition or integrally. The said plates are supported from the frame plates 23 by two bolts 46, each plate being provided for the purpose with a tubular sleeve 47 at the one end and a collar 48 at the other end set at right angles to the plate to receive the bolts 46 as bearings, the sleeve 47 and the collar 48 being united by a triangular plate 49. In order that the plates 44 may approach to the minimum distance, the sleeve 47, collar 48 and triangular plate of the one plate 44 are reversed in position on the other plate 44 so that the collar of the one plate is on the same bolt as the sleeve of the other plate. Each triangular plate 49 carries a lug 50 which has a screw-threaded bore, the threads of the bores of the two lugs being of opposite hand and engaging respectively right and left handed screw threads formed upon an operating spindle 51 which has bearings in the frame plates 23 and extends through the main frame plate 2 to receive a fixedly mounted operating handle 52. By the rotation of the said handle in one or the other direction the side plates 44 of the magazine may be caused to approach each other or to separate according to the dimensions of the envelope.

The letters to be inserted into the envelopes are fed onto a table of sheet metal comprising a narrow portion 53 and a wider portion 54 that are pivoted or hinged together upon a bolt 55 extending between the frame plates 23. The portion 54 extends the full distance between the plates 23 and at the rear end is conveniently supported upon studs 56 mounted in the main frame plates 1 and 2. Thus the portion 54 may be raised, after the manner of a hinged lid, to render the magazine accessible for the insertion of a pile of envelopes. The portion 53 extends advantageously towards the main frame plate 1 short of the position which the adjacent side plate 44 of the magazine occupies when at the extreme limit of its inward movement of adjustment. This disposition permits the mounting upon the said side plate of a lateral letter register plate 57 which extends upwardly in the space adjacent the portion 53 of the letter table and which is therefore always adjusted with the said side plate 44. It may be fixedly mounted upon the said side plate or may be adjustable thereon, as by means of a pin and slot connection. Alternatively, it may be independently mounted upon the frame plate 23 or upon the main frame plate 1. In either case it may adjustable and for the purpose may be mounted, for example, to move along a guide or slide under the action of an adjusting screw. With such a disposition of the register plate it is unnecessary for the portion 53 of the letter table to be shortened. The said portion may be bolted at its forward edge to the adjacent succeeding portion of the table, the bolts advantageously engaging slots in the forward flange of the portion 53.

For the feed of the envelopes from the magazine there is provided a spindle 58 mounted in bearings in the main frame plates 1 and 2 and having fixed in a middle position a plate-like fitting 59 which at the outer end is slotted at the middle and the two arms 60 so formed bent at right angles and to a circular curvature about the axis of the spindle 58, the radial position of the arms and their separation being such that, in an oscillation of the fitting 59 through an angle represented in Figure 1 by the full line and the dot and dash positions of the fitting 59, the arms 60 are caused to follow a path which carries them into the slots 28 in the bottom plate of the magazine and so permits them to engage and carry forward the flap of the bottom envelope into the range of a set of feed rollers. The oscillation of the fitting 59 is effected by a cam which operates upon the fitting through a crank arm 61 secured to the spindle 58 outside the frame plate 1.

The envelopes are received from the feed arms 60 by a series of feed rollers that are carried by a second inner frame comprising the frame plates 62 that are spaced from and secured to the main frame plates 1 and 2 by the bolts 63 and suitable distance members. The said inner frame carries a series of upper driving feed rollers 64 the spindles of which extend between the plates 62 and through that which is adjacent the main frame plate 1, to receive fixedly mounted gear wheels which are geared as a train by idler gear wheels 65. The third in the series of rollers 64 is maintained in contact with a lower roller 66 the spindle of which forms the pivotal axis for a movable roller cradle 67 comprising two spindle bearing plates and a sheet metal bridge member 68. The said cradle carries two rollers 69, adapted to co-operate with the first and second rollers 64 and each of which is formed in three spaced

sections, the spacing being such that the feed arms 69 can enter freely into the spaces. The portions of the second roller 69 are caused to protrude through corresponding slots formed in the bridge member 68. The cradle 67 is moved about its pivot to bring the rollers 69 into co-operation with the first and second rollers 64 to take up the feed of the envelope from the feed arms 60 by a pair of pivoted links 70 which are connected to arms 71 fixedly mounted upon a spindle 72 having bearings in the main frame plates 1 and 2 and, on the outer side of the plate 1, a fixedly mounted operating arm 73 which receives movement from a cam in the manner hereinafter described. The cradle 67 may advantageously be balanced by a counterweight 74 carried from the spindle 72 by an arm or arms 75. The inner frame plates 62 carry a slotted guide plate 76 through which the second and third rollers 64 protrude, which guide plate serves, in conjunction with the bridge member 68 of the cradle 67, to constrain the envelope flap to follow the determined path of travel.

For the continued feed of the envelope the frame plates 62 also serve as bearing plates for the spindles of a roller 77 co-operating with the last upper feed roller 64 and of a further pair of larger feed rollers 78 and 79. The roller 78 is a driving roller and is provided with a gear wheel which gears through an idle wheel 80 with the gear wheel of the last feed roller 64 and receives a drive through an idle gear wheel 81. The frame plates 62 further carry two envelope guide plates 82, 83 which are respectively slotted for the protrusion of the rollers 77 and 79 and the roller 78.

A further pair of inner frame plates 84 lie adjacent the plates 62 and, as before, are supported from the main frame plates 1 and 2 by distance members and bolts 85. These plates serve to carry in particular the spindles of the rollers 86, 87, and 88, 89, forming parts of the envelope flap reversing mechanism, by which the flap is reversed onto the front of the envelope. The rollers 86, 87, 88, are formed in a series of sections that are spaced apart at distances approximating to their own width. Each of the four rollers is provided with a gear wheel fixed to its spindle. The gear of the roller 86 meshes with the idle gear wheel 81 while the rollers 87 and 89 are in gear through an idle gear wheel 90, all gear wheels being, as before, on the outer side of the frame plate 84 adjacent the main frame plate 1. The flap turning element comprises a sheet metal fitting 91 formed by a plate that is doubled upon itself in such manner as to leave an intervening space 92 of small thickness and the two parts of the plate are bent to a slight curvature in the same direction. The forward part of the plate from the edge adjacent the mouth of the space 92 is formed with slots 93 extending deeply into the said forward part and of a width and so spaced that the sections of the rollers 87 and 88 may pass freely through the slots 93 between the tongues formed thereby. The fitting 91 is further provided at the lateral edges with bearing lugs 94 by which it is fixedly mounted on a spindle 95 extending from a bearing in the main frame plate 2 through the main frame plate 1 to receive a toothed quadrant 96 fixed thereto capable of effecting the rotation of the fitting 91 through an angle of approximately 100°. This movement is effected by a cam through a similar toothed quadrant, in the manner hereinafter described, the two quadrants being provided with bevel teeth. The forward end of the guide plate 83 is slotted to correspond with the spacing of the sections of the roller 86 and to permit it to extend into the range of the rollers 86 and 87 and so that it lies in close proximity to the upper unslotted portion of the fitting 91 when the latter has rotated in the anti-clockwise direction into its limiting position, as represented in full lines in Figure 2 of the drawings.

In a position immediately below the spindle 95 the frame plates 84 have fixed to them a guide fitting 97 which functions as a continuation of the guide plate 82 and is formed of a number of bridge-like plate members that are spaced apart to correspond with the spaces between the tongues of the forward part of the fitting 91 and are supported upon a sheet metal carrier 98 provided with lateral lugs by which it may be secured to the frame plates 84.

It will be understood that as the envelope is fed forward by the rollers 78 and 79 with the flap in alignment with the front of the envelope, the flap is guided by the rollers 86 and 87 into the mouth of the space 92 of the reversing fitting 91 and, at the appropriate moment in the forward travel of the envelope, the fitting 91 rotates in the clockwise direction so that the mouth moves at the same speed as the envelope with the result that the flap is turned back and finally flattened upon the front of the envelope by the rollers 88 and 89.

The envelope continues on its path, with the flap reversed, as defined by the pairs of guide plates 99 and 100 extending between and secured to the frame plates 84, the envelope being impelled forward by the pairs of rollers 101, 102 and 103, 104, of which the rollers 101 and 103 are driving rollers, being provided with gear wheels which mesh with the idle gear wheels 105 and 106, the wheel 105 engaging with the gear wheel of the roller 88.

At the upper part of the main frame and over the forward ends of the frame plates 84 there is provided a further pair of inner frame plates 107 also spaced from the main frame plates 1 and 2 and secured thereto by means of bolts 108 and distance members. A pair of guide plates 109, secured to the frame plates 107, serve to guide the envelope into the range of the pair of rollers 110 and 111. The roller 111 is fixedly mounted upon a spindle 112 which serves as the power spindle for the application of the drive of an electric or other motor (not shown) which is disposed outside the main frame plate 2 and is suitably geared to the outwardly extending portion of the spindle 112. The latter extends through clearance holes in the main frame plates and is carried in bearing members 113 having bosses or sleeves extending into close contact with the body of the roller 111 and serving as bearings for certain other elements of the mechanism, that is to say, the envelope diverting member and the flap straightener, as hereinafter described. The spindle 112 further carries fixedly mounted upon it a gear wheel 114 which transmits the motor drive to the driving rollers of the mechanism. For this purpose it is in gear with an idle gear wheel 115 carried on a stub spindle mounted in the frame plate 1 which in turn meshes with a gear wheel 116 engaging with the gear wheel of the roller 103. The spindle 112 also serves to drive the cam gear, as hereinafter described.

The envelope fed forward by the rollers 110 and 111 is constrained in its path by the guide plate 115' extending between the frame plates

107 and the diverting member. The latter is a sheet metal plate 117 bent about the middle of its length to a sharp angle and carried by laterally disposed bearing plates 118 which are rotatably carried upon the bosses of the flap straightening device, to be hereinafter described, which bosses are in turn mounted upon the bosses or sleeves of the bearing members 113. This construction is not essential and may, of course, be modified. The plate 117 is so disposed that under gravity its angular portion tends to rest upon the guide plate 116'. The limit of the upward movement of the plate 117 is determined by means of stop plates 119 fitted to the frame plates 107 and by adjustable screwed stop pins 120 mounted in lateral brackets upon the bearing plates 118.

The guide plate 116' is continued rearwardly by a flying or bridge-like envelope filling table formed in two lateral sections 121 and a narrow middle section 122 spaced from the lateral sections to leave a longitudinal space or slot on each side. The middle section 122 inclines downwardly in the rearward direction for a purpose that will hereinafter be explained and the lateral sections similarly incline transversely, but not necessarily to the same degree.

When the envelope lies upon the table sections 121 and 122 it is in the position to be charged with a letter. It is carried into the said position by means now to be described.

A spindle 123 mounted in bearing bushes in the main frame plates 1 and 2 serves to support in a pivotal manner a bridge member 124 of sheet metal of which the lateral portion adjacent the main frame plate 1 is formed with an outwardly extending arm 125. The bridge member 124 has fixed to it a U-shaped fitting 126 the limbs of which are so spaced that they may protrude upwardly through the slots present at the two sides of the middle section 122 of the table before referred to. At the upper edges of the said limbs there are provided sheet metal shoes 127 which, in the most forward position of the bridge member 124, butt against the rearward edge of the guide plate 116', to form a short continuation of the surface of the said guide. The bridge member 124 further carries on its under face a second U-shaped fitting 128 which serves for the support of the operating mechanism of clips 129 which co-operate with the shoes 127. A spindle 130 is carried in bearings in the fittings 128 and upon the spindle there is mounted a double-armed lever 131 which by the one arm supports a roller 132 and by the other arm is linked by a link 133 to an arm 134 fixedly mounted upon a spindle 135 having bearings in the fitting 126 and having also in fixed relation thereto two arms 136 which are positioned to bear upon arms 137 in fixed relation with the clips 129. The clips are normally maintained in the closed position in relation to the shoes 127 by leaf springs 138. The clips 129 are operated to close upon the shoes 127 by a cam 139 that is in a fixed position upon the spindle 123, the said cam being operated by an operating arm 140 that is in fixed relation to the spindle 123 at the exterior of the main frame plate 1.

The envelope impelled forward by the rollers 111 and 110 and guided by the guide plate 116' and the diverting member 117 arrives with its mouth upon the shoes 127. The cam 139 is then operated to close the clips 129 upon the inner face of the front of the envelope to grip the envelope upon the shoes 127, whereupon the bridge member 124 is caused to move through a determined angle to carry the envelope on to the filling table comprising the sections 121 and 122. The movement of the bridge member is effected by an arm 141 that is in fixed relation to a short spindle 142 mounted in a bearing in the main frame plate 1, the arm 141 being linked by a connecting rod 143 to a pivotal point upon the arm 125 of the bridge member 124. The arm 141 is adapted to be oscillated through the determined angle required by the movement of the bridge member 124 by an operating arm 144 that is connected to an operating cam lever hereinafter described.

The envelope now rests upon the filling table comprising the sections 121 and 122 of which it will be remembered the middle guide inclines to a lower elevation than the lateral sections, while the latter incline inwardly in a like direction. It is therefore possible by depressing the inner surface of the front of the envelope to cause the envelope to distend. For this purpose there is mounted at the rear end of the middle section 122 in the flanges or cheeks thereof a spindle 145 which carries loosely mounted upon it a clip 146 which protrudes through a corresponding opening in the middle section and is normally caused to press upon the surface of the middle section by means of a leaf spring 147 secured to the tie rod 5 of the main frame and adapted to bear upon an extension or arm 148 of the clip. The clip is operated to engage and press down the front of the envelope after its arrival upon the filling table by a crank arm 149 mounted upon a spindle 150 carried in bearings in the main frame plates 1 and 2. The said crank arm carries a roller 151 adapted to press upon the arm 148 of the clip in opposition to the action of the spring 147. The crank arm is operated by a cam and a cam lever in a manner hereinafter described, by means of the operating arm 152 fixed to the spindle 150 to the exterior of the main frame plate 1. The spindle 150 further carries a counter-weight 153.

In order to permit the introduction of the letter into the distended envelope there are provided a series of letter guide fingers, three in the construction described, comprising a middle guide finger 154 and the two lateral guide fingers 155. The guide fingers are provided of sheet metal and are mounted rotatably upon a spindle 156 which is carried in an extended bridge member 157 fixedly mounted upon a spindle 158 having bearings in the main frame plates 1 and 2. The middle guide finger is constrained to retain its middle position by means of a U-shaped retainer 159 mounted on the underside of the transverse portion of the bridge member 157. The lateral guide fingers 155 are adapted for adjustment towards and away from the middle guide finger and for the purpose their sleeve portions by which they are mounted upon the spindle 156 are slotted for the reception in each case of an adjusting member 160 which is provided with a screw-threaded hole to permit it to be threaded upon a spindle 161 having two screw threads, respectively right and left handed respectively to engage corresponding screw threads in the holes of the members 160, and which is carried in bearings in the bridge member 157. It has fitted to it an adjusting knob 162 by the rotation of which the guide fingers 155 may be caused to be laterally adjusted in position.

The guide fingers 154 and 155 are caused to enter the distended envelope by a limited travel

which is produced by an angular movement of the bridge member 157 about the spindle 158 as the axis. This movement is effected through an arm 163 secured to the spindle 158 and connected by a link 164 to a second arm 165 that is fixedly mounted upon a spindle 166 mounted in a bearing in the main frame plate 1 and carrying outside the said plate an operating arm 167 which is actuated from a cam and cam lever in the manner to be hereinafter described. The rearward position of the bridge member 157 is conveniently determined by a stop 168' mounted upon the inner face of the frame plate 1.

The following description relates to the manner of introduction of the letter into the distended envelope.

Immediately forward of the portion 53 of the letter table there is provided a further pair of inner frame plates 168 also secured to the main frame plates 1 and 2 by bolts 169 and distance members. Extending between the said frame plates is a guide plate 170 that is provided with two series of spaced slots disposed the one forward of the other. Below the said guide plate there is carried in bearings in the frame plates 168 a spindle 171 on which is mounted fixedly in a middle position a letter register comprising a sheet metal fitting 172 provided with three forwardly projecting arms the extremities of which are turned upwardly, the spacing of the said arms being such that, in a determined position of the spindle 171, the said extremities extend through the forward series of slots in the guide plate 170. The spindle 171 further carries fixed thereto adjacent the bearings in the frame plates 168 a pair of arms 173 in which is rotatably supported a spindle 174 on which are fixedly carried three short rollers 175 spaced to agree with the positions of the rearward series of slots in the guide plate 170. The relative disposition of the rollers 175 and the extremities of the arms of the fitting 172 with respect to the spindle 171 is such that when, on limited rotation of the spindle, the said extremities are withdrawn through the slots in the guide plate 170 the rollers are protruded through the corresponding slots in the guide plate so that they may be brought into contact with a driven roller 176 the spindle of which is carried in the inner frame plates 168. Thus, if, when the said extremities are protruding from the guide plate 170, a letter is fed forward until it is arrested by the said extremities, it is in the position to be fed forward to the filling table by the rollers 175 when the latter are brought into contact with the roller 176 and the said extremities have been withdrawn below the surface of the guide plate 170 in synchronism with the operations of the remaining mechanisms. The oscillatory movements of the spindle 171 that are thus required are effected through an operating arm 171' secured to the spindle outside the main frame plate 1 from a cam and a cam lever, as hereinafter described.

The guide plate 170 is connected with the sections 121 and 122 of the before mentioned envelope filling table by a middle guide plate 177 and two lateral guide plates 178 that are spaced apart and that are of such relative widths that the longitudinal spaces or slots that are presented on each side of the middle guide plate 177 are more widely spaced than the corresponding spaces or slots at the sides of the middle section 122 of the envelope filling table. Each of the guide plates 177 and 178 is provided with downwardly extending flanges in which are formed bearings for the spindles of two sets of three short rollers 179 and 180 the spindles of which correspond in length with the respective widths of the guide plates 177 and 178 so that the longitudinal spaces or slots between the guide plates are not obstructed thereby, the rollers 179 and 180 being of such diameters that their upper parts protrude sufficiently through corresponding slots in the guide plates to enable them to press upon and co-operate with driven rollers 181 and 182 the spindles of which are carried in bearings in the frame plates 168. The spindles of the rollers 176, 181 and 182 have corresponding gear wheels fixedly mounted upon them on the outer side of the inner frame plate adjacent the main frame plate 1, the said gear wheels being geared together and to the gear wheel 115 by the gear wheel 183, carried by a spindle from the main frame plate 1, and the gear wheels 184 and 185, carried by spindles from the adjacent frame plate 168. Thus the said rollers receive the necessary drive from the power spindle 112. The elevation of the letter table 53, 54 is somewhat above that of the sections 121, 122 of the envelope filling table and is compensated by the setting of corresponding portions of the guide plates 177 and 178 immediately in front of the roller 181 on an inclination which, in conjunction with the longitudinal spaces or slots separating the said guide plates, serves a useful purpose to be hereinafter described. The guide plates 170, 177, and 178 are covered in the spaces between the rollers 176, 181, and 182, to constrain the letters to follow the desired path, by means of guide plates 186, 187, 188 of which the guide plate 186 is secured to the guide plate 170 and the guide plates 187 and 188 to the outer flanges of the guide plates 178. The guide plates 187 and 188 are slotted on the under faces in coincidence with the longitudinal spaces or slots between the guide plates 177 and 178. It will be observed that the guide plate 188 extends sufficiently far forward to lift the letter guide fingers 154 and 155 off the surface of the envelope filling table when the bridge member 157 is in its rearmost position.

The letter that is fed forward by the rollers 181, 182 requires to be impelled into the distended envelope. For this purpose there is provided a letter thruster mechanism conveniently of the form now to be described. The tie bars 5 and 6 of the main frame are respectively provided to carry plate-like brackets 189 and 190, the bracket 189 being extended upwardly and downwardly to give rigidity and to serve also to permit of the connection thereto of the middle section 122 of the envelope filling table. The brackets have for their main function to support parallel guide bars 191 upon which is slidably mounted a carrier 192 provided at the forward end with two upstanding angular arms 193 which have the upper ends formed to fork-like fittings 194, the spaces of which are parallel with the guide bars 191. The elevation of the forks 194 is such that the spaces of the said forks are coincident in elevation with the space between the guide plates 177 and 178 and the upper guide plate 188 and the spacing of the arms 193 upon the carrier 192 is such that they may be received with clearance in the longitudinal spaces or slots that are formed between the guide plates 177 and 178. It will thus be seen that if the carrier 192 is moved to the rear end of the guide bars 191 the forks 194 are withdrawn below the elevated portions of the guide plates 177 and 178 but when the letter fed forward by the feed rollers has arrived in a

position below the guide plate 188 a forward movement of the carrier 192 causes the forks 194 to emerge from below the guide plates 177 and 178 on passing the inclined portions of the said guide plates, and to engage the rear edge of the letter. The continued forward movement of the carrier towards the forward end of the guide bars 191 ensures that the letter is carried forwardly into the distended envelope below the letter guide fingers 154 and 155 which are at the moment within the open envelope.

The means whereby the carrier is caused to be reciprocated in synchronism with the operation of the remaining mechanisms conveniently comprises a link 195 which is pivoted upon a vertical pivot mounted in the rear portion of the carrier, the link 195 being in turn pivoted by a vertical pivot to the inner end of a double armed lever 196, the pivot 197 of which, disposed outside the main frame plate 1, is supported by a bracket 198 applied to the said main frame plate. The outer arm of the lever 196 is provided with a vertical pivot which on the underside of the arm supports a roller 199. The said roller is engaged with a cam groove of a drum-like cam that will hereinafter be described. In Figure 4, for the purpose of clearness, the lever 196 is shown in mid-travel.

The envelope now charged with the letter is caused to return on its path along the envelope filling table by a return movement of the bridge member 124, the clips 129 retaining their hold upon the envelope. The diverting member 117 is again resting with its angular point upon the guide plate 116' and accordingly the envelope is diverted above the upper surface of the said diverting member and passes into the range of the power roller 111 at a position at which the said roller cooperates with a roller 200, the spindle of which is carried in bearings in the inner frame plates 107. The diverted path of the envelope is now defined by a guide plate 201 carried by the inner frame plates 107 and the flap straightener which comprises a sheet metal fitting 202 of substantially triangular cross-section having one of the angles directed rearwardly to form the means for straightening the flap. The said fitting is supported by bearing arms 203 having bosses which are rotatably fitted upon the bearing members 113 of the power roller 111. The fitting 202 is slotted in the upper surface to permit of the upward protrusion of a roller 204, the spindle of which is carried in the bearing arms 203 of the flap straightener. The flap straightener is adapted to have a limited movement of rotation about the spindle 112 in such manner that the roller 204 may be moved into contact with a roller 205, the spindle of which is supported by the inner frame plates 107 in such position that the roller may protrude through a slot in the guide plate 201.

The bearing arms 203 and the inner frame plates 107 may be provided in either or both cases with cooperating stop elements in the form, for example, of short lengths of angle metal by which the lower limit of movement of the bearing arms 203 may be determined. To effect the oscillatory movements of the flap straightener there is provided a spindle 206 carried in bearings in the main frame plates 1 and 2 which, within the said main frame plates, is provided to carry fixedly mounted thereon arms 207 connected by links 208 to a spindle 209 in the flap straightener. The spindle 206 carries outside the main frame plate 1 a fixedly mounted operating arm 210 which receives the necessary movements from a cam and a cam lever in the manner hereinafter described. By the mechanism described the forward feed of the envelope effected by the rollers 205 and 204 results in the flap which is lying against the lower surface or front of the envelope being engaged with the lower surface of the flap straightener with the result that it is straightened out into alignment with the front of the envelope.

The envelope is then caused to travel towards the mechanism by which the flap is tucked therein by a series of pairs of rollers 211, 212, 213, 214, 215, 216, and 217, 218, the spindles of which are carried in bearings in the inner frame plates 107 and of which the rollers 212, 214, 216, and 218 are driving rollers, the spindles of which are provided on the exterior of the frame plate 107 adjacent the main frame plate 1 with gear wheels which are geared together by the sequence of gear wheels 219, 220, 221. The drive from the power spindle 112 is transmitted to the said sequence of rollers from the gear wheel 114 by way of a sequence of gear wheels 222, 223 and 224, the spindles of which are carried by the adjacent frame plate 107.

Below the rollers 217, 218 there is disposed the flap tucking mechanism (illustrated more particularly in Figure 12) the parts of which are pivotally mounted upon a spindle 225 that is carried in bearings in the main frame plates 1 and 2. For the support of the envelope during the time that the flap is tucked therein there is provided a cradle or rocking back plate fitting pivotally supported upon the spindle 225 and that is comprised of two lateral frame members 226 and 227 that are united by a plate 228 which extends from about the middle of the length of the members 226 and 227 to a position beyond their upper ends. The upper edge of the said plate is shaped as by bending, so that the middle section is to the rear of a line joining the lines of junction of the plate with the frame members 226 and 227, the bends being effected on diagonal lines that leave the inner edge of the plate 228 straight. Towards the spindle 225 there is further provided between the frame members 226 and 227 a second plate 229 substantially in alignment with the plate 228 and spaced therefrom a sufficient distance to permit the disposition between the two plates of a roller 230 the spindle of which is carried freely in the frame members 226 and 227. The plate 229 is provided, for example, over the greater part of its middle section, with a series, for instance, four, of channel-like recesses 231 in the forward surface, which may be formed by the repeated bending of the plate. The portions of the plate that are so recessed are also reduced in width by the cutting away of a section of each of the parts forming the channels in order to provide clearance for the roller 230. The upper edge of the middle section of the said plate is therefore alternately of two elevations, the lower elevations being at those positions at which the channels before referred to are formed. On the outer sides of the frame members 226 and 227 there are pivoted at 232, by short pivots, bracket members 233 that are connected together by a plate 234 extending at the rear of the frame members 226 and 227. The bracket members 233 carry at the forward end of their arms a bridge member 235 the lateral parts of which are pivoted to the brackets 233 at 236, one of the said lateral parts being extended downwardly for the

reception of a pivot 237 for a purpose to be hereinafter described. The bridge member 235 is of such form that its surface inclines upwardly towards the upper edge of the plate 229 and its rearward edge is provided with a sequence of sheet metal fingers 238 of angular formation, which project beyond the edge of the bridge member and are adapted to be received into and to contact with the bottoms of the channels 231 in the plate 229. The purpose of the fingers 238 is to support the bottom edge of the envelope while it is resting against the plate 228 of the rocking back fitting. The bridge member 235 is mounted under the action of a torsion spring 239 tending always to press the fingers 238 into the channels 231.

In order that the position of the fingers 238 may be varied in elevation according to the depth of envelope that is in use, the brackets 233 are provided to be adjustable of position about the pivots 232 upon the frame members 226 and 227. For this purpose one of the brackets, advantageously the bracket adjacent the frame member 227, is formed, as indicated in dotted lines, with an upwardly directed extension 240 in which is formed a slot 241 to an arc struck from the pivotal point 232 as centre, which slot serves for the reception of a clamping screw 242 mounted in the frame member 227. It will be observed that by an angular adjustment of the extension 240 the pivots 236 of the bridge member 235 are raised or lowered about the pivots 232 and by reason of the spring pressure exerted upon the bridge member 235 the finger pieces 238 rise or fall along the channels 231.

The roller 230 supported by the frame members 226 and 227 is adapted in the foremost position of the said frame members to contact with a driven roller 243 the spindle of which is supported in brackets or frame plates 244 spaced from and secured to the main frame plates 1 and 2 by distance members and bolts 245. The roller 243 is driven by way of a gear wheel upon its axis which is geared to the gear wheel of the roller 218 by way of gear wheels 246, 247, 248 and 249, the spindle of the gear wheel 246 being extended to the adjacent frame plate 244 to carry a gear wheel in mesh with the gear wheel upon the roller spindle, while the spindles of the remaining wheels 247, 248 and 249 are supported in the main frame plate 1.

The roller 243 is grooved peripherally or formed in sections to afford clearance for the fingers 238.

For distending the envelope when it is resting against the rocking back fitting there is provided a framing comprising two lateral members 250 and 251 that are pivoted upon the spindle 225 to the outer side of the brackets 233 and which, towards their upper ends, are provided to carry a sheet metal plate 252 that at the lower edge is bent so that it may be coiled about a retaining bolt 253. At the middle of the length of the plate 252 there is provided a channel-like sheet metal fitting of wedge-like shape 254 that is disposed opposite to the rearwardly bent portion of the plate 228 of the rocking back fitting. Upon a spindle 255 rotatably carried towards the forward edges of the lateral members 250, 251 there is securely mounted an angular plate member 256 which in one position of the spindle 255 will rest with its outer limb lying in close contact with the rearward face of the fitting 254. The said fitting 256 serves as an envelope distending arm in a manner to be hereinafter described. For the operation of the fitting 256 there is provided, adjacent the lateral member 251 and fixedly mounted upon the spindle 255, an arm 257 which is linked by a link 258 to one arm of a bell crank lever 259 the pivotal point of which is also upon the lateral member 251 and which on its other arm carries a roller 260 that is adapted to co-operate with a cam 261 rotatably mounted upon the spindle 225. The cam is linked by a connecting rod 262 to an arm 263 fixed to a spindle 264 mounted in the main frame plate 1 and bearing fixedly mounted thereon to the exterior of the frame plate an arm 265 which receives movement from a cam and cam lever as hereinafter described.

It is necessary that in the operation of the mechanism immediately hereinbefore described that the rocking back fitting comprising the frame members 226, 227 and the plates 228, 229, the distending mechanism comprising the lateral members 250 and 251 and the distending arm 256 and also the fingers 238 forming the support for the bottom of the envelope shall be moved through a sequence of movements in order to carry out their respective functions. These movements are also derived from cam mechanism in a manner hereinafter to be described. The frame member 226 is connected by a link 266 to an arm 267 fixedly mounted upon a spindle 268 carried by the main frame plate 1 and bearing outside the said plate a fixedly mounted operating arm 269. Similarly the lateral member 251 is connected by a link 270 to an arm 271 secured to a spindle 272 mounted in the main frame plate 1 and carrying outside the said plate a fixedly mounted operating arm 273; while the pivot 237 of the bridge member 235 is connected by a link 274 to an arm 275 fixedly mounted upon a spindle 276 carried in the main frame plate 1 and bearing outside the said plate an operating arm 277 secured to it. A counter-weight is advantageously mounted in fixed relation to the spindle 276.

The folding of the flap ready for tucking while the envelope is resting against the rocking back fitting is effected by a series of three tucking fingers 278, 279 and 280. The said fingers are supported upon a spindle 281 which extends between the main frame plates 1 and 2 and has secured to it on the outer side of the main frame plate 1 an arm 282 which receives a movement from a cam lever operated by a cam as hereinafter described. The tucking fingers are caused to have an angular movement such that when the rocking backing fitting has been moved by the cam mechanism through nearly the full angle of its movement the completion of such movement is effected under the pressure exerted by the tucking fingers. The spindle 281 further serves to support fixedly mounted thereon two brackets, 283, and 284, which extend in the rearward direction and afford further support for the carriers of the tucking fingers. The middle tucking finger 278 is of fixed position upon the spindle 281 but the tucking fingers 279 and 280 are capable of axial movement along the spindle under the action of a spindle 285 with right and left handed screw threads that is rotatably mounted in the brackets 283 and 284 and provided at the bracket 284 with an adjusting knob 286. By the rotation of the knob 285 the tucking fingers 279, 280 may be caused through the spindle 285 to approach or recede one from the other according to the requirements of the particular envelope that is in use. The tucking fingers and their accessory parts are advantageously in part

counter-weighted by a counter-weight 287 carried upon an arm 288 fixed to the spindle 281 and serving also to engage a limit stop 289 mounted on the adjacent main frame plate.

In the operation of the mechanisms immediately hereinbefore described, at the time of delivery of the envelope by the rollers 217 and 218, the rocking back fitting comprising the plate 228 is disposed in an intermediate position so that the roller 230 is separated from the driving roller 243. The carrier for the distending arm 256 is in its most forward position and the distending arm is itself lifted to its highest position. The envelope accordingly falls with the front against the plate 228 and with its bottom resting upon the fingers 238. The carrier of the distending arm is then caused to approach the rocking back fitting and in the movement the distending arm 256 is caused to enter the envelope. The carrier of the distending arm continues its rearward movement and is now accompanied by the rocking back fitting so that the envelope rests closely confined between the two. In this movement the flap of the envelope is brought into contact with the tucking fingers and is turned partly in the direction for closing the envelope. As the rocking back fitting approaches its rearmost position the tucking fingers 278, 279 and 280 execute their angular movement with the result that they press the flap downwardly upon the back of the envelope in the closed position and at the same time press the rocking back fitting to the end of its rearward travel. In the meantime the carrier of the distending arm 256 has begun its return movement in the forward direction and in so doing the distending arm draws forward the back of the envelope until the flap held in position by the tucking fingers has passed into the envelope so as to enclose the letter therein. The tucking fingers are then caused to execute their return movement and at the same time the rocking back fitting follows the carrier of the distending arm 256 to its forward limit of travel and in so doing presses the envelope by means of the roller 230 into contact with the rotating roller 243. At the same time, under the action of its cam, the bridge member 235 carrying the fingers 238 is caused to turn in an anti-clockwise direction about its pivots 236, to permit the envelope to pass under the fingers. In this way, under the action of the rollers 230 and 243, the envelope with the letter therein and the flap tucked inwards is delivered from the machine.

The cam gear by which the whole of the movements of the several mechanisms is effected is positioned on the outer side of the main frame plate 1. For the purpose there are secured to the said main frame plate a sequence of strip metal brackets 290 and 291 upon the upper surfaces of which there are provided bearings 292 for a cam shaft 293. The cam shaft receives a movement of rotation from the power spindle 112 which for the purpose is extended outwardly from the main frame plate 1 in a bearing bracket 294 to carry at the outer end a skew pinion 295 for engaging a skew wheel 296 fixedly mounted upon the cam shaft. The cams which are mounted in sequence upon the shaft 293 between the several bearings serve to operate corresponding cam levers that are rotatably mounted upon a spindle 297 carried in bearings 298 mounted upon the brackets 290 and 291, the spindle 297 being conveniently provided in sections the ends of which are received into the several pairs of bearings 298. The respective cam levers are connected by corresponding connecting links to the corresponding operating arms of the respective mechanisms that are disposed at the outer side of the frame plate 1. Thus, referring to the diagrammatic representations in Figures 13 and 14 of the cam shaft, the cams and the cam levers, the cams *a* to *o* serve respectively to operate cam levers a^1 to o^1, with the exception of the cam *m* which is the drum cam operating the lever 196 for the letter thruster mechanism. Certain of the cams, that is to say *a, b, d, i, k, l, n* and *o*, are what may be termed "gravity cams" which serve to move the corresponding cam levers in the one direction, the cam levers following the cams in the other direction under the action of gravity or under spring action. The remaining cams *c, e, f, g, h* and *j* are positive cams in that they effect the movement of the corresponding cam levers in each direction. Such cams are formed in two juxtaposed parts, each part of which acts upon a different runner carried by the cam lever. In the construction illustrated in Figures 13 and 14 of the drawings the cams are allotted to the several mechanisms in the following manner: The cam *a* operates the envelope flap straightener 202 through the operating arm 210. The cam *b* operates the flap tucking fingers by way of the cam lever b^1, the connecting rod b^2 and the operating arm 282. Again, the double cam *c* operates the envelope distender carrier by way of the cam lever c^1, the connecting rod c^2 and the operating arm 273. In the same way, the cam *d* operates the bridge member 235 for the release of the envelope from the mechanism by way of the operating arm 277, the double cam *e* operates the rocking back fitting by means of the operating arm 269, the double cam *f* the envelope distending arm 256 by way of the operating arm 265, the double cam *g* the envelope clips 129 through the operating arm 140, the cam *h* the bridge member 124 by the operating arm 144, the cam *l* the envelope clip 146 by way of the operating arm 152, the cam *j* the flap turning element by way of the quardrant 96 through bevel teeth provided on the cam lever j^1, the cam *k* the roller cradle 67 by way of the operating arm 73, the cam *l* the letter guide fingers 154 and 155 by way of the operating arm 167, the drum cam *m* the letter thruster by way of the lever 196, the cam *n* the letter feed rollers by way of the operating arm 171' and the cam *o* the envelope feed arms by way of the operating arm 61. The cam gear comprising the cam shaft with the cams and the cam levers may be enclosed within a suitable casing.

It will be appreciated that the invention may be carried out by mechanism exhibiting variations from that hereinbefore described. It may be desirable in certain instances to provide timing rollers or like means for adjusting the time of arrival of the envelopes adjacent the filling position. Thus there may be provided rollers similar to the rollers 174 and 175 or 204 and 205, one or both of which are adapted for an oscillatory movement transverse to the axis, such movement being synchronised by the corresponding cam drives with the operation of the means by which the envelope is carried into the filling position. Thus the rollers may separate until such time as the envelope is required to be fed forward. The disposition of the several mechanisms may be modified where desirable and according as requirements may dictate.

Variations of the original form of the apparatus are possible within the scope of the invention. Thus, the mechanism receiving the envelope during the operation of the tucking of the flap into

the charged envelope is not necessarily disposed so that the envelope enters in a substantially vertical direction. A modified construction of the flap tucking mechanism is represented, by way of example, in Figure 15. The mechanism is here disposed in such position that the envelope is received directly from the rollers 204, 205 in the horizontal direction and the drive of the roller 243 supported by the brackets or frame plates 244 is effected from a gear wheel on the spindle of the roller 205 by way of the sequence of toothed wheels 224, 219, 220 and 221, and a wheel that is upon the spindle of the gear 246 driving a gear wheel on the spindle of the roller 243.

The rocking back fitting comprising the frame members 226, 227 and plates 228, 229, the distending mechanism comprising the lateral members 250, 251 and the distending arm 256 and also the brackets 233 and the bridge member 235 with the fingers 238 forming the support for the bottom of the envelope are substantially identical with the same parts of the construction first described and are merely turned as a group through 90°. The only modifications necessary are in respect of the arrangement of the several operating rods and arms. Similarly, the tucking fingers 278, 279 and the associated parts are merely disposed in the position necessary for co-operation with the remaining elements of the flap tucking mechanism. On completion of the tucking of the flap the envelope is discharged from the mechanism by the pressure exerted upon it by the rollers 230 and 243 in the manner hereinbefore described.

Again, it is possible to dispose the thrusters by which the postal matter is inserted into the envelope at the filling position so that they are above the path of approach of the postal matter. Such a modification in construction is illustrated by way of example in Figures 16 and 17 of the accompanying drawings. The slide bars 191 are for the purpose supported upon bracket members 189, 190 depending downwardly from cross bars 5', 6' suitably supported upon upwardly directed extensions of the main frame plates 1 and 2. The guide plates 177, 178, 186, 187, and 188 are modified for the purpose of inclining the bend in the path for the postal matter between the rollers 181 and 182 in the upward direction in order that the thruster forks 194 and their arms 193 may retire above the guide plate 186 on rearward movement of the slide 192. Similarly, the position of the driving rollers 182, 181 and 176 is reversed in order that the short rollers 180, 179 and 175 may be disposed in the upper position. The letter register 172 is also reversed with the roller 175 to operate in the downward direction through the guide plate 186.

In view of the lack of head room involved in the disposition of the slide bars 191 in the upper position a minor modification of the bridge member 157 supporting the letter guide fingers 154 and 155 is necessary. In the construction illustrated the modification is such that a single spindle 161 serves not only for the support of the guide fingers but also for the adjustment in position of the guide fingers 155 for differing widths of envelopes. Thus the spindle is screw-threaded with opposite hand screw threads and is provided with the knurled adjusting knob 162. The guide finger 154 is of fixed axial position upon the middle of the length of the spindle 161. The sleeves by which the guide fingers 154 are mounted upon the spindle 161 are provided with end flanges of a form such that they bear upon the underside of the transverse portion of the bridge member 157 in order to prevent rotation and permit adjustment of the position of the said fingers.

It will further be understood that the rollers that are required in the several mechanisms of the apparatus may be made of any suitable material, such as metal or wood and may, with advantage in most cases, be provided to be covered with rubber or like material. Again, the bearings of the numerous spindles or certain of them may be provided as ball or roller bearings.

I claim:

1. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising a filling table, envelope receiving and adjusting mechanism receiving an envelope from a supply magazine and advancing it into the filling position upon the said table, envelope distending mechanism acting upon the envelope in the filling position, postal matter feed mechanism transferring the postal matter from a position of supply into the envelope while it is distended, guide and feed mechanism to advance the filled envelope to a flap tucking position, and, at the said flap tucking position, mechanism for distending the filled envelope, and mechanism for turning the flap into the envelope to enclose the postal matter, and driving means for synchronising the operation of the several mechanism.

2. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising a feed mechanism withdrawing the envelopes by the flaps from a supply magazine, a filling table, grippers to engage an envelope advanced by the feed mechanism, a carrier for the said grippers movable in relation to the feed mechanism and the filling table, means to open and close the grippers intermittently and means to move the carrier while the grippers are closed on the envelope to a position to dispose the envelope upon the filling table.

3. Apparatus for charging envelopes with postal matter and preparing them for despatch, according to claim 2, comprising also flap tucking mechanism, and guide and feed mechanism for supplying envelopes to the tucking mechanism, and means for moving the carrier for the grippers between the filling table and the said guide and feed mechanism while the grippers remain closed upon the charged envelopes.

4. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope filling table, of a form that presents a plane surface for the part upon which the bottom of an envelope will rest and that is concave at the part upon which the mouth of an envelope will rest, envelope feed mechanism for advancing envelopes from a source of supply to the filling table, feed mechanism for the postal matter, transfer mechanism for inserting postal matter into an envelope reposing upon the filling table, and an envelope distending device, co-operating with the filling table to depress the front of an envelope reposing upon the table into the concavity of the table and thus to distend the envelope to receipe the postal matter.

5. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope filling table consisting of a plurality of parallel plate-like sections spaced apart for clearance between adjacent sections, the general configuration of the table being plane where the bottom of an envelope rests and concave where the mouth of an envelope rests, feed mechanism for advancing envelopes from a source of supply to the filling table, grippers po-

sitioned in the clearance between the adjacent sections of the table and mounted upon a reciprocatory carrier moving the grippers intermittently from one end of the table to the other, means for opening and closing the grippers to engage the envelopes and carry them on to the table, a pivoted distending element co-operating with the middle of the concave part of the table to distend the envelope and means for transferring postal matter from a feed position into the distended envelope.

6. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope filling table, feed mechanism for advancing envelopes to said filling table, means co-operating with the said filling table to distend an envelope resting upon the said table, a postal matter guide device consisting of a reciprocatory carrier having a part disposed at a distance from and transversely to the surface of the table and guide elements pivotally mounted upon the said part of the carrier, and means to move the carrier to withdraw the guide elements from the table and, after the disposal and distention of an envelope upon the table, to advance the carrier to insert the guide elements into the distended envelope upon the table, and means for transferring postal matter from a feed position into the distended envelope between the guide elements of the postal matter guide device and the inner face of the front of the envelopes.

7. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope filling table, feed mechanism for advancing envelopes to the said filling table, means co-operating with the said filling table for distending an envelope resting upon the said table, guides for defining a path for the postal matter to the said filling table consisting of plate-like elements spaced apart for the passage of the postal matter and formed in sections set parallel with clearance between adjacent sections in the direction of advance of the postal matter, driving feed rollers cooperating with the guides for the advance of the postal matter towards the filling table, and postal matter transfer mechanism consisting of thruster elements mounted upon a reciprocatory carrier, the said elements being spaced upon the carrier in accordance with the spacing of the clearances between the sections of the guides and the path of movement of the said carrier and the disposition of the guides being such that in the movement of the carrier in the direction of the table the thruster elements emerge through the clearances between the sections of the guides to engage and press forward the postal matter in the guides and in the movement of the carrier in the reverse direction diverge from the guides.

8. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope filling table, feed mechanism for advancing envelopes to the said table, means co-operating with the said filling table for distending an envelope resting upon the said table, a pair of feed rollers for feeding the postal matter towards the filling table, a register stop for arresting the progress of the postal matter, a carrier for one of the said feed rollers with which is associated the register stop, the carrier being movable so as alternately to move the feed roller and the register stop into the operative position, means for synchronising the movement of the said carrier with the feed mechanism for advancing the envelopes to the filling table, and means for transferring the registered postal matter into the distended envelope.

9. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope receiving mechanism receiving the envelopes singly from a supply magazine by the flaps, an oscillatory pocket-like element mounted for angular movement about an axis transverse to the path of advance of the envelopes which is followed by the mouth of the element, the flap of an advancing envelope being received into the pocket and being folded towards the front of the envelope during the movement of the element, a pair of feed rollers for receiving the envelope with the flap folded and further advancing it, a filling table, envelope receiving and adjusting mechanism receiving an envelope from the feed rollers and advancing it into the filling position upon the said table, envelope distending mechanism acting upon the envelope in the filling position, postal matter feed mechanism transferring the postal matter from a position of supply into the envelope while it is distended, a flap straightening element disposed adjacent the path of advance of the filled envelope, guide and feed mechanism to advance the filled envelope to a flap tucking position and, at the said flap tucking position, mechanism for distending the filled envelope, and mechanism for turning the flap into the envelope to enclose the postal matter, and driving means for synchronising the operation of the several mechanisms.

10. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising an envelope receiving mechanism receiving the envelopes singly from a supply magazine by the flaps, an oscillatory pocket-like element having an angular movement about an axis transverse to the path of advance of the envelope and receiving and turning over the flap of an advancing envelope towards the front of the envelope, a pair of feed rollers for receiving the envelope with the flap folded and further advancing it, a filling table, envelope receiving and adjusting mechanism receiving an envelope from the feed rollers and advancing it into the filling position upon the said table, envelope distending mechanism acting upon the envelope in the filling position, postal matter feed mechanism transferring the postal matter from a position of supply into the envelope while it is distended, a flap straightening element of angular cross-section set transverse to the path of advance of the filled envelope, the angle of the element being disposed opposite to the direction of advance of the envelope, a carrier for the said flap straightening element having a movement of oscillation transverse to the path to be followed by the envelope, a pair of feed rollers, of which one is of fixed position and is driven and the other of which is mounted upon the said carrier to be moved thereby to press the envelope into contact with the driving feed roller, guide and feed mechanism to advance the filled envelope to a flap tucking position and, at the said flap tucking position, mechanism for distending the filled envelope and mechanism for turning the flap into the envelope to enclose the postal matter, and driving means for synchronising the operation of the several mechanisms.

11. In apparatus for charging envelopes with postal matter and preparing them for despatch, mechanism for tucking the flap of a charged envelope, comprising flap tucking elements mounted for angular movement about an axis

transverse to the path of approach of the envelope, a plate-like fitting against which the front of the envelope comes to lie, the said fitting having a concave cross-section at that part at which the upper part of the envelope is disposed, a second plate-like fitting to contact the back of the envelope, the two fittings having a pivotal connection whereby they are separated for the reception of the envelope and again closed upon the envelope, and the two fittings and the flap tucking elements being relatively movable to cause the flap tucking elements to engage the flap of the envelope, and an envelope distending element carried by and angularly movable upon the second plate-like fitting to engage inside the back of the envelope and to distend the envelope when the second fitting separates from the first fitting, and means for co-ordinating the operation of the flap tucking elements, the two fittings, and the envelope distending element so that the angular movement of the flap tucking elements to tuck the flaps is effected while the envelope is distended.

12. In apparatus for charging envelopes with postal matter and preparing them for despatch, mechanism for tucking the flap of a charged envelope, comprising flap tucking elements disposed offset from the path of approach of the envelopes and mounted for angular movement about a fixed axis transverse to the said path, a back fitting and a follow-up fitting between which the envelope is received with the front resting against the back fitting, the said fittings being mounted for common angular movement to carry the mouth of the envelope from the said path of approach to a position for the tucking of the flap by the tucking elements, and an envelope distending element to engage within the back of the envelope, the said element being movable with the follow-up fitting to distend the envelope for the entry of the flap under the movement of the tucking elements.

13. In apparatus for charging envelopes with postal matter and preparing them for despatch, mechanism for tucking the flap of a charged envelope, comprising a cradle for the envelope consisting of two oppositely disposed parts between which the envelope is received and a member by which the envelope is arrested, the said member being adjustable in the plane of an envelope contained in the cradle and angularly movable in relation to the said parts for the discharge of the envelope.

14. In apparatus for charging envelopes with postal matter and preparing them for despatch, mechanism for tucking the flap of a charged envelope, comprising flap tucking elements disposed offset from the path of approach of the envelopes and mounted for angular movement about a fixed axis transverse to the said path, a back fitting and a follow-up fitting between which the envelope is received with the front resting against the back fitting, a member for arresting the envelope between the two fittings, the said fittings and the member being mounted for a common angular movement to carry the mouth of the envelope from the said path of approach to a position for the tucking of the flap by the tucking elements, and an envelope distending element to engage within the back of the said envelope, the said element being movable with the follow up fitting to distend the envelope for the entry of the flap under the movement of the tucking elements, and the said arresting member being angularly movable in relation to the two fittings for the release and discharge of the envelopes.

15. In apparatus for charging envelopes with postal matter and preparing them for despatch, comprising flap tucking elements mounted for angular movement about an axis transverse to the path of approach of the envelopes, a cradle for the reception of the envelope during the flap tucking operation, the said cradle and the flap tucking elements being relatively movable to cause the flap tucking elements to engage the flap of the envelope, an envelope distending element operated to distend the envelope within the cradle for the passage of the flap into the envelope, a driving envelope discharge roller of fixed position parallel with the plane of the envelope within the cradle, and a cooperating roller carried by the cradle and pressing the envelope against the driving roller on movement of the cradle for the discharge of the envelope.

16. Apparatus for charging envelopes with postal matter and preparing them for despatch, comprising mechanism for feeding an envelope from a source of supply by the flap, mechanism by which the flap of the envelope is folded upon the front face of the envelope, guide and feed mechanism by which the envelope having the flap resting upon the front face is advanced to a filling position, mechanism for distending the envelope disposed at the filling position, mechanism for feeding the postal matter into the distended envelope, guiding and feeding mechanism for moving the filled envelope from the filling position, mechanism for turning the flap of the envelope again into alignment with the front face of the envelope, and mechanism whereby the flap of the envelope is tucked into the envelope to enclose the postal matter.

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