Dec. 21, 1954 W. A. STAHL 2,697,514

MAIL SORTING DEVICE

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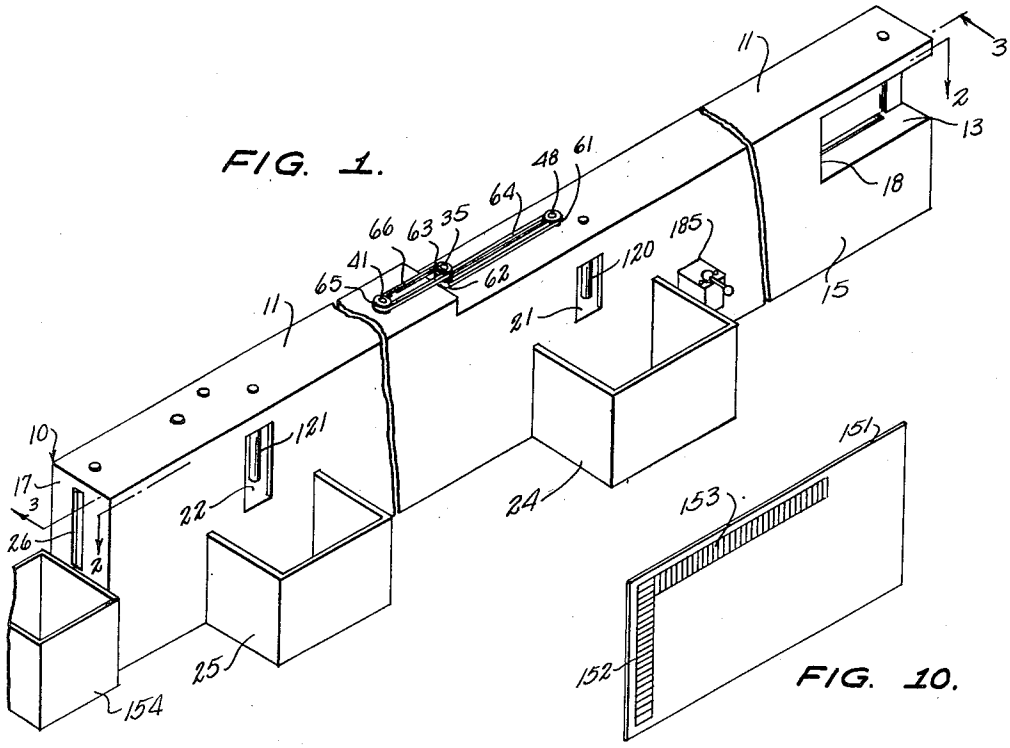


FIG. 1.

FIG. 10.

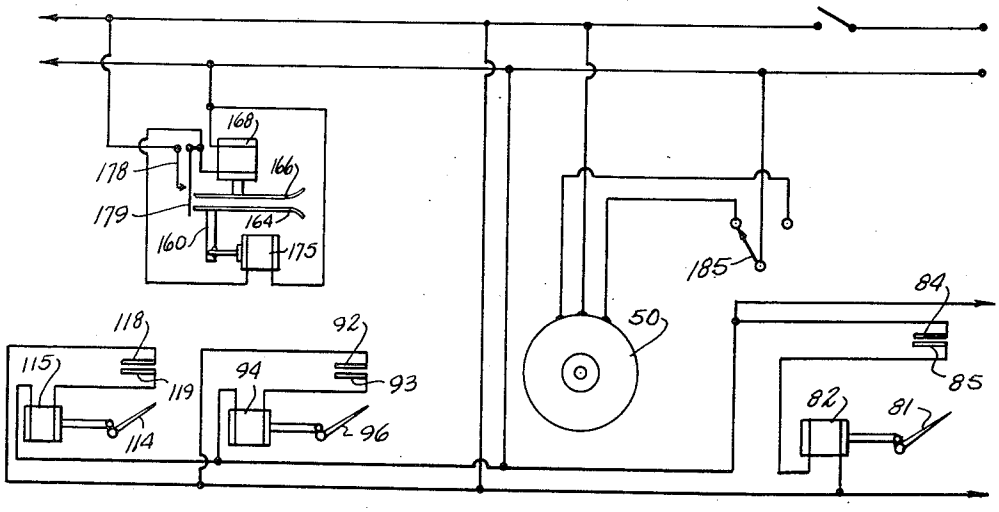


FIG 11.

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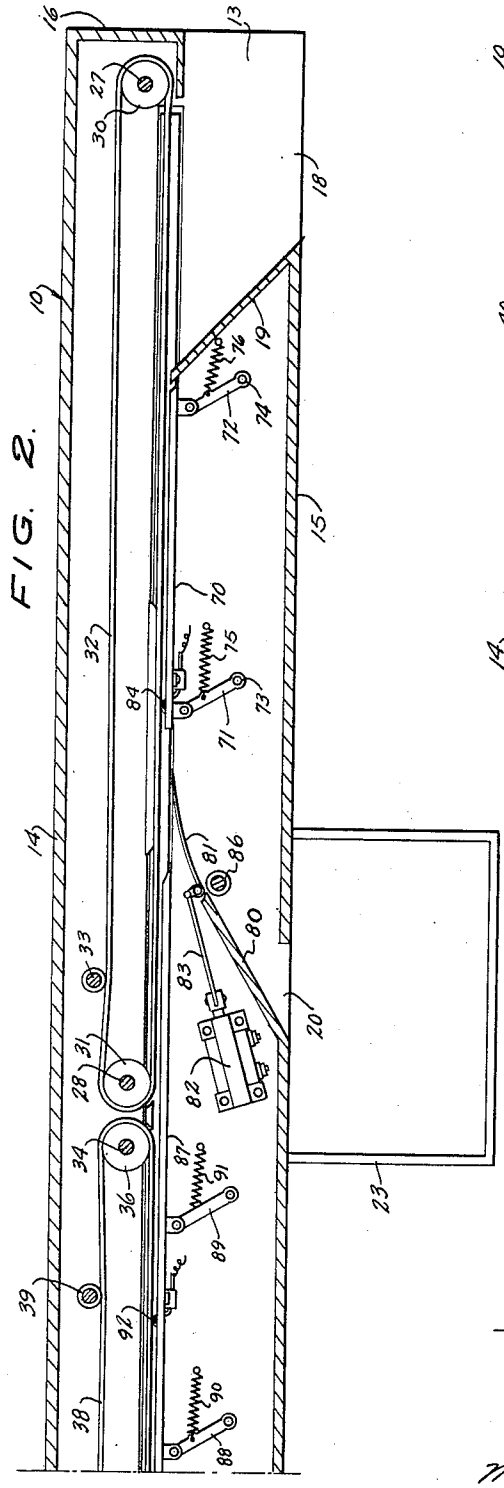


FIG. 2.

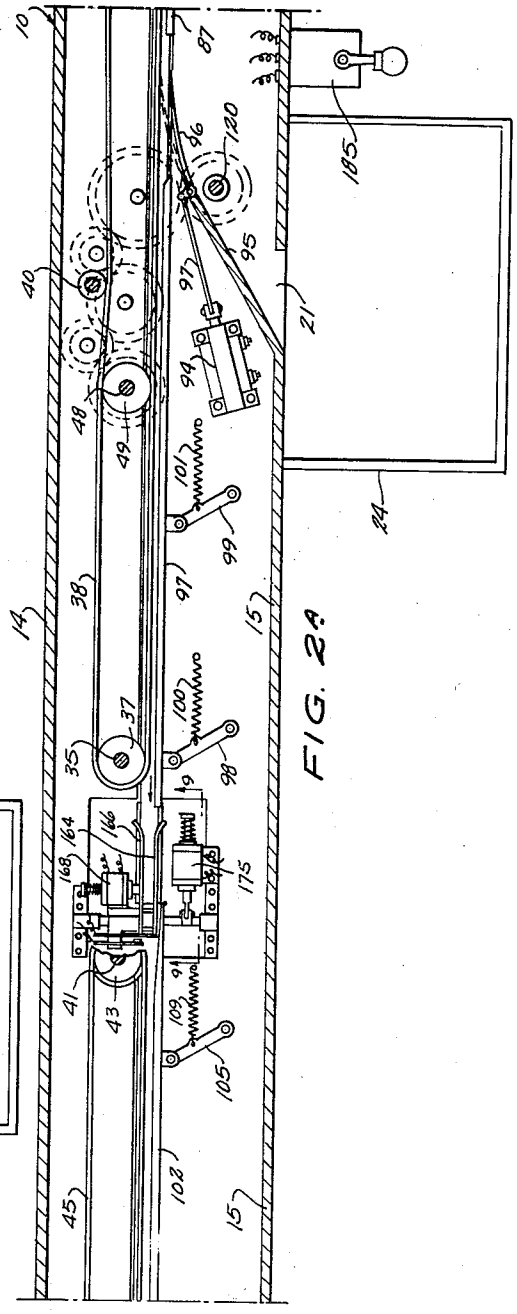


FIG. 2A.

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FIG. 2B.

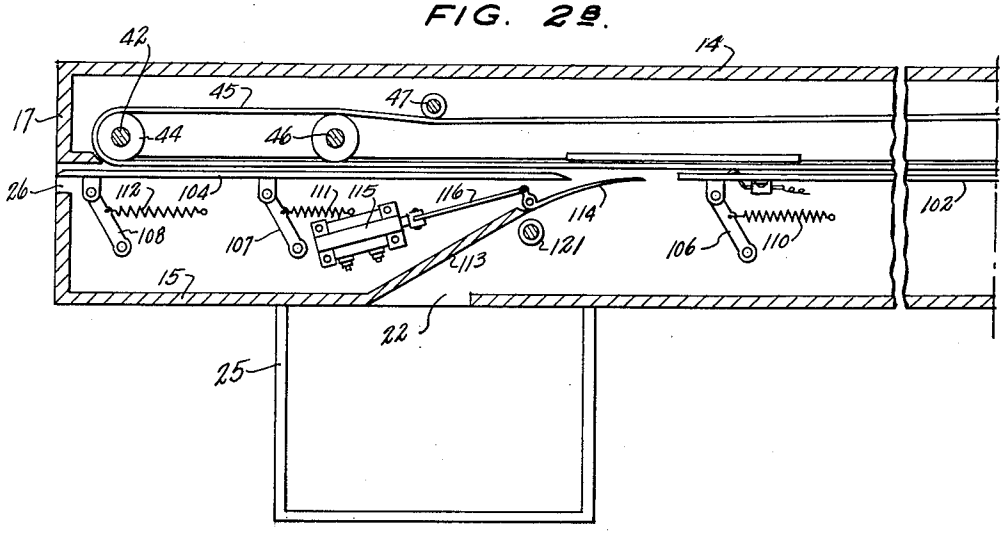
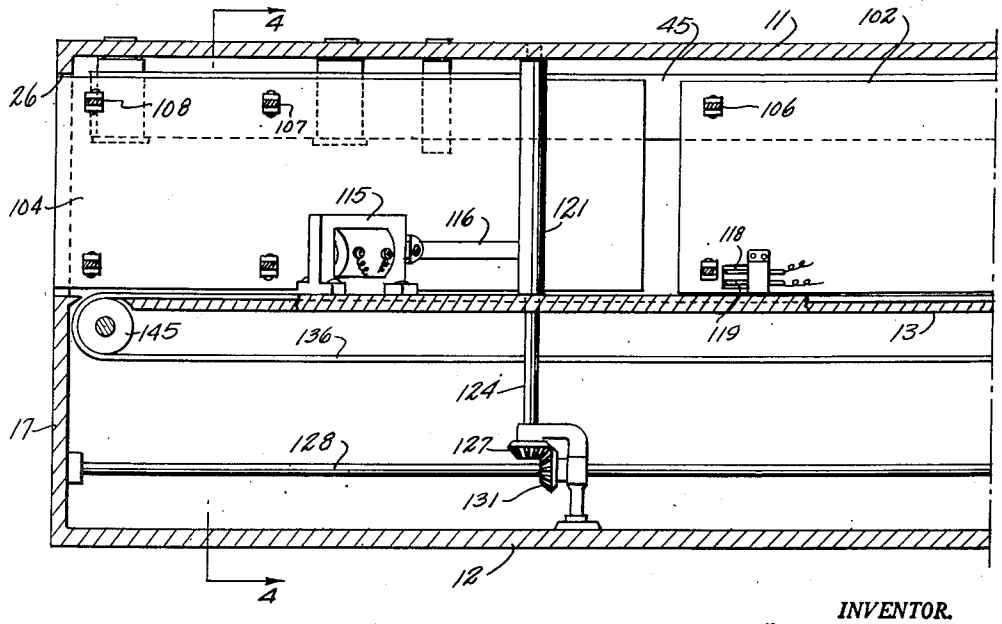


FIG. 3B.



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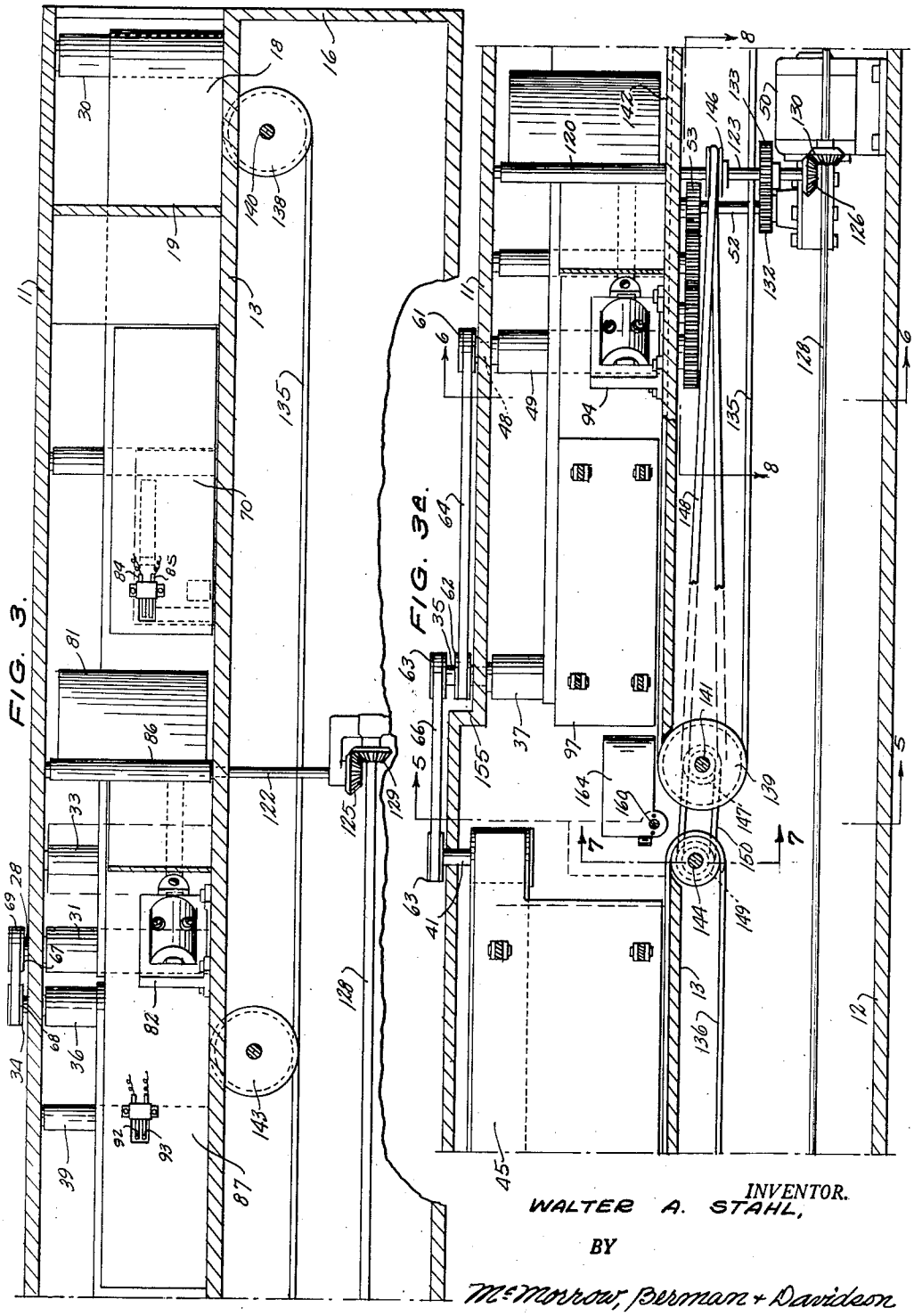


FIG. 3.

FIG. 3a.

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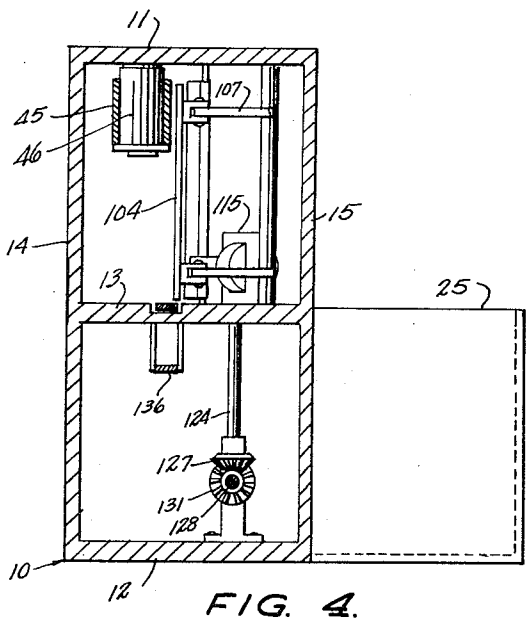


FIG. 4.

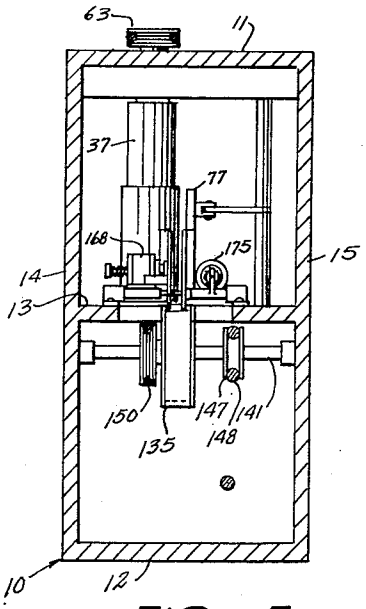


FIG. 5.

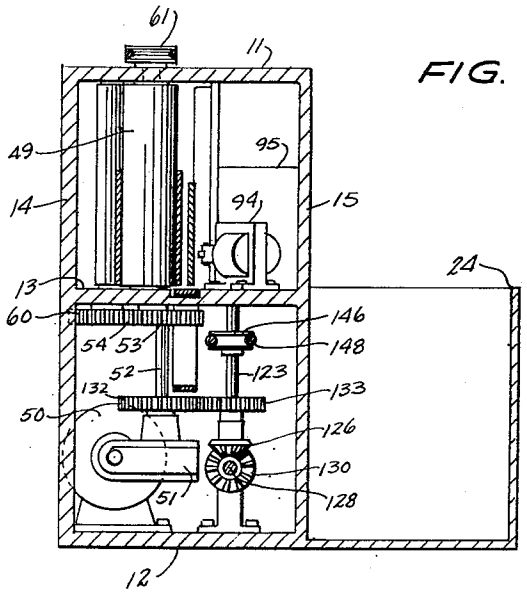
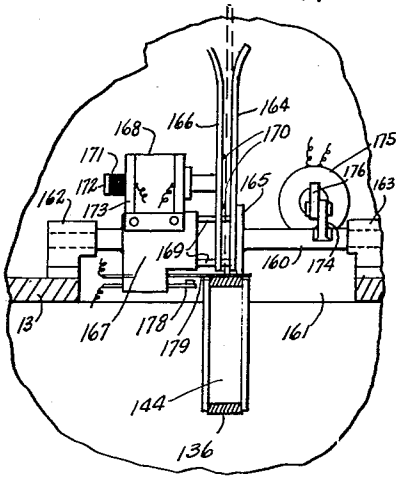


FIG. 6.

FIG. 7.



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FIG. 8.

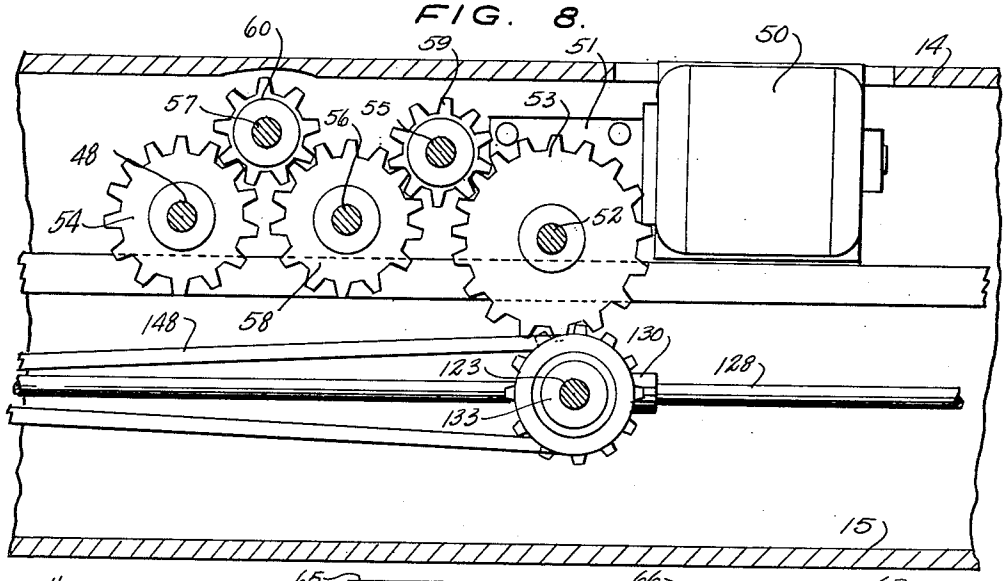
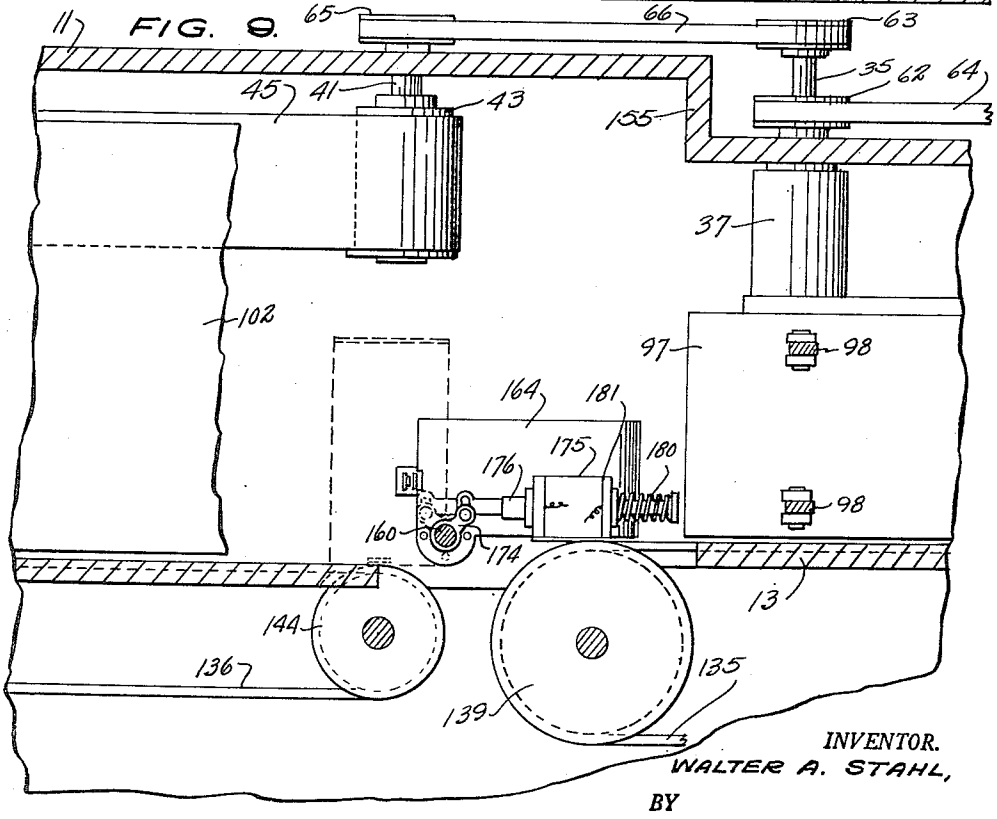


FIG. 9.



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United States Patent Office 2,697,514 Patented Dec. 21, 1954

2,697,514

MAIL SORTING DEVICE

Walter A. Stahl, Cleveland, Ohio

Application July 3, 1952, Serial No. 297,105

5 Claims. (Cl. 209—72)

This invention relates to a device for sorting objects in accordance with predetermined classifications thereof and more particularly to a device for sorting mailing envelopes in accordance with their destinations.

It is among the objects of the invention to provide a device which is operative with special envelopes to rapidly and automatically sort the envelopes into groups according to their destination; which can be used to sort various objects, such as envelopes, cards and documents in accordance with a code provided on the objects; which can be operated by a single operator and will place the sorted objects into suitable receptacles, such as mail bags; which occupies a small amount of space in proportion to the amount of work accomplished; and which is simple and durable in construction, economical to manufacture, easy to use, and positive and effective in operation.

Other objects and advantages will become apparent from a consideration of the following description and the appended claims in conjunction with the accompanying drawings wherein:

Figure 1 is a fragmentary perspective view of a sorting device illustrative of the invention;

Figures 2, 2*a* and 2*b* constitute a longitudinal cross sectional view of the device on the line 2—2 of Figure 1;

Figures 3, 3*a* and 3*b* together constitute a longitudinal cross sectional view of the device on the line 3—3 of Figure 1;

Figure 4 is a transverse cross sectional view on the line 4—4 of Figure 3*b*;

Figure 5 is a transverse cross sectional view on the line 5—5 of Figure 3*a*;

Figure 6 is a transverse cross sectional view on the line 6—6 of Figure 3*a*;

Figure 7 is a fragmentary cross sectional view on an enlarged scale on the line 7—7 of Figure 3*a* but with the parts in a somewhat different operative position from that illustrated in Figure 3*a*;

Figure 8 is a fragmentary cross sectional view on an enlarged scale on the line 8—8 of Figure 3*a*;

Figure 9 is a fragmentary cross sectional view on an enlarged scale on the line 9—9 of Figure 2*a*;

Figure 10 is a perspective view of a special envelope used in the sorting device; and

Figure 11 is an electric wiring diagram of the device.

With continued reference to the drawings, the device includes an elongated, hollow housing of rectangular cross sectional shape, generally indicated at **10**, and including a top wall **11**, a bottom wall **12** spaced from and substantially parallel to the top wall **11**, a partition wall **13** disposed substantially midway between and parallel to the top and bottom walls, and side walls **14** and **15** extending along the respectively opposite longitudinal edges of the top, bottom and partition walls in spaced apart and substantially parallel relationship to each other.

The housing also has end walls **16** and **17** and the side wall **15** is provided at its end adjacent the end wall **16** with an inlet opening **18** which also extends into the adjacent portion of the end wall. The partition wall **13** provides a bottom wall for the opening **18** and a deflector wall **19** extends inwardly of the housing from the side wall **15** at the end of the opening **18** remote from the end wall **16**, this deflector wall being disposed substantially perpendicular to the partition wall **13** and inclined from the side wall **15** inwardly of the housing and away from the end wall **16**.

The side wall **15** is also provided with spaced apart outlet openings of rectangular shape, as indicated at **20**, **21** and **22** and receptacles, as indicated at **23**, **24** and **25** are disposed one below each of the outlet openings to receive articles ejected from the housing through these outlet openings. It is contemplated that when the device is used for sorting mail the receptacles **23**, **24** and **25** will be in the form of frames or hoppers having open bottoms and supporting mail bags depending therefrom so that the sorted mail can be deposited directly into the bags in which it is shipped to its destination.

The end wall **17** is provided with a reject opening **26** therein and a receptacle for this opening may be provided on the housing, if desired.

A belt conveyor mechanism extends longitudinally through the housing **10** from the end wall **16** to the end wall **17** and from the inlet opening **18** to the reject opening **26** past the several outlet openings, as indicated at **20**, **21** and **22**.

While only three outlet openings have been shown in the accompanying drawings, it is to be understood that, when the device is used for sorting mail there may be as many as fifty outlet openings, one for each of the forty-eight States, one for the District of Columbia and one Territorial. In addition to sorting mail for destination by States, the device may be used to sort mail for destination to post offices in a selected area.

The belt conveyor means includes a shaft **27** journaled at its ends in the top wall and the partition wall of the housing and disposed adjacent the end wall **16**, a shaft **28** journaled at its ends in the top wall and partition wall of the housing at a location spaced from the shaft **27**, rollers **30** and **31** on the shafts **27** and **28** respectively and a flexible, endless belt **32** trained around the rollers **30** and **31**, this belt constituting with the associated rollers and shafts a first belt conveyor section. A belt tightening roller **33** is journaled at its opposite ends in the top wall **11** and partition wall **13** of the housing adjacent the roller **31** and bears against the side of belt **32** adjacent the side wall **14** of the housing to maintain the belt in a tight condition around the rollers **30** and **31**.

A shaft **34** is disposed adjacent the shaft **28** and journaled at its upper and lower ends in the top wall and partition wall of the housing and a complementary shaft **35** is journaled at its upper and lower ends in the top and partition walls of the housing at a location spaced longitudinally of the housing from the shaft **34**. Rollers **36** and **37** are mounted on the shafts **34** and **35** respectively and a flexible, endless belt **38** extends around the rollers **36** and **37** and constitutes with these rollers and the shafts **34** and **35** a second section of the belt conveyor assembly.

Belt tightening rollers **39** and **40** are journaled at their respective opposite ends in the top wall **11** and partition wall **13** of the housing **10** one near the shaft **34** and the other at a location spaced from the shaft **35**, and bear against the side of the belt **38** nearest the side wall **14** of the housing to maintain the belt in a tight or taut condition around the rollers **36** and **37**.

A shaft **41** is journaled at its ends in the top wall and partition wall of the housing at a location near but spaced from the shaft **34** and a shaft **42** is journaled at its opposite ends in the top and partition walls of the housing near the end wall **17** of the housing. Rollers **43** and **44** are mounted on the shafts **41** and **42** respectively and an endless, flexible belt **45** is trained around the rollers **43** and **44** and together with these rollers and the shafts **41** and **42** constitutes a third section of the belt conveyor assembly.

An idler roller **46** is journaled at its upper and lower ends in the top and partition walls of the housing and is positioned between the two sides of the belt **45** at a location near but spaced from the roller **44** and a belt tightening roller **47** is journaled at its opposite ends in the top and partition walls of the housing and bears against the side of the belt **45** nearest the side wall **14** of the housing at a location spaced beyond the roller **46** from the roller **44**.

A shaft **48** carrying a roller **49** thereon is disposed between two sides of the belt **38** at a location spaced from the roller **37** and is journaled in and extends through the top and partition walls **11** and **13** respectively of the housing **10**. An electric motor **50** is mounted on the bottom wall **12** of the housing at a location near the

shaft 48 and a speed reduction unit 51 is mounted on one end of the motor 50 and includes a vertically disposed output shaft 52. A spur gear 53 is mounted on the shaft 52 and disposed immediately below the partition wall 13 of the housing. A spur gear 54 is mounted on the shaft 48 immediately below the partition wall 13 and gear arbors, 56 and 57 are disposed in spaced apart relationship to each other between the gears 53 and 54. The arbor 56 has its axis substantially on a line connecting the axes of the shafts 52 and 48 and a spur gear 58 is mounted on this arbor 56. An idler gear 59 is mounted on the arbor 55 and meshes with the gears 53 and 58 and an idler gear 60 similar to the gear 59 is mounted on the arbor 57 and meshes with the gears 58 and 54. With this arrangement, the shaft 48 is driven at a reduced speed from the motor 50. The upper end of the shaft 48 projects above the top wall 11 of the housing and carries a belt pulley 61. The upper end of the shaft 35 also extends above the top wall 11 of the housing and carries two spaced apart belt pulleys 62 and 63. The belt pulley 61 is connected to the lower pulley 62 on the shaft 35 by a V-belt or similar driving connection 64 so that the roller 37 is driven from the motor 50 and drives the belt 38.

The shaft 41 also projects above the top wall 11 of the housing and carries on its upper end a belt pulley 65. The upper pulley 63 on the shaft 35 is connected to the belt pulley 65 by a V-belt or similar driving element 66 so that the belt 45 is also driven from the motor 50.

The shafts 28 and 34 both project above the top wall of the housing and carry belt pulleys 67 and 68 respectively above the housing top wall and these pulleys 67 and 68 are connected by a suitable belt 69 so that the conveyor belt 32 is also driven from the motor 50, the belts in the three belt conveyor sections all being driven in the same direction and at the same speed.

A flat pressure plate is disposed against the side of the belt 32 nearest the side wall 15 of the housing and extends along the belt from the inner end of the deflector wall 19 to a location spaced from the outlet opening 20 in the side wall 15. This plate is held in position against the adjacent side of the belt by pivotally mounted, swinging arms 71 and 72 each pivotally connected at one end to the plate 70 and at its upper end to posts, as indicated at 73 and 74 extending between and secured at their opposite ends to the top and partition walls of the housing. The arms are preferably arranged in pairs with an upper and a lower arm pivotally connected to each post and to the pressure plate at vertically spaced apart locations on the latter and a corresponding upper and lower arm connected to the post 74 and to the pressure plate at spaced apart locations thereon. The arms 71 and 72 are resiliently urged in a rotational direction around the posts 73 and 74 to force the pressure plate 70 against the adjacent side of the belt by tension springs 75 and 76 each connected at one end to the corresponding arm and at its other end to the housing.

A guide wall 80 extends from the side of the outlet opening 20 remote from the end wall 16 of the housing inwardly of the housing and is inclined toward the end wall 16. This guide wall terminates short of the belt 32 and a gate 81 in the form of a curved, thin plate is pivotally connected at one end to the inner end of the guide wall 80 and has its end remote from the guide wall disposed adjacent the nearest side of the belt 32 at a location spaced from the rear end of the pressure plate 70. An electric solenoid 82 is mounted on the partition wall 13 and connected by a link 83 to the gate 81 so that, when the solenoid is energized the gate 81 will be swung into contact with the side of the belt 32 nearest the side wall 15 of the housing and will, in that position, deflect mailing envelopes passing between the belt 32 and the pressure plate 70 along the guide wall 80 and out of the housing through the outlet opening 20.

Energization of the solenoid 82 is controlled by a pair of spaced apart contacts 84 and 85 carried by the pressure plate 70 near the rear end of this pressure plate and exposed at the side of the pressure plate adjacent the belt 32.

The mailing envelopes to be sorted by the device are provided with elements of electrically conductive material at selected locations thereon, as will be later described in detail, and when such an element on a mailing envelope passing along the conveyor assembly between the belt 32 and the pressure plate 70 bridges the contacts 84 and 85, the solenoid 82 is energized moving

the distal end of the gate 81 into engagement with the side of the belt 32 nearest the side wall 15 at a location rearwardly of the rear end of the pressure plate 70 and deflecting the envelope along the gate and the guide wall 80 through the outlet opening 20 into the receptacle 23. After leaving the pressure plate 70 the envelope is propelled along the gate 81 and guide wall 80 by an ejecting roller 86 disposed adjacent the proximal end of the gate 81 and journaled in the top and partition walls of the housing. This roller 86 is driven from the motor 50 by means presently to be described in detail.

A second pressure plate 87 is disposed against the sides of the belts 32 and 38 nearest the side wall 15 and extends along these belts from a location spaced from the rear end of the pressure plate 70 to a location in advance of the next outlet opening in the side wall 15 of the housing. Since there will be one pressure plate between the inlet opening 18 and the first outlet opening and between each two adjacent outlet openings, there will be a number of pressure plates equal to the number of outlet openings or fifty pressure plates in the case of a device having fifty outlet openings as indicated above.

The pressure plate 87 is resiliently held against the adjacent side of the belts 32 and 38 by pivoted arms 88 and 89 pivotally mounted each at one end on the housing 10 and pivotally connected at its other end to the pressure plate 87, and tension springs, as indicated at 90 and 91 urging the arms to swing in a direction to hold the pressure plate against the adjacent sides of the belts 32 and 38.

The pressure plate 87 carries spaced apart contacts 92 and 93 which control the energization of a solenoid 94 mounted adjacent the outlet opening 21 in the housing. A guide wall 95 and pivoted gate is provided adjacent the outlet opening 21 in the same manner as the guide wall 80 and gate 81 adjacent the outlet opening 20 and the solenoid 94 is connected to the gate 96 by a link 97' to move the gate to a position at which the gate deflects mailing envelopes from the belt 38 along the gate 96 and guide wall 95 through the opening 21 when the solenoid is energized. A pressure plate 97 extends from the gate 96 rearwardly past the roller 37 and is held against the belt 38 by pivoted arms 98 and 99 and tension springs 100 and 101 in the manner described above. A pressure plate 102 extends along the belt 45 from a location spaced rearwardly from the rear end of the plate 97 to a location spaced somewhat forwardly of the outlet opening 22 near the rear end of the housing and a pressure plate 104 extends from a location adjacent the last outlet opening 22 to the reject opening 26 in the end wall 17 of the housing along the side of the belt 45 nearest the side wall 15 of the housing.

The pressure plates disposed rearwardly of the pressure plate 97 are mounted on pivoted arms, as indicated at 105, 106, 107 and 108 and are forced against the corresponding belts by tension springs, as indicated at 109, 110, 111 and 112 connected between the corresponding lever arms and the housing.

A guide wall 113 is inclined inwardly and forwardly of the housing from the rear edge of the outlet opening 22 and a gate 114 is pivotally connected at one end to the wall 113 at the inner end of the latter and extends from the wall 113 to the adjacent side of the belt 45. A solenoid is mounted on the partition wall 13 adjacent the guide wall 113 and a link 116 connects the solenoid 115 to the gate 114.

Spaced contacts 118 and 119 are carried by the pressure plate 102 and exposed at the side of this plate adjacent the belt 45 for controlling the energization of the solenoid 115, the solenoid 115 being energized when the contacts 118 and 119 are bridged by an element of electrically conductive material carried by an envelope passing through the sorting device.

An ejecting roller 120 is journaled in the housing and positioned adjacent the proximal end of the gate 96 and a similar roller 121 is journaled in the housing adjacent the proximal end of the gate 114. The shafts of the ejecting rollers 86, 120 and 121 extend below the partition wall 13, as indicated at 122, 123 and 124 and are provided on their lower ends with beveled gears, as indicated at 125, 126 and 127. A line shaft 128 extends longitudinally of the housing 10 adjacent the bottom wall of the housing and carries beveled gears, as indicated at 129, 130 and 131 meshing with the beveled gears 125, 126 and 127, to impart rotational movement

in the same direction and at the same speed to the ejecting rollers **86**, **120** and **121**.

A second gear **132** is mounted on the motor output shaft **52** below the gear **53** and this gear **132** meshes with a gear **133** on the ejecting roller shaft **123** to directly drive the ejecting roller **120** and drive the ejecting rollers through the line shaft **128** and beveled gear connections.

The belts **32**, **38** and **45** of the main belt conveyor system are mounted on rollers which rotate about substantially vertical axes and this main belt conveyor assembly is supplemented in its function of moving mailing envelopes longitudinally of the housing **10** in a direction away from the inlet opening **18** by a secondary or auxiliary belt conveyor assembly including belts mounted on rollers which rotate about substantially horizontal axes.

In the arrangement illustrated the secondary conveyor system comprises belts **135** and **136** disposed in end to end relationship to each other and extending longitudinally of the housing **10**. The belt **135** is mounted on rollers **138** and **139** disposed adjacent the vertically disposed rollers **30** and **37** respectively. The rollers **138** and **139** are mounted on horizontally disposed shafts **140** and **141** disposed below the partition wall **13** and the partition wall **13** is provided in its upper surface with a longitudinally extending, flat groove **142** which receives the upper part of the belt **135**. The upper part of the belt **135** is disposed at the lower edges of the sides of the belts **32** and **38** nearest the side wall **15** of the housing so that the bottom edges of mailing envelopes moved along the housing by the belts **32** and **38** will rest on the upper portion of the belt **135** and this belt will also assist in moving the envelopes longitudinally of the housing in a direction away from the end of the housing having the inlet opening **18**.

An idling roller **143** is disposed between the upper and lower portions of the belt **135** intermediate the length of this belt to assist in maintaining the belt **135** in a tight condition and in proper position relative to the walls of the housing.

The belt **136** is mounted on rollers **144** and **145** disposed at the front and rear ends respectively of this belt and the upper portion of the belt **136** runs in a groove in the upper surface of the partition wall **13** at the lower edge of the belt **45**.

A belt pulley is provided on the ejector roller shaft **123** and a complementary belt pulley **147** is provided on the shaft **141** of the auxiliary belt roller **139**. A V-belt or similar connector **148** drivingly connects the pulley **146** to the pulley **147** so that the belt **135** is driven by the motor **50** whenever the device is in operation. A belt pulley **149** is mounted on the shaft of the roller **144** and a corresponding belt pulley is mounted on the shaft **141** and drivingly connected by a belt **150** to the pulley **149** to drive the roller **144** and belt **136** whenever the belt **135** is driven.

With the above described arrangement, the main and auxiliary belt conveyor assemblies will move the envelopes or other objects to be sorted longitudinally of the housing of the device in a direction away from the end of the housing having the inlet opening therein as the envelopes or other objects are manually fed into the conveyor system through the inlet opening in the housing and the several gates will be operated by the associated solenoid, as the solenoids are energized, to deflect the envelopes away from the conveyor system and through the several outlet openings in the side wall of the housing in accordance with a predetermined code provided on the envelopes or other objects to be sorted.

As illustrated in Figure 10, the envelope particularly arranged for use in the sorting device of the present invention is of elongated, rectangular shape and has code strips **152** and **153** on one side thereof extending one along one end edge and the other along one longitudinal edge of the envelope. Each of the strips **152** and **153** comprises an elongated body of electrically conductive material, such as a wire or a strip of sheet metal or metal foil, disposed adjacent the surface of the envelope, and a strip of electrically non-conductive material, such as paper, secured to the envelope and covering the body of electrically conductive material. The covering strip is divided into a plurality of consecutively arranged tabs joined together by perforated portions of the strip so that any selected tab can be removed from the corresponding strip of electrically insulative material to expose the portion of the corresponding body of electrically conductive material within the area of the removed tab.

If it were desired to provide as many as fifty tabs to provide one tab for each of the forty eight States, one for the District of Columbia and one for territorial destinations, there would not be sufficient room across any one edge of the envelope to provide the entire number of tabs and it has therefore been found desirable to arrange the tabs in two strips disposed one along an end edge and one along a side edge of the envelope, as described above.

The pairs of contacts carried by the pressure plates such as **70**, **87**, etc. are arranged at different heights from the partition wall **13** of the housing, the height of these contact pairs above the partition wall progressively increasing or decreasing longitudinally of the housing in a direction from the end wall **16** to the end wall **17**.

The envelopes to be sorted are first placed in the inlet opening **18** of the device with their longitudinal edges horizontally disposed and the strips **152** and **153** thereon at the sides thereof adjacent the pressure plates. If one of the tabs has been removed from the strip **152** exposing the portion of the conductor body under this tab, as soon as the envelope reaches a pair of contacts in line with the tab which has been removed these contacts are bridged and the next adjacent solenoid is energized to operate the corresponding gate and deflect the envelope out of the housing through the adjacent outlet opening. If none of the tabs of the strip **152** has been removed, the envelope will pass by a number of contact pairs and associated outlet openings corresponding to the number of tabs in the strip **152** and is then uprighted to bring the strip **153** to a vertical position and is carried along the conveyor assembly until a pair of contacts is bridged by a portion of the conductive body in the strip **153** exposed by the removal of one of the tabs in this strip. If no tab has been removed in either of the strips **152** or **153** the envelope will be carried to the end of the housing and ejected through the reject opening **26** in the end wall **17** and will fall into the reject receptacle **154**.

The belt rollers **37** and **139** are located substantially at the position along the housing **10** at which a number of contact pairs corresponding to the number of tabs in the strip **152** along the end edge of the envelope will be passed if none of the tabs in this strip have been removed. At this location the side walls **14** and **15** are extended upwardly raising the rearward portion of the top wall **11** above the forward portion of the top wall so that the rearward portion of the housing will accommodate the envelopes in upright position, that is, with their longitudinal edges vertically disposed, the two portions of the top wall being joined by a transverse shoulder **155** in the housing.

Immediately to the rear of the belt roller **37** mechanism is provided for turning the envelopes through approximately ninety degrees from their horizontally disposed to their vertically disposed position and this mechanism includes a shaft **160** extending transversely of the housing immediately above an opening **161** in the partition wall **13** and journaled at its ends in bearings **162** and **163** mounted on the partition wall **13**.

A flat clamp plate **164** projects radially from the shaft **160** and is fixed thereon by a collar **165** formed on the shaft and bearing against the outer side of the clamp plate **164**. A movable clamp plate **166** is slidably mounted on the shaft **160** and projects radially from the shaft in superposed relationship to the plate **164**. A base **167** is mounted on the shaft **160** between the clamp plate **166** and the bearing **162** and a solenoid **168** is mounted on this base and has its armature connected to the plate **166** at the outer side of the latter. Guide pins **169** extend from the base **167** through apertures in the plate **166** to maintain the plate **166** in alignment with the opposed plate **164**.

When the solenoid **168** is energized it forces the clamp plate **166** toward the clamp plate **164** to engage an envelope between the two clamp plates, the plate **166** having detents **170** on its inner side for firmly engaging the envelopes, and when the solenoid is de-energized the plate **166** is moved away from the plate **164** to release an envelope clamped between the plates by a compression spring **171** acting between the solenoid armature **172** and housing **173**.

An arm 174 projects from the shaft 160 adjacent the bearing 163 and a solenoid 175 mounted on the partition wall 13 of the housing has its armature 176 pivotally connected at one end to the arm 174 at the distal end of the arm.

A substantially rigid contact bar 178 is carried by the base 167 substantially in alignment with the rearward ends of the clamp plates 164 and 166 and a spring contact bar 179 is carried by the base 167 immediately ahead of the bar 178. When the clamp plates 164 and 166 are in their horizontal position and an envelope is forced by the conveyor belt mechanism between these clamp plates and into engagement with the spring contact bar 179, the bar 179 is moved into engagement with a contact on the bar 178 thereby completing energizing circuits for the solenoids 168 and 175. As soon as the solenoid 168 is energized it moves the clamp plate 166 toward the fixed clamp 164 to clamp an envelope between these clamp plates. As soon as the solenoid 175 is energized it rotates the shaft 162 to an angle of approximately ninety degrees bringing the clamp plates 164 and 166 from a horizontal to a vertical position. As the clamp plates are brought to a vertical position the spring contact bar 179 engages the upper part of the belt 136 and is moved away from the contact bar 178 thereby breaking the solenoid energizing circuit. As soon as this circuit is broken a compression spring 180 acting between the armature 176 and the housing 181 of the solenoid 175 rotates the shaft 160 back through an angle of approximately ninety degrees to return the clamp plates 164 and 166 to their horizontal position and, at the same time, the spring 171 moves the movable plate 166 away from the fixed clamp plate 164 to release the envelope from between the two clamp plates. The spring 171 acts in time to leave the envelope in upright position on the belt 136 and engaged between the belt 45 and the pressure plate 102 so that the envelope will be carried rearwardly of the housing in upright position and the clamp plates will be positioned to receive and upright the next envelope reaching the uprighting mechanism.

The tabs provided by the perforated strips of electrically non-conductive material on the envelopes will carry indicia denoting the several States, District and Territorial destinations and in order to prepare an envelope for sorting it is necessary merely to remove the tab carrying designation of the desired State, District or Territorial destination. The envelopes, each with a single tab removed, are then fed into the front or intake end of the sorting device through the inlet opening 18, one at a time, and, as they are moved rearwardly of the machine by the belt conveyor assemblies, they are ejected selectively through the several outlet openings and into the corresponding receptacles in accordance with the location of the tabs removed therefrom. A large number of objects, such as mailing envelopes, can thus be automatically sorted by the sorting device in a short time and grouped in accordance with a code designation carried by the objects.

The motor 50 is controlled by a manually operated reversing switch 185 mounted on the side wall 15 of the housing at a location within convenient reach of an operator feeding envelopes into the housing through the inlet opening 18. This switch 185 can be closed by the operator in one position so that the motor will turn in a direction to drive the belt conveyor assemblies rearwardly of the housing and the switch can be changed to reverse the motor and drive the belt conveyor assemblies in the opposite direction to return the envelopes back to the inlet opening in the event the conveyor assemblies should become jammed or an envelope should fail to pass through the device.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. A device for sorting articles in accordance with a predetermined code indication provided on the articles comprising an elongated housing having a top wall, a bottom wall, a partition wall between said top and bottom walls, and side walls extending along the longitudinal edges of said top, bottom and partition walls, one of said side walls having an inlet opening at one end thereof and outlet openings spaced apart longitudinally thereof, belt conveyor means extending longitudinally of said housing between said top and said partition walls and including belt rollers journaled in said top and partition walls at spaced apart locations along said housing, flexible endless belts trained around said rollers and disposed in end to end relationship to each other, pressure plates disposed one between each two adjacent openings in said one side wall and against the sides of said belts adjacent said one side wall, spring means resiliently urging said pressure plates against said belts, power means disposed in said housing between said partition wall and said bottom wall and drivingly connected to said belt rollers for driving said belts, movable gates disposed in said housing one between each of said outlet openings and said belts for selectively deflecting objects from said conveyor means through said outlet openings, and electrically actuated means carried partly by said pressure plates and connected to said gates for operating the latter in response to code designations on objects passing along said conveyor means.

2. A device for sorting articles in accordance with a predetermined code indication provided on the articles comprising an elongated housing having a top wall, a bottom wall, a partition wall between said top and bottom walls, and side walls extending along the longitudinal edges of said top, bottom and partition walls, one of said side walls having an inlet opening at one end thereof and outlet openings spaced apart longitudinally thereof, main belt conveyor means extending longitudinally of said housing between said top and said partition walls and including belt rollers journaled in said top and partition walls at spaced apart locations along said housing, flexible endless belts trained around said rollers and disposed in end to end relationship to each other, pressure plates disposed one between each two adjacent openings in said one side wall and against the sides of said belts adjacent said one side wall, and spring means resiliently urging said pressure plates against said belts, auxiliary conveyor means comprising belt rollers disposed immediately below said partition wall at spaced apart locations along said housing and journaled in said side walls, and belts trained over said rollers and disposed in end to end relationship with one part of each belt disposed above said partition wall and extending along the bottom edges of the belts constituting said main belt conveyor, power means mounted in said housing between said bottom wall and said partition wall and drivingly connected to said belt rollers for driving said main and auxiliary conveyors, movable gates disposed in said housing one between each of said outlet openings and said belts for selectively deflecting objects from said conveyor means through said outlet openings, and electrically actuated means carried partly by said pressure plates and connected to said gates for operating the latter in response to code designations on objects passing along said conveyor means.

3. Mechanism for sorting mailing envelopes comprising electrically conducting elements disposed one on each envelope at a location spaced along one edge of the envelope a predetermined distance from a second edge disposed at right angles to said one edge, an elongated support, conveyor means mounted on said support and including an endless belt, movable gates carried by said support at locations spaced apart along said conveyor means, pressure plates disposed one between each two adjacent gates with flat surfaces opposed to the adjacent flat surface of said belt and resiliently pressing envelopes against said belt with said one edge of each envelope extending transversely of an edge of said belt, and means connected to said gates and responsive to code designations on the envelopes passing along said conveyor means to selectively open said gates in accordance with predetermined code designations and discharge the envelopes from said conveyor means including detectors carried one by each of said pressure plates with the detectors on the several pressure plates disposed at different predetermined distances from common edges of said pressure plates parallel to the edges of said belt and each detector including a pair of spaced apart contacts interconnected by an envelope carried element located to engage the contacts of a specified detector.

4. Mechanism for sorting mailing envelopes compris-

ing selectively exposable detector actuating elements spaced apart along at least two perpendicularly related edges of each envelope, an elongated support, conveyor means mounted on said support for carrying envelopes along said support with one of said two edges of each envelope extending transversely of the direction of travel of said conveyor means, movable gates carried by said support at locations spaced apart along said conveyor means, detector means disposed at locations spaced apart along said conveyor means and connected one to each of said gates and responsive to the location of the actuator elements on envelopes passing along said conveyor means to selectively open said gates in accordance with predetermined locations of said actuator elements and discharge envelopes in sorted condition from said conveyor means, and means carried by said support at the end of a series of detector means corresponding in number to the number of detector actuating elements along said one of said two edges of an envelope effective to receive envelopes passing along said conveyor means, turn each envelope to a position at which the other of said two edges thereof extends transversely of the direction of travel of said conveyor means and return the envelopes to the conveyor means for movement of the envelopes past a second series of detector means.

5. Mechanism for sorting mailing envelopes comprising detector actuating elements exposed one on each envelope at predetermined locations along corresponding edges of the envelopes, conveyor means having an envelope receiving end at which envelopes are fed consecutively into said conveyor with their edges adjacent which the corresponding actuator elements are disposed extending transversely of the direction of travel of said

conveyor means and disposed at the front ends of the envelopes in the direction of travel of the envelopes along said conveyor means, gates disposed at spaced apart locations along said conveyor means and selectively movable to deflect envelopes from said conveyor at the locations of the selected gates, detectors disposed one between each two adjacent gates and at different predetermined positions from one edge of said conveyor means for selective engagement by said envelope carried actuator elements in accordance with the positions of the elements along the front edges of the associated envelopes, electrically energized means controlled by said detectors and selectively moving said gates in accordance with the actuation of said detectors by said detector actuating elements to discharge envelopes from said conveyor means in a sorted condition, and a manually operated control for said conveyor means effective to temporarily reverse the direction of operation of said conveyor means to clear the sorting mechanism from a clogged condition.

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