July 28, 1964 C. J. VALLAD 3,142,392

ELECTRIC MAIL SORTING MACHINE

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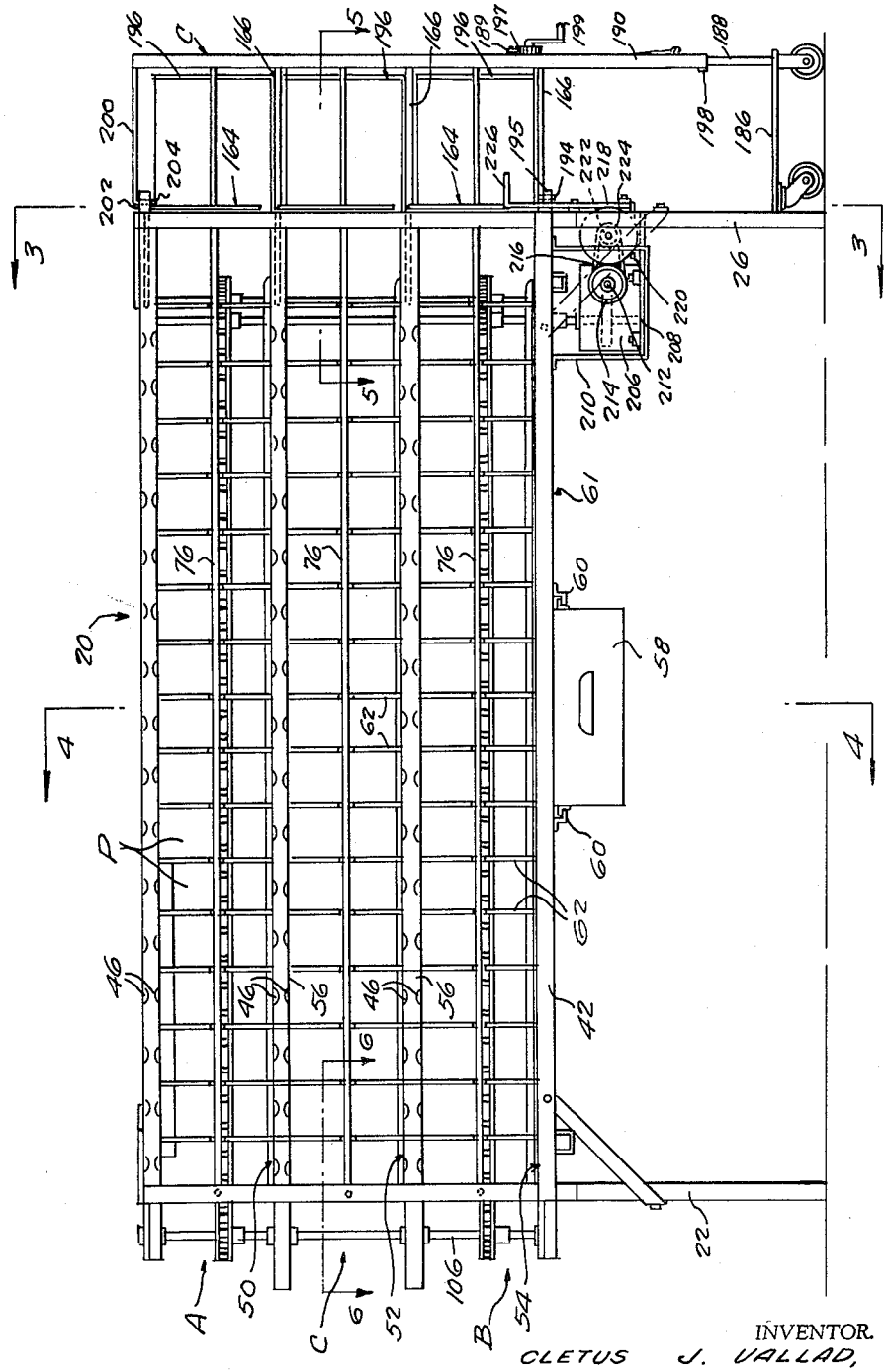


FIG. 1.

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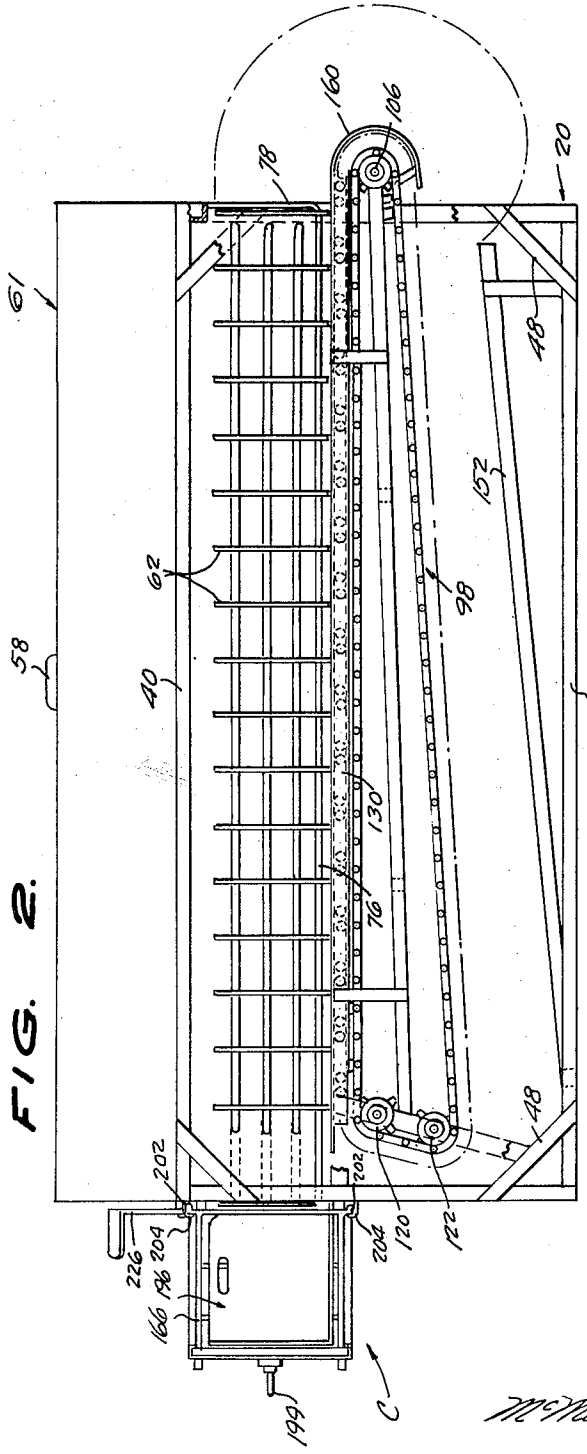


FIG. 2.

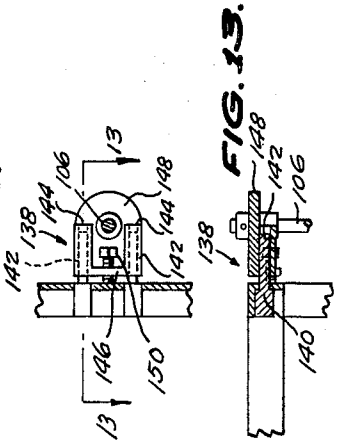


FIG. 12.

FIG. 13.

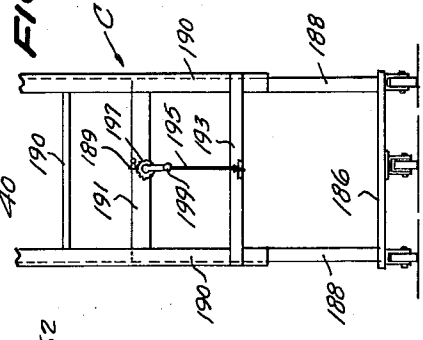


FIG. 14.

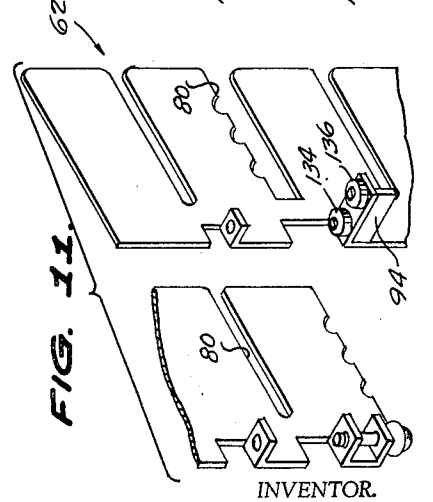


FIG. 11.

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ELECTRIC MAIL SORTING MACHINE

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FIG. 3.

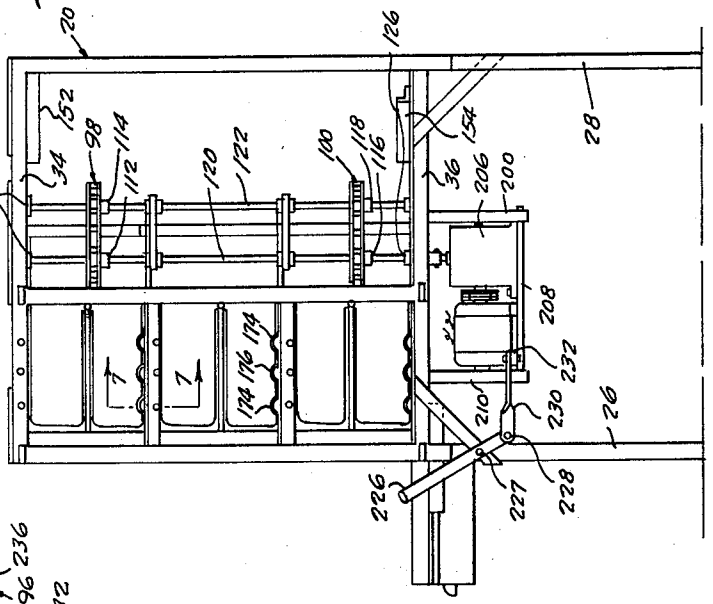


FIG. 16.

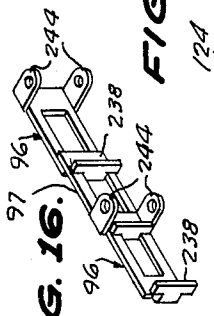


FIG. 17.

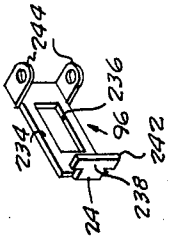


FIG. 4.

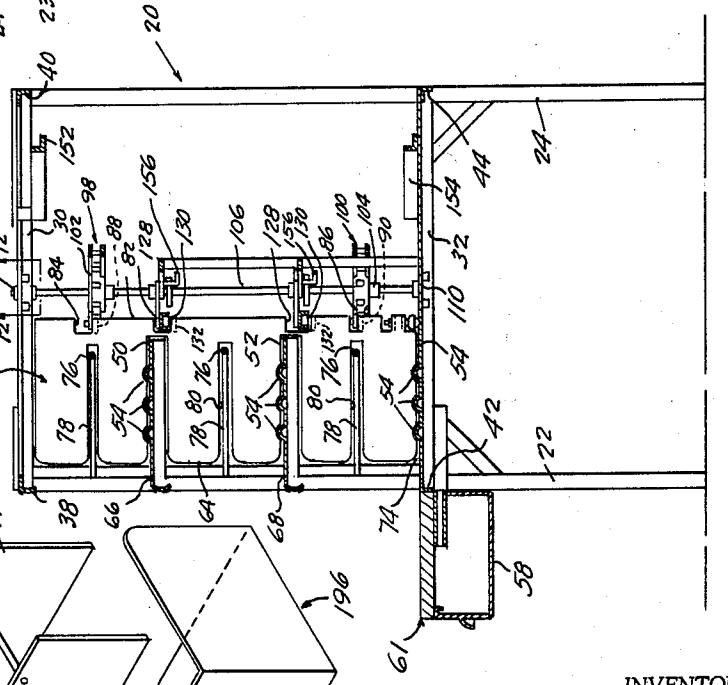
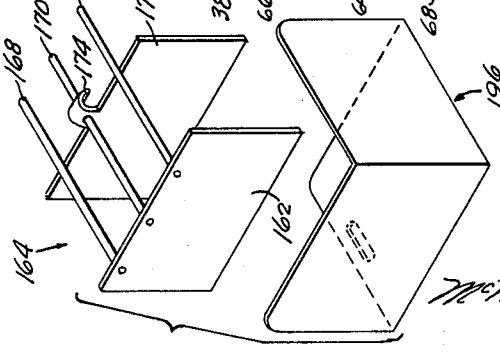


FIG. 15.



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FIG. 5.

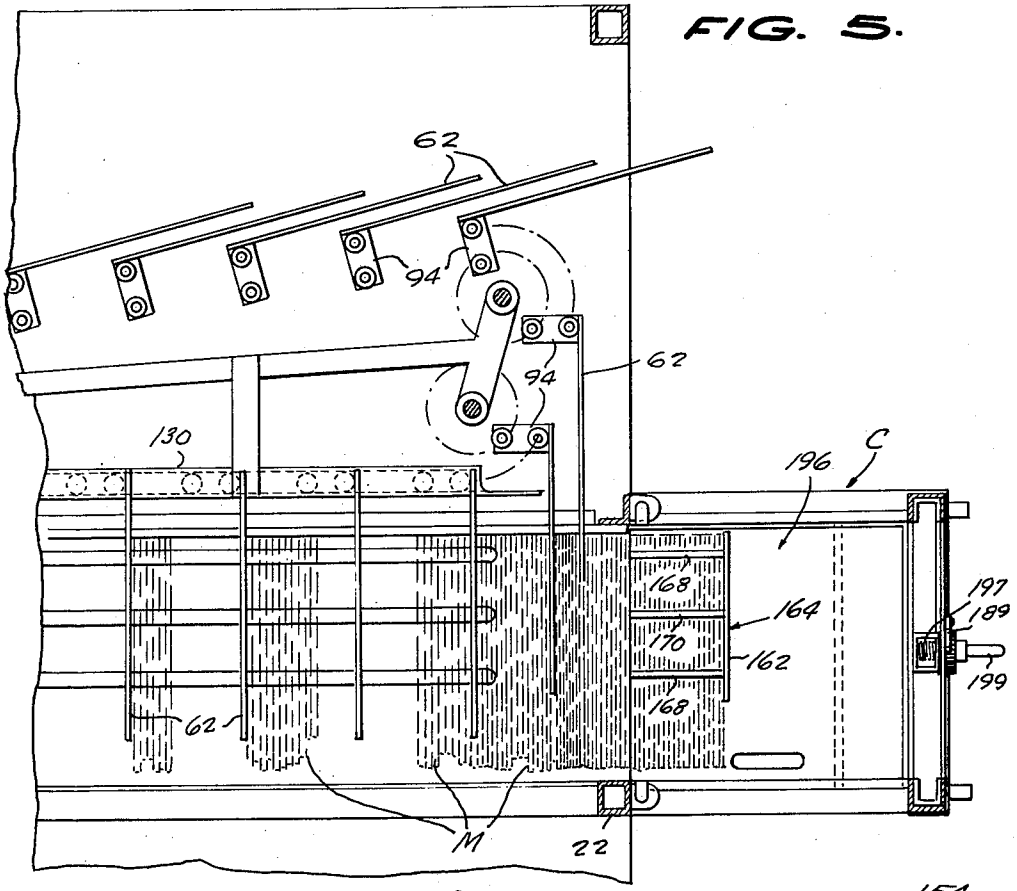
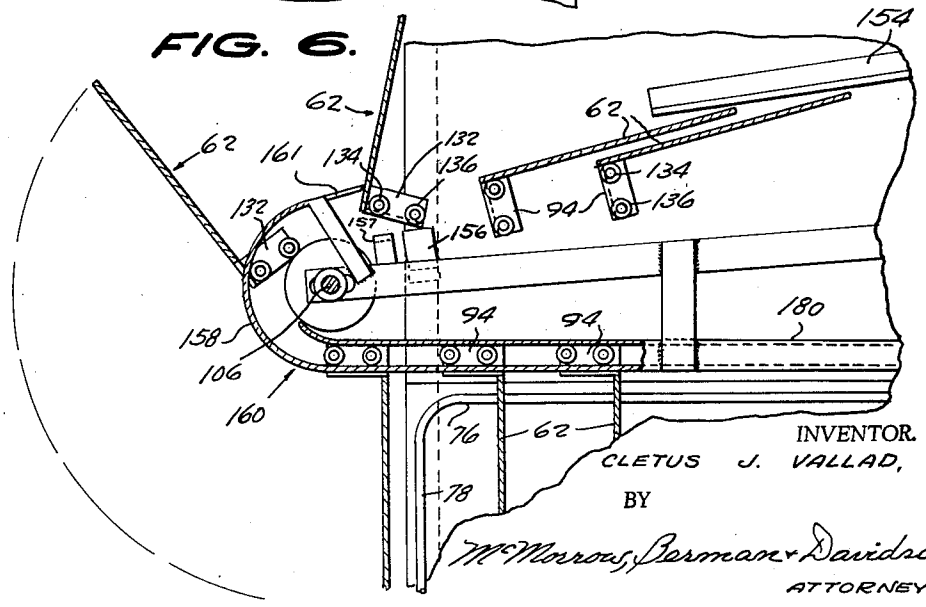


FIG. 6.



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FIG. 7.

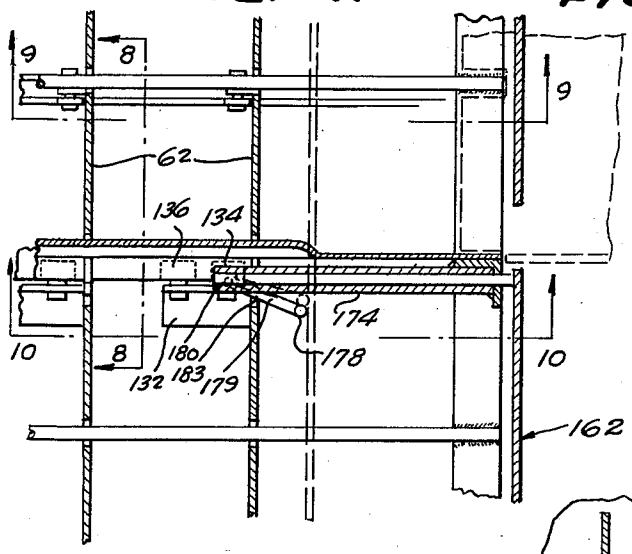
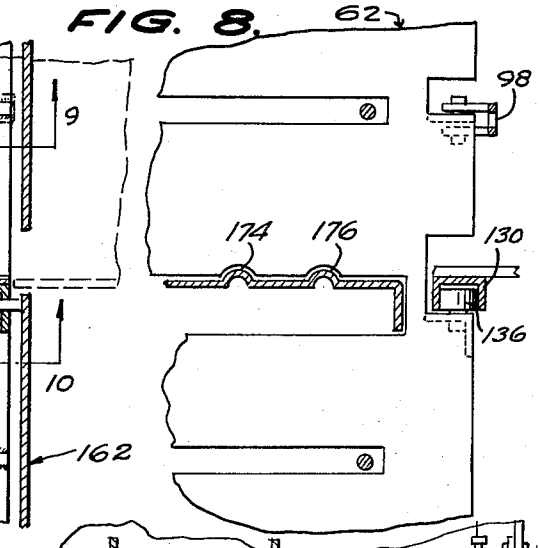


FIG. 8.



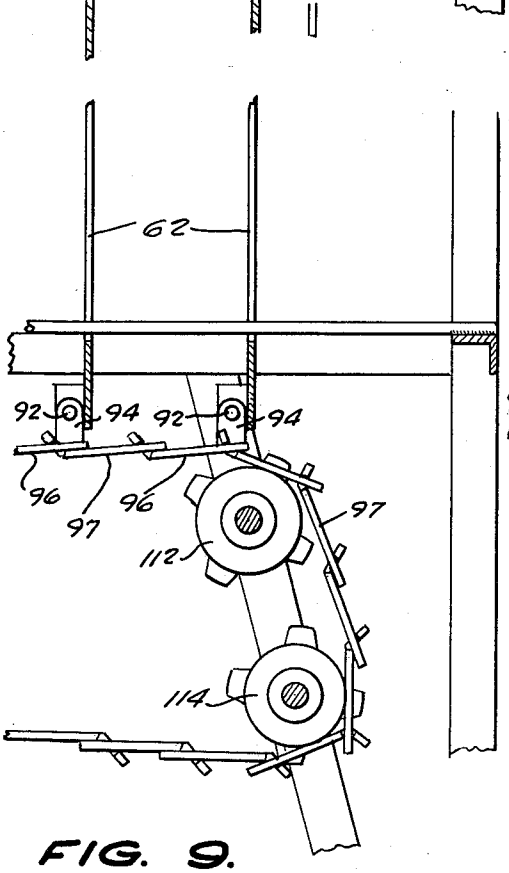


FIG. 9.

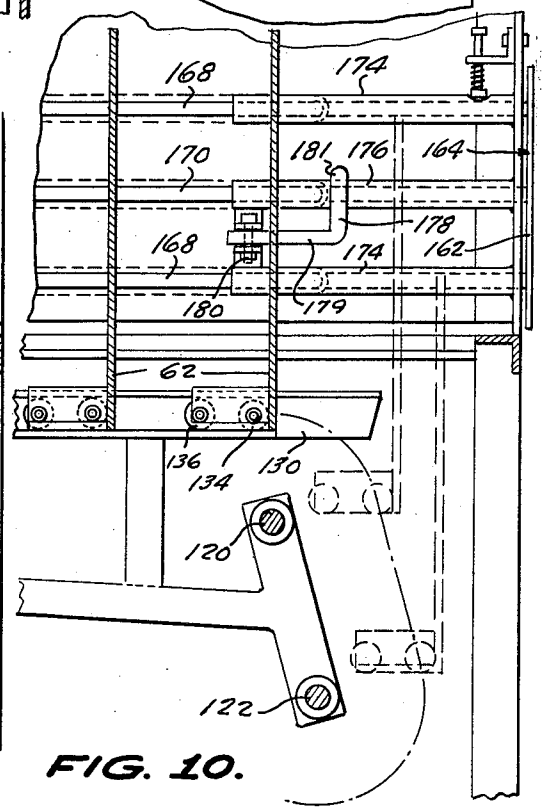


FIG. 10.

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United States Patent Office 3,142,392 Patented July 28, 1964

3,142,392

ELECTRIC MAIL SORTING MACHINE

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Filed Jan. 18, 1963, Ser. No. 252,362
11 Claims. (Cl. 214—41)

This invention relates to a novel electric mail sorting machine, specifically but not exclusively for use as a mailman's sorting case.

The primary object of the invention is the provision of an efficient and practical time and work-saving machine of the kind indicated which provides for the manual insertion of mail in compartments, corresponding to predetermined destinations or routes, and constituted by pairs of horizontally travelling separator plates and stationary bottom plates, while the separator plates are stationary, and then moving the separator plates toward one end of the machine, whereat separator plates are withdrawn from the mail, and the mail is deposited in receivers, the batch of mail so deposited being compressed by succeeding batches similarly deposited, against a yielding pressure plate equipped clamping assembly, which, on stopping the machine, is adapted to be utilized to clamp together several batches of mail and be then transferred to and emptied into a mailman's bag or a mail truck, with the pieces of mail in proper consecutive order for delivery to consecutive addresses of his route.

Another object of the invention is the provision of a machine of the character indicated above, wherein novel endless horizontal chains carry several vertically spaced horizontal rows of separator plates, these chains being simultaneously driven for advancing batches of mail simultaneously from one end of the machine to the discharge end thereof.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a front elevation of a machine of the present invention, including its haul-away cart;

FIGURE 2 is a top plan view thereof;

FIGURES 3 and 4 are vertical transverse sections taken on the lines 3—3 and 4—4, respectively, of FIGURE 1;

FIGURES 5 and 6 are enlarged fragmentary horizontal sections taken on the lines 5—5 and 6—6, respectively, of FIGURE 1; FIGURE 5 showing batches of mail forced against the pressure plate of a clamping assembly;

FIGURE 7 is an enlarged fragmentary vertical longitudinal section taken on the line 7—7 of FIGURE 3;

FIGURE 8 is an enlarged fragmentary vertical transverse section taken on the line 8—8 of FIGURE 7;

FIGURES 9 and 10 are further enlarged fragmentary horizontal sections taken on the lines 9—9 and 10—10 of FIGURE 7;

FIGURE 11 is an exploded and fragmentary perspective view, partly broken away and in section, of associated separator plates;

FIGURE 12 is an enlarged fragmentary horizontal section taken on the line 12—12 of FIGURE 4;

FIGURE 13 is a transverse vertical section taken on the line 13—13 of FIGURE 12;

FIGURE 14 is a fragmentary right-hand end elevation of the haul-away cart;

FIGURE 15 is a group perspective veiw of a mail clamping assembly and a mail tray;

FIGURE 16 is a perspective view of a portion of one of the endless chains, showing adjacent separator plate carrier links;

FIGURE 17 is a perspective view of a carrier link.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the illustrated machine comprises a horizontally elongated, open rectangular frame 20, composed of a pair of transversely spaced perpendicular left-hand front and rear corner uprights 22 and 24, respectively, a pair of transversely spaced perpendicular right-hand front and rear corner uprights 26 and 28, respectively, which are spaced and connected, at their upper ends, by upper and lower left-hand and right-hand cross members 30 and 32, and 34 and 36, respectively, the lower cross members 32 being spaced upwardly from the lower ends of the uprights.

Front and rear upper horizontal longitudinal members 38 and 40 are connected between the upper ends of related uprights, and lower front and rear longitudinal members 42 and 44 are connected to related uprights, on the level of the lower cross members 30, 32 and 34, 36. On the forward or front side of the upperfront longitudinal member 38 are equally spaced pairs of oppositely directed and outwardly aligned and opposed card retaining flanges 46, adapted to receive and hold cards (not shown) which identify the destinations or sequential route stops of mail to be sorted. Diagonal braces 48 extend between the upper cross members and longitudinal members, as shown in FIGURE 2.

A number of horizontal longitudinal shelves or mail compartment bottoms, herein shown at upper, intermediate, and lower shelves 50, 52 and 54, respectively, extend between and are fixed to the front corner uprights 22 and 26, are spaced from each other and from the upper and lower front longitudinal members 38 and 42. The upper and intermediate shelves have pendant flanges 56, on their forward edges, which have pairs of card retaining flanges 46, which are vertically aligned with those of the upper front longitudinal member. This arrangement provides three rows of mail compartments consisting of an upper row A, a lower row B, and a middle row C. As shown in FIGURE 4, the shelves are formed with spaced raised longitudinal ribs 54, which reduce the sliding friction with the lower edges of vertically disposed pieces M of mail resting upon the shelves. A pull-out drawer 58, is slidably mounted, as indicated at 60, beneath a counter 61 carried by the front lower longitudinal member 42.

A single assembly of flat vertical separator plates 62 serves all of the rows A, B and C. The separator plates are of vertically elongated rectangular shape and are formed, from their front edges 64, with upper and lower horizontal slots 66 and 68, respectively, which conformably receive the upper and intermediate shelves 50 and 52, respectively, with their upper edges in sliding contact with the upper surfaces of these shelves, and the lower edges 74 of the separator plates conformably and slidably engaged with the upper surface of the lower shelf 54.

Three vertically spaced horizontal back-stop rods 76 have transverse end legs 78 fixed to the front corner uprights of the frame 20, and are spaced rearwardly from the front uprights, as shown in FIGURE 4. The back-stop rods 76 are spaced between the shelves, and the separator plates 62 are provided with horizontal slots 80, opening to their forward edges, which pass the rods 76 and their legs 78.

As shown in FIGURE 4, the separator plates 62 are formed in their rear edges 82, with upper and lower notches 84 and 86, respectively, on whose upper and lower edges are formed upper and lower lateral flat arms 88 and 90, respectively, which, as indicated in FIGURE 9, are vertically pivoted on pins 92 which extend between

spaced lateral ears 94 on one end of links 96 of endless upper and lower chains 98 and 100, respectively. The chains 98 and 100 are trained around single upper and lower left-hand sprocket wheels 102 and 104, which are fixed on a single left-hand vertical shaft 106, which is journaled, at its ends, in upper and lower bearings 108 and 110, respectively, supported on the frame 20, behind the shelves, and outside of the left-hand end of the frame, as indicated in FIGURE 2. These chains are also trained around upper and lower forward and rear sprocket wheels 112 and 114 and 116 and 118, respectively, fixed on forward and rear vertical shafts 120 and 122, respectively, which are supported, at their ends, in upper and lower bearings 124 and 126 on the frame 20, behind the shelves, and adjacent to the right-hand end of the frame 20.

The rear edges 82 of the separator plates 62 are further formed, between the upper and lower notches 84 and 86, with two vertical spaced intermediate notches 128, which, at times receive stationary horizontal longitudinal, downwardly opening guide channels 130, which are mounted on the frame 20 between its end members. The separator plates 62 have intermediate angle iron lateral arms 132, on the lower edges of the intermediate notches 128, which have journaled on their horizontal flanges, spaced upstanding leading and trailing rollers 134 and 136, respectively, the leading rollers 134 being located next to the separator plates, as shown in FIGURE 6.

Similar but reversed upper and lower chain tighteners 138 are associated with the left-hand sprocket wheel shaft 106, which, as shown in FIGURES 12 and 13, comprise horizontal brackets 140, fixed to and extending longitudinally outwardly from the upper and lower left-hand frame cross members 30 and 32, and have spaced upstanding ribs 142 thereon on which are slidably confined channels 144, joined by cross members 146, which are upstanding parts of journal plates 148, in which the ends of the shaft 106 are journaled. Adjusting screws 150 are threaded through the cross members 146 and bear against the related frame cross members.

The separator plate rollers 134 and 136 of the front flights of the chains 98 and 100 are guidingly engaged in the guide channels 130, as indicated in FIGURES 2 and 6, whereby the separator plates 62 are maintained in parallel relationship, so as to define, with the shelves, and the back-stop rods 76 individual mail compartments P, above the front of the frame 20, which compartments are initially vertically aligned with cards in the flanges 46.

As the chains 98 and 100 are rotated, counterclockwise in FIGURE 2, the separator plate rollers 134 and 136 of the front flights of the chains pass out of the right-hand ends of the guide channels 130, upon completion of a transit of the separator plates 62 to the right-hand end of the frame 20, and swing out of right-angular relation to the shelves, as shown in FIGURE 6, and are prevented from swinging too far rearwardly out of folded position by upper and lower stop bars 152 and 154 fixed on the frame 20 behind the chains, and angled forwardly toward the left-hand end of the frame 20, against which the free edges of the separator plates slide. When the rear flight separator plates reach the left-hand end of the frame 20, preliminary to being returned to right-angular relationship to the shelves and to be moved therealong in this relationship, their trailing rollers 134 strike trips 156 and 157, in succession on the left-hand end of the frame 20, as shown in FIGURE 6, so that the separator plates are tilted out of the folded relationship shown, and, as the separator plates move around the sprocket wheels of the shaft 106, their leading rollers engage the arcuate forward walls 158 of arcuate guides 160 on the adjacent ends of the guide channels 130, so that both rollers move into the channels and bring the separator plates 62 into their compartments forming parallel relationship, at right angles to the shelves. The arcuate guides 160 have tangential extensions 161, on the entering ends thereof, which assure that the leading and trailing rollers are more positively and smoothly led into the guides 160.

Mail, such as letters and the like, are placed in vertical position, in the compartments P, the chains having been stopped, with the compartments lined up with the route cards in the flanges 46, and when all mail for the compartments has been inserted, the chains are again moved, toward the right-hand end of the frame 20. As a result, separator plates 62 successively "peel off" at the right-hand end of the frame, that is, are moved rearwardly from between batches of mail, as shown in FIGURE 5, so that continued right-hand movement of successive separator plates 62 discharges or deposits batches of mail, in compressed or compacted condition, against the stationary plate 162 of clamping assemblies 164, which are supported, on a level with the rows of compartments P, on the shelves 166 of a haul-away cart C, which is ground-supported, in abutting relation to the right-hand end of the frame 20.

The clamping assemblies 164, as shown in FIGURE 15, comprise the mentioned stationary plates 162, from whose upper edge outer horizontal rods 168 and intermediate horizontal rods 170 extend longitudinally inwardly. Movable clamping plates 172 have apertured spring detent ears 174 centrally on the upper edges, through which the intermediate rods 170 frictionally extend. In mail-receiving positions of the assemblies 164, the clamping plates 172 are not in place on the intermediate rods 170, but are applied thereto for clamping batches of mail between the fixed plates 162 and the stationary plates 172. The outer rods 168 and intermediate rods 170, in the mail-receiving positions of the assemblies 164, are engaged in tubes 174 and 176, respectively, as shown in FIGURES 7 and 8, which are supported from the right-hand end of the frame 20, beneath the related shelves. The assemblies 164 are held in place by means of gravity operated stops 178, which are pivoted, as indicated at 180, between and beneath the tubes 174 and 176. The stops 178 comprise vertical levers 179, pivoted adjacent to their upper ends, and having lateral arms 181 on their lower ends. The upper ends of the levers 179 extend through the openings 183 in the plates 162, at an acute downward angle, so that the levers are cammed up out of the way when a plate 162 passes it, and then falls gravitationally to its depressed stop position, behind the passed plate, as shown in FIGURE 7.

When the assemblies 164 have become filled with compacted batches of mail, the stops 178 are released, the assemblies withdrawn, and the clamping plates 172 are installed on the intermediate rods 170, and pressed toward the stationary plates, so as to clamp the mail therebetween, whereat the assemblies 164 are removed from the cart C, and transferred to delivery means, such as mail bags, after the mail clamped therein has been tied into bundles, and the bundled mail dropped into the bags. The assemblies 164 can be used instead of the trays now used by postal routemen in their cars, and this use eliminates the need for bundling and tying the mail.

The haul-away cart C, as shown in FIGURES 1, 2 and 14, can comprise a caster wheel equipped base plate 186, from which rise a pair of spaced perpendicular posts 188, on whose upper ends are telescoped tubular uprights 190, which are spaced and connected by vertically spaced cross members 191 and 193. Vertically spaced open shelves 166 extend from the uprights 190, over the base plate 186, and two-walled trays 196 are carried by the shelves 166 in line with the shelves of the frame 20, when the uprights 190 are properly adjusted on the posts 188. Arms 200, on the upper ends of the uprights 190 have hooks 202, on their free ends, which are adapted to be engaged in detent brackets 204 on the upper right-hand cross member of the frame 20, and the bottom shelf 166 has hooks 194 adapted to engage in apertured lugs 195 on the lower right-hand cross member of the frame 20, for holding the cart C in place relative to the right-hand end

frame 20. A cross member 191 connects the posts 188, and a cross member 193, spaced below the cross member 191 connects the uprights 190. A cable 195 is connected to the cross member 191 and leads upwardly to a ratchet drum 197, carried by the cross member 191, and provided with an operating handle 199, for extending and contracting the height of the cart C. A ratchet pawl 189 on the cross member 191 cooperates with the drum 197.

The chains 93 and 100 are driven from the rear right-hand sprocket wheel shaft 120, through a reducing gear assembly 206 connected to the lower end thereof. The reducing gear assembly 206 is supported on a base plate 208, connected by brackets 210 to the right-hand end of the frame 20, beneath the lowermost shelf 54. The assembly 206 has a forwardly extending shaft 212 having a pulley 214 thereon, over which a drive belt 216 is trained. An electric motor 218 is mounted upon the base plate 208, and is vertically pivoted thereon, at one corner thereof, as indicated at 220, with the shaft 222 of the motor generally paralleling the pulley shaft 212, and carrying a pulley 224, over which the belt 216 is trained. A clutch level 226 is pivoted, intermediate its ends, on the front right-hand frame upright 26, as indicated at 227, and is pivoted, at its lower end, as indicated at 228, to the forward end of a horizontal link 230, whose rear end is pivoted, as indicated at 232, to the motor 218, at a point eccentric with respect to the motor-mounting pivot 220. When the lever 226 is pulled forward, to the position shown in FIGURE 3, the motor 218 is pivoted toward the reducing gear assembly 206, so that the belt 216 is loosened and does not drive the gear assembly, whereas when the lever 226 is pushed rearwardly, the motor is pivoted away from the gear assembly, and the belt is tightened to drive the chains.

As shown in FIGURES 16 and 17, each of the separator plate carrying sprocket chains comprises carrier links 96 which comprise elongated flat plates 234, formed with elongated central openings 236, and having on one end thereof, lateral T-shaped lugs 238, whose shanks 240 are narrower than their crossheads 242, so that when the crossheads are rotated and passed through the openings 236 and returned to cross-wise positions, the shanks 240 are slidably engaged, crosswise, in the openings 236, with the ends of the crossheads bearing upon the same sides of the plates 234 from which the lugs 238 extend. At the other ends of the plates 234, pairs of spaced lateral apertured ears 244 extend on the same sides of the plates as the lugs 238, through which the pivot pins 92 of the separator plate arms 94 extend. As shown in FIGURE 9, the teeth 239 of the sprocket wheels extend through the link plate openings 236 to drive the chains.

Although there has been shown and described a preferred form of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains.

2. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said separator plates having other slots opening to their forward edges in which the back-stop rods are disposed.

3. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journalled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said separator plates having other slots opening to their forward edges in which the back-stop rods are disposed, said shelves having mail destination indicators spaced along their forward edges for identifying compartments.

4. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said separator plates having other slots opening to their forward edges in which the back-stop rods are disposed, a single vertical shaft journaled on the support at one end thereof, front and rear vertical shafts journaled on the support at the other end thereof, upper and lower sprocket wheels on the shafts around which the upper and lower chains are severally trained, said separator plates having lateral arms at their rear edges to which links of the chains are pivoted.

5. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front

flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said separator plates having other slots opening to their forward edges in which the back-stop rods are disposed, a single vertical shaft journaled on the support at one end thereof, front and rear vertical shafts journaled on the support at the other end thereof, upper and lower sprocket wheels on the shafts around which the upper and lower chains are severally trained, said separator plates having lateral arms at their rear edges to which links of the chains are pivoted, said support having upper and lower horizontal guide channels, said separator plate arms having spaced leading and trailing rollers thereon adapted to be engaged in the guide channels to hold the separator plates of the front chain flights parallel, said channels having entering ends and leaving ends, and horizontal stop bars on the support spaced behind the chains with which the separator plates of the rear chain flights are adapted to engage when the rollers are out of the channels and are pivoted out of parallel relationship.

6. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said separator plates having other slots opening to their forward edges in which the back-stop rods are disposed, a single vertical shaft journaled on the support at one end thereof, front and rear vertical shafts journaled on the support at the other end thereof, upper and lower sprocket wheels on the shafts around which the upper and lower chains are severally trained, said separator plates having lateral arms at their rear edges to which links of the chains are pivoted, said support having upper and lower horizontal guide channels, said separator plate arms having spaced leading and trailing rollers thereon adapted to be engaged in the guide channels to hold the separator plates of the front chain flights parallel, said channels having entering and leaving ends, and horizontal stop bars on the support spaced behind the chains with which the separator plates of the rear chain flights are adapted to engage when the rollers are out of the channels and are pivoted out of parallel relationship, said entering ends of the guide channels having forward curved arcuate guides, trip means on the support in advance of the arcuate guides with which the separator plate arms engage to be pivoted toward the arcuate guides preliminary to their rollers entering the arcuate guides and the guide channels.

7. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said rotating means comprising clutch equipped motor means on the support and operatively connected to the lower end of the forward vertical shaft.

8. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said shelves having horizontal tube means opening to an end thereof, and mail clamping assemblies having rod means removably engaged in the tube means, fixed pendant plates on the ends of the rod means remote from the shelves, and clamping plates slidably and securably engaged on the rod means for movement toward and away from the fixed plates.

9. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support, adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said shelves having horizontal tube means opening to an end thereof, and mail clamping assemblies having rod means removably engaged in the tube means, fixed pendant plates on the ends of the rod means remote from the shelves, and clamping plates slidably and securably engaged on the rod means for movement toward and away from the fixed plates, a mobile cart, means for separably connecting the cart to the delivery end of the support, said cart having shelves aligned with the support shelves, containers removably engaged on the cart shelves and adapted to receive clamping assemblies removed from the support shelves.

10. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these slots

bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said chains comprising working links and connecting links, said links comprising flat plates having centered longitudinal openings, said plates having lateral lugs on one end thereof, said lugs having relatively narrow shanks engaged through openings of adjacent links and wider cross heads bearing against the sides of link plates remote from link plates, said working links having pairs of lateral ears on the ends thereof remote from the lugs, pivot pins extending through the ears and adapted to support and carry members spaced therealong, said members comprising separator plates pivoted on said members.

11. A mail sorting machine comprising a support, vertically spaced shelves on the support, said shelves having forward and rear edges, a back-stop rod spaced above each shelf and mounted to the support adjacent to said rear edges, upper and lower horizontal endless chains journaled on the support behind the shelves and having front flights disposed above the shelves and adjacent to the rear edges thereof, and rear flights behind the front flights, a row of longitudinal separator plates spaced along and pivoted to the chains, said separator plates having forward and rear edges, said separator plates being vertically elongated and having slots opening to their forward edges receiving the shelves, with the upper edges of these

slots bearing slidably upon the shelves, said shelves, adjacent separator plates and the back-stop rods defining mail-receiving compartments, and means for rotating the chains, said chains comprising working links and connecting links, said links comprising flat plates having centered longitudinal openings, said plates having lateral lugs on one end thereof, said lugs having relatively narrow shanks engaged through openings of adjacent links and wider cross heads bearing against the sides of the link plates remote from link plates, said working links having pairs of lateral ears on the ends thereof remote from the lugs, pivot pins extending through the ears and adapted to support and carry members spaced therealong, said members comprising separator plates pivoted on said members, said separator plates being pivoted on ears of links.

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