

Dec. 13, 1966

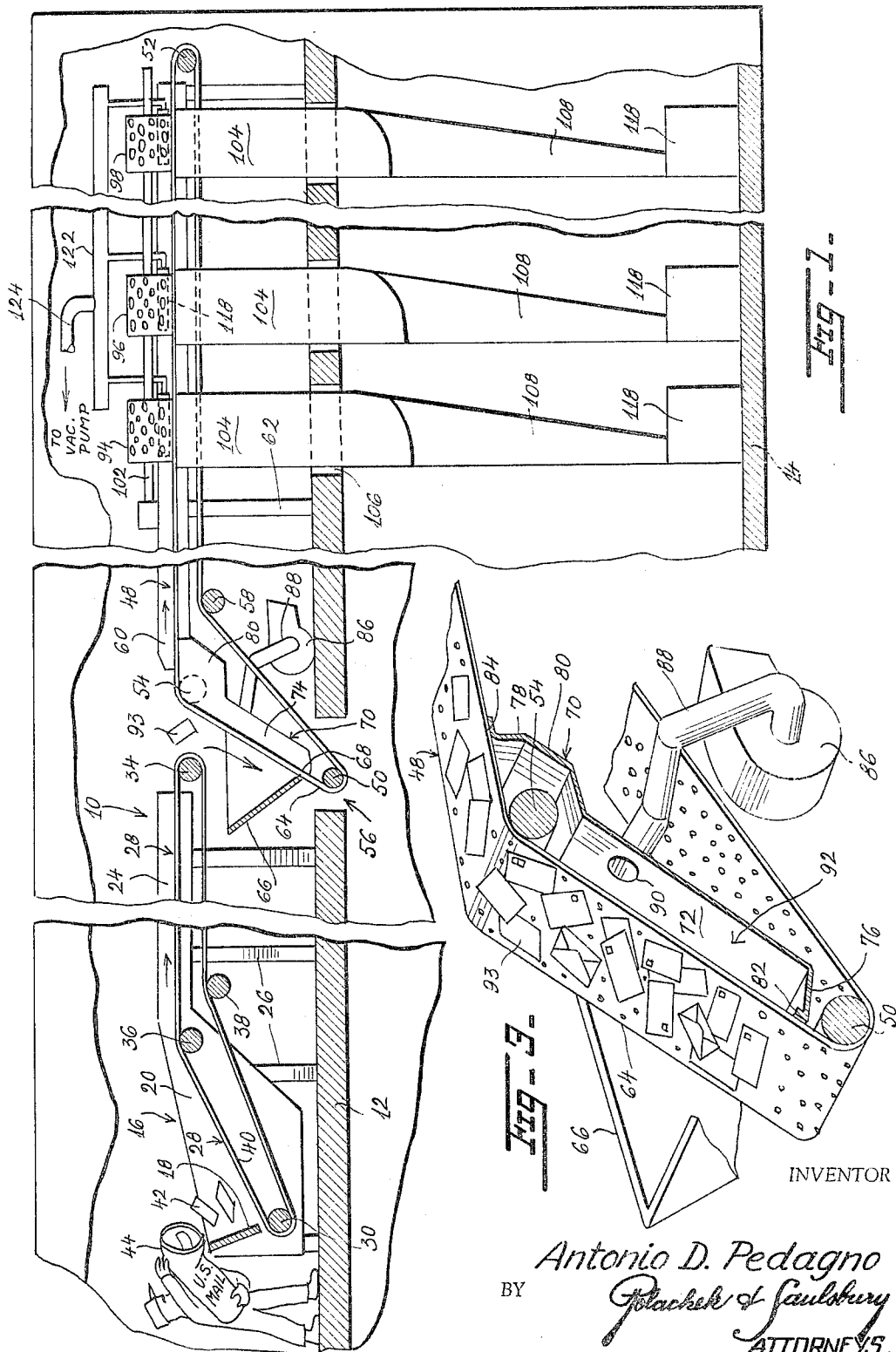
A. D. PEDAGNO

3,291,282

MAIL FEEDING EQUIPMENT

Filed June 10, 1965

5 Sheets-Sheet 1





Dec. 13, 1966

A. D. PEDAGNO  
MAIL FEEDING EQUIPMENT

3,291,282

Filed June 10, 1965

5 Sheets-Sheet 3

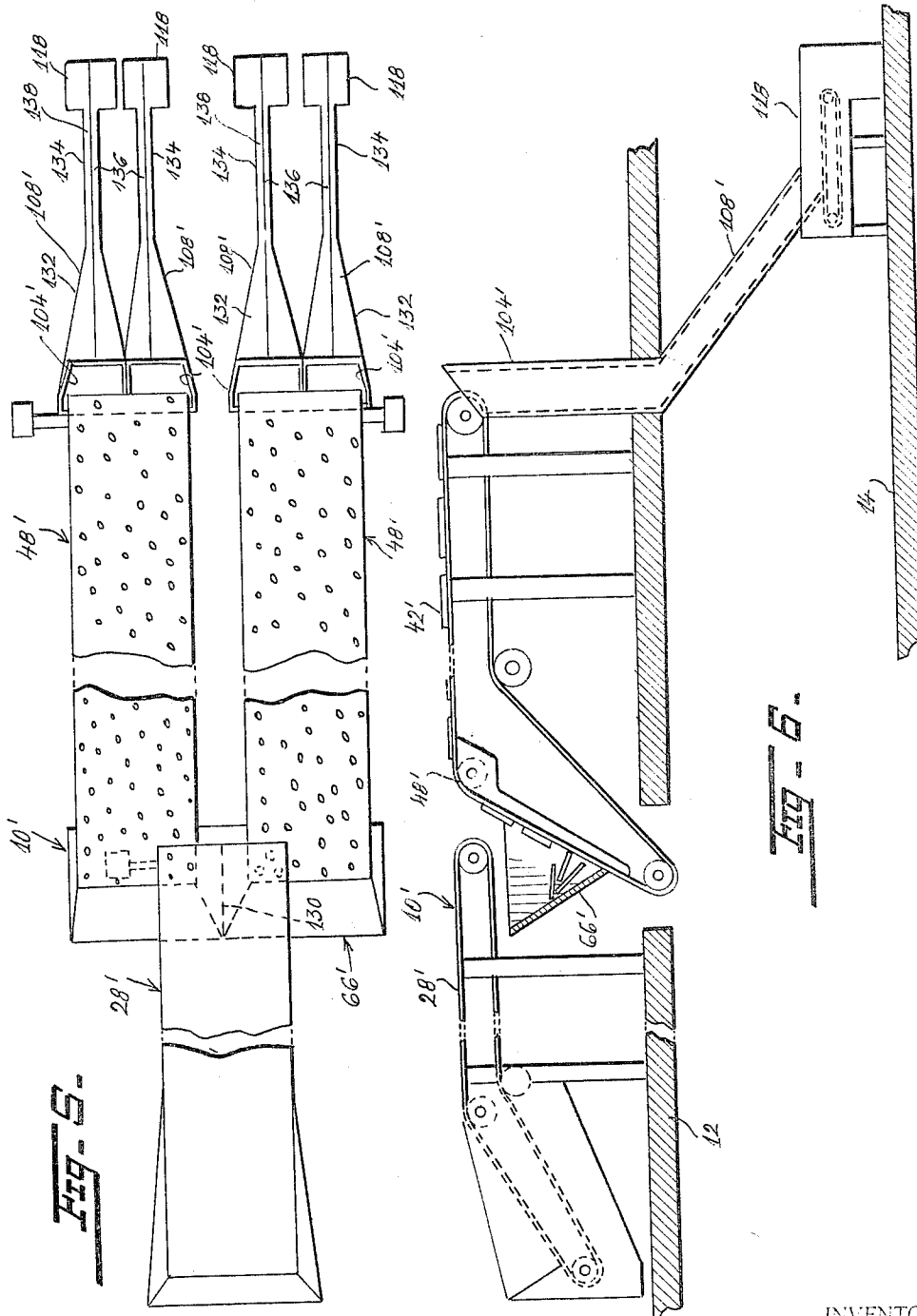


FIG. 5.

FIG. 6.

INVENTOR.  
Antonio D. Pedagno  
BY  
*Polack & Saulsbury*  
ATTORNEYS.

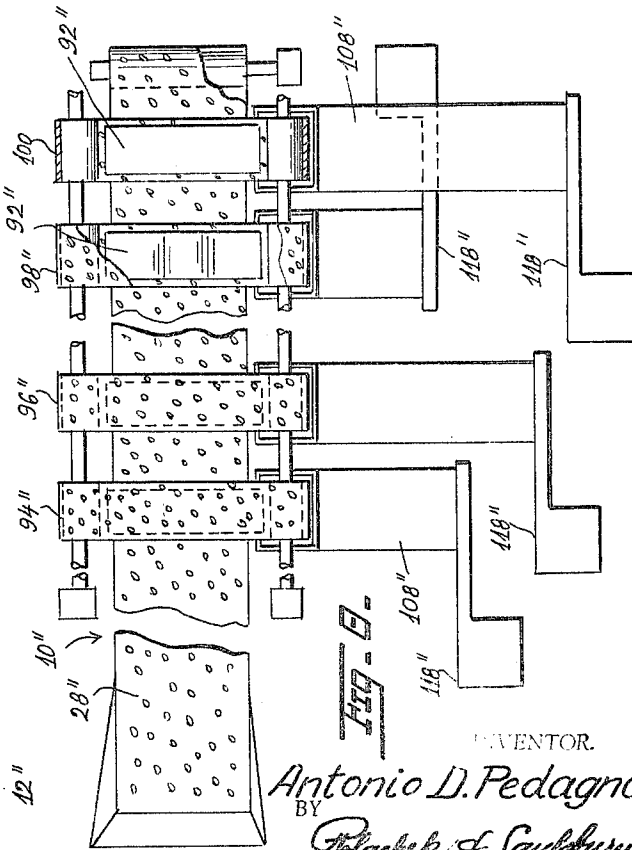
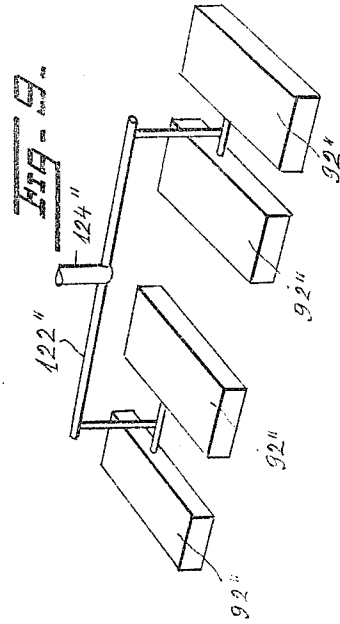
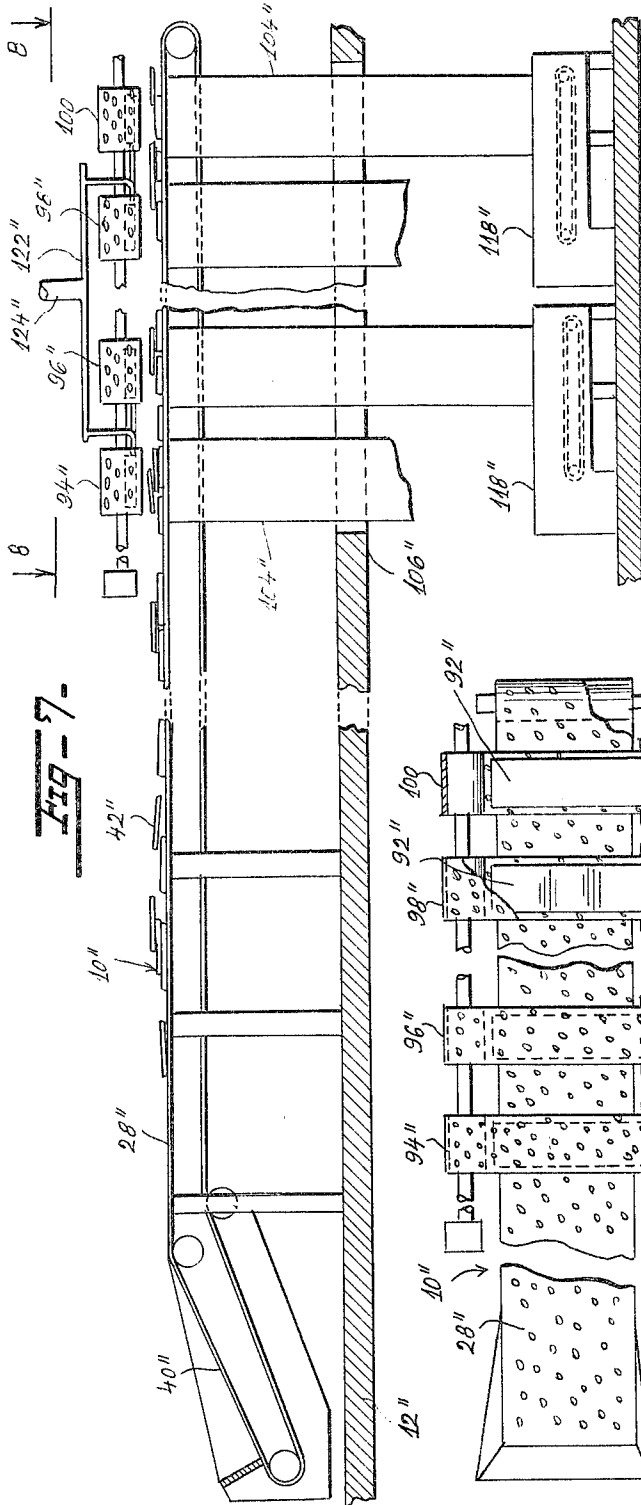
Dec. 13, 1966

A. D. PEDAGNO  
MAIL FEEDING EQUIPMENT

3,291,282

Filed June 10, 1965

5 Sheets-Sheet 4



INVENTOR.  
*Antonio D. Pedagno*  
 BY  
*Polach & Sautsbury*  
 ATTORNEYS

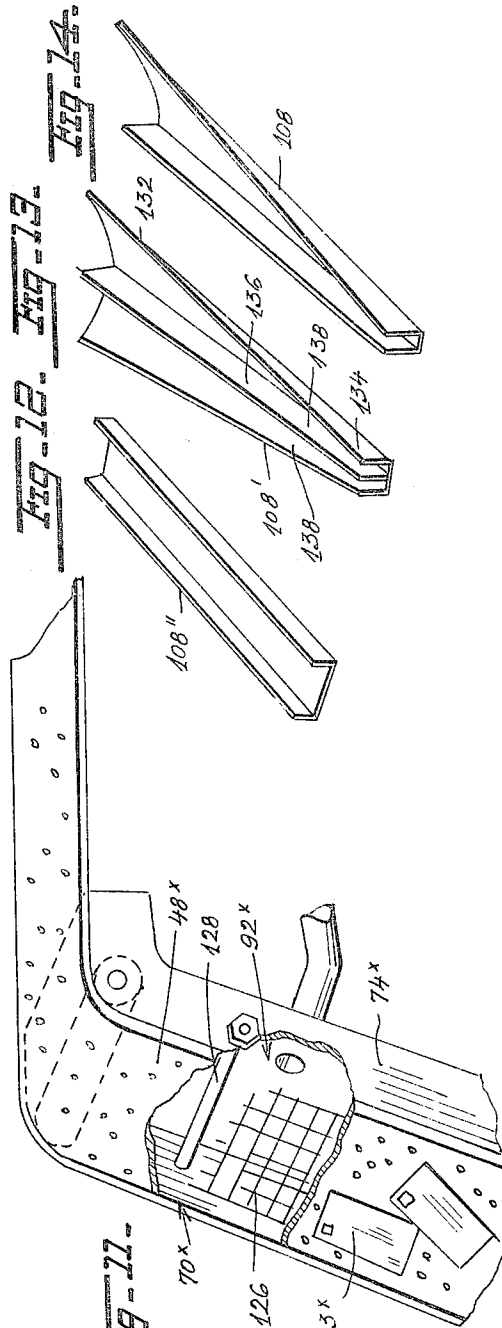
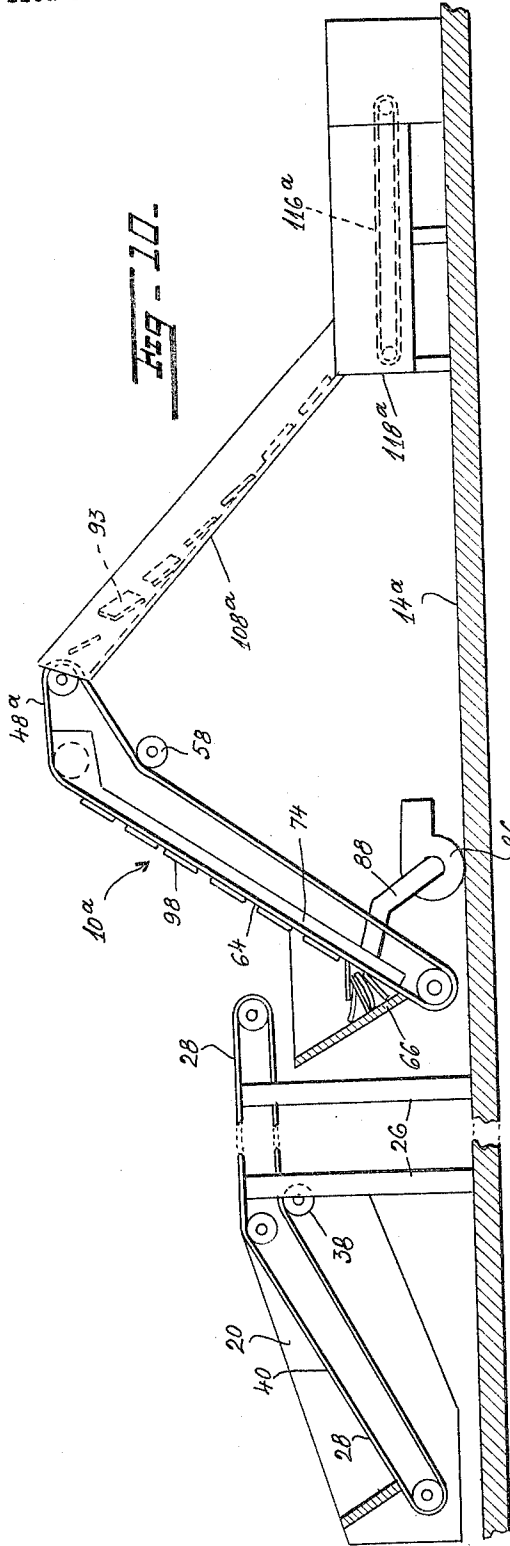
Dec. 13, 1966

A. D. PEDAGNO  
MAIL FEEDING EQUIPMENT

3,291,282

Filed June 10, 1965

5 Sheets-Sheet 5



INVENTOR.  
*Antonio D. Pedagno*  
 BY *Polach & Saulsbury*  
 ATTORNEYS.

1

3,291,282

MAIL FEEDING EQUIPMENT

Antonio D. Pedagno, 588 Henry St., Brooklyn, N.Y.

Filed June 10, 1965, Ser. No. 462,975

12 Claims. (Cl. 198-66)

This invention relates generally to mail feeding equipment and more particularly to mail feeding equipment by the use of which the necessary procedure of feeding culled mail is greatly facilitated and space economized.

A typical mail feeding and culling procedure involves the constant movement of personnel between the receiving and cancelling and bundling stations, and because of this movement of personnel the work has been carried out on one floor level necessitating the provision of a great amount of floor space and large loss of time and in turn of the work of the mail sorters.

An object of the invention is to arrange the culling and cancelling stations at different levels whereby gravity feed of the mail from station to station may be utilized.

Another object of the invention is to provide mechanical mail feeding and culling equipment which is simple in design and has a minimum of working parts resulting in avoidance of mechanical failure and less cost of maintenance.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIGURE 1 is a view, part sectional, part elevational and part diagrammatical, of mail feeding equipment embodying the invention and suitable for sorting large volumes of mail, parts being shown broken away, a bag of mail being shown dumped into the equipment for culling.

FIG. 2 is a top plan view thereof, the mail being omitted.

FIG. 3 is an enlarged cross sectional view taken on the line 3-3 of FIG. 2, mail being shown on the endless belt.

FIG. 4 is a sectional view taken on the line 4-4 of FIG. 2, mail being shown.

FIG. 5 is a view similar to FIG. 2 of mail feeding equipment embodying a modified form of the invention.

FIG. 6 is a side elevational view thereof, parts being shown broken away, mail being shown transported.

FIG. 7 is a similar view of mail feeding equipment embodying another modified form of the invention.

FIG. 8 is a top plan view as seen along the line 8-8 of FIG. 7.

FIG. 9 is a top perspective detail view of the suction chamber and manifold of FIG. 7.

FIG. 10 is a side elevational view of mail feeding equipment embodying yet another modified form of the invention, parts being shown broken away, mail being shown transported.

FIG. 11 is a detail perspective view of modified form of suction chamber, parts being shown broken away.

FIGS. 12, 13 and 14 are detail perspective views of modified forms of slide chutes.

Referring more in detail to the drawings and particularly to FIG. 1, mail feeding and culling equipment embodying a preferred embodiment of the invention is shown and indicated generally at 10. The equipment 10 is shown diagrammatically mounted on a mezzanine floor 12 and on the main floor 14 of the structure, such as a post office. On the mezzanine floor 12, at one end, there is shown a chute 16 having an inwardly slanting outer end wall 18 and inwardly slanting side wall 20, 20 with rectangular

2

shaped inwardly projecting extensions 24, 24. The chute is supported by spaced vertical posts 26.

A perforated endless belt 28 extends from the outer end of the chute to the inner end thereof. The belt 28 is trained around a shaft 30 at the outer end thereof, a shaft 34 at the inner end thereof and a shaft 36 intermediate the ends thereof, and over a guide shaft 38 intermediate the ends of the belt. The outer shaft 30 is disposed in a plane below the plane of the other shaft so that the belt is provided with a slanting uphill portion 40 onto which mail in the form of letters 42 is dumped from a mail bag 44 as seen in FIG. 1. Shaft 34 is operatively connected to an electric motor 35.

Another perforated endless belt 48 is provided closely spaced from the inner end of belt 28. Belt 48 is trained around a shaft 50 at one end thereof, the left hand end as viewed in FIG. 1, a shaft 52 at the other end, and a shaft 54 intermediate the ends. Shafts 52 and 54 are on the same plane as the shafts 34 and 36 of belt 28. The shaft 50 is disposed on a lower plane than the plane of the shaft 50 and 52 and is disposed in an opening 56 in the mezzanine floor 12. The belt 48 is also trained around a guide shaft 58 disposed slightly below the shafts 52 and 54. The shafts are suitably journaled in side supports and shaft 52 is operatively connected to a motor 53. The upper reach of the belt 48 extends along elongated strips 60 supported by vertical posts 62 to prevent mail from falling off of the belt. The belt 48 in following the shafts is provided with an uphill slanting portion 64. A chute 66 similar in shape to the body of chute 16 is suitably mounted on the mezzanine floor 12 above the opening 56 in the mezzanine floor underneath the inner end of the belt 28 so that letters are adapted to fall by gravity into the chute 66 as seen in FIG. 1. The slanting uphill portion 64 of belt 48 extends downwardly into the chute 66 below the bottom thereof and through an opening 68 in the bottom thereof to the rear of the chute. A metal channel-shaped casing 70 having a base wall 72, opposed side walls 74, and end walls 76 and 78 is suitably mounted on the chute 66 below the slanted uphill portion 64. The casing is formed with an enlargement 80 adjacent its top end 78 to provide clearance for the cross shaft 54 which extends out through holes in the side walls 74. The belt 28 moves over the open top of the casing 70 forming the closure for the top, the belt riding over and guided by an inwardly extending flange 82 on the end wall 76 and an outwardly extending flange 84 on the end wall 78. A vacuum pump 86 is mounted on the mezzanine floor 12 adjacent the casing 70, which pump is connected to the interior of the casing 70 by a pipe 88 leading to an inlet 90 in the base wall 72 of the casing. The casing 70 and belt 28 thus define a suction chamber 92.

Mail, such as the letters 93 that has been left remaining after the culling operation, falls by gravity into the chute 66 and is sucked by the pump 86 flat against the outer surface of the slanted uphill portion 64 of belt 48 and carried upwardly to the topmost reach of the belt and then carried forwardly or toward the right as viewed in FIG. 1 in the direction of the arrow.

Referring particularly to FIG. 2, a number of perforated spaced endless belts are suitably mounted on the elongated strips 60 and extend over and across the belt 48 closely spaced thereabove. Three belts, 94, 96 and 98 are shown and each is trained around rollers 100 fixed on shafts 102 extending along both sides of the belt 48. Vertically disposed tubular drop or gravity chutes 104 are suitably supported in openings 106 formed in the mezzanine floor 12 adjacent one side of the belt. Each gravity or drop chute 104 continues into an integral slide chute 108 slanting downwardly and laterally from the

3

drop chute 104. Each slide chute 108 has one side 110 slanting inwardly toward the other opposite side 112 thereby forming a guide for the letters to guide the letters to one side of the chute, toward the side 112, and into a narrow extension 114, open at its free end, and leading to an endless belt 116 mounted in an elongated casing 118 supported on the main floor 14 therebelow. The belt 116 brings the culled letters in proper position to the cancelling and bundling stations.

With particular reference to FIG. 4, in accordance with the invention, a rectangular inverted pan-shaped shallow casing 118 is suitably mounted on the side strips 60 and positioned inside each endless belt 94, 96 and 98 with the lower reach of the belt closing the bottom open end of the casing as viewed in FIG. 4. The casing 118 and endless belt 94 constitute a suction chamber 120 suitably and operatively connected to a manifold 122 including a pipe 124 operatively connected to the vacuum pump 86. The suction chambers of all of the endless belts are operatively connected to the vacuum pump by means of the manifold 122.

In operation, a bag 44 of mail in the form of letters of all classes is dumped into the trough 16 onto the upwardly moving endless belt portion 40 of belt 28. A mail sorter is stationed on each side of the belt 28 and manually culls out the letters it is not desired to process. The letters that are left are carried by the endless belt 28 to the end thereof where they drop by gravity down into the trough 66 and during their fall they are sucked onto the surface of the uphill slanting portion 64 of the belt 48 by means of the suction pump 86 and suction chamber 92 therebehind. The letters are carried along the top reach of belt 48 until they reach the first transverse belt, such as belt 94, whereupon the vacuum pump 86 and manifold 122 suck the letters off of belt 48 onto the bottom reach of belt 94 as shown in FIG. 4 and carry such letters to the outer end of the belt 94 where they drop by gravity into the drop chute 104 therebelow and from chute 104, the letters slide down through slide chute 108 into the narrow extension 114 thereof and off of extension 114 onto the endless belt 116 that carries them to the cancellation and bundling stations (not shown).

In FIGS. 5 and 6, mail feeding and culling equipment 10' embodying a modified form of the invention is shown. The equipment 10' differs from the equipment 10 of FIG. 1 in that a pair of endless belts 48', 48' receive the culled letters 93' from the endless belt 28'. This necessitates a wider chute 66', extending from side to sides of the belts 48', 48'. Midway its ends, the chute 66' is formed with a transverse partition 130 so that when the letters fall off the end of belt 28', they strike the partition 130 and fall on both sides of the partition, some falling on one of the belts 48' and other letters falling on the other of said belts 48', thereby dividing the load. At the exit end of each belt 48', two drop or gravity chutes 104' are provided, each drop chute continuing into an integral slide chute 108'. The slide chute 108' as seen in FIG. 13 consists of a flaring portion 132 joined to the end of the drop chute which flaring portion continues into a narrow channel-shaped portion 134. A central partition wall 136 extends centrally of the body of the chute from end to end thereof dividing the body of the chute into two compartments 138, 138 leading to the cancelling and bundling stations.

Another modified form of mail feeding and culling equipment 10'' is shown in FIGS. 7 to 9, inclusive. The equipment 10'' includes only a single long endless belt 28'' that receives the mail in the form of letters 42'' and carries them initially uphill where they are manually culled at portion 40'' and then along the top reach of the belt. A plurality of spaced transverse belts 94'', 96'', 98'' and 100 similar in arrangement end construction to the belts 96, 97 and 98 FIG. 1 terminate at one end over drop chutes 104'' extending through openings 106'' in the mezzanine floor 12'' where they continue into down-

4

wardly slanting channel-shaped slide chutes 108'' that lead to endless belts (not shown) in casings 118'', the endless belts leading in turn to cancellation and bundling stations. The latter endless belts and casings are disposed at various horizontal and vertical planes on the main floor 14'', as shown in FIG. 8 so as to save space. The suction chambers 92'' of the transverse endless belts are actuated by means of the manifold 122'' operatively connected by means of the pipe 124'' to a vacuum pump such as the pump 86 in FIG. 1.

The modified form of mail feeding and culling equipment 10a shown in FIG. 10 is installed on the main floor 14a. The perforated receiving endless belt 48a has a very short horizontal portion, the end of which is received in the top end of the slide chute 108a, which chute leads directly to the endless belt 116a in casing 118a. Belt 116a leads to the cancellation and bundling stations. The slide chute 108a may be similar in construction to the slide chute 108' shown in FIG. 13.

In all other respects, the equipment 10a is similar to the equipment 10 and similar reference numerals are used to indicate similar parts.

In FIG. 11, a modified form of suction chamber 92x is shown wherein the open top of the channel-shaped casing 70x is spanned by a wire grill or mesh 126 over which the perforated endless belt 48x moves carrying the letters 93x. A reinforcing bar 128 may be fastened to the side walls 74x of the chamber. The grill or mesh 126 adds rigidity to the chamber and gives body to the endless belt 48x.

While I have illustrated and described the preferred embodiments of the invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

What is claimed is:

1. Equipment for effecting a first culling followed by delivery to final collection receptacles of flat articles such as pieces of mail or cards, comprising: a first trough receiving mail promiscuously; a first receiving movable endless belt for carrying said mail forwardly in position to be manually culled; a second trough at the inner end of said endless belt disposed in a plane below the end of the belt; a second movable receiving perforated endless belt having one end movable through said second trough and adapted to carry mail from said second trough; air suction means in said second trough for sucking mail from the second trough onto said one end of the perforated belt; means for moving said second endless belt; a series of space transverse movable perforated endless belts disposed across the top of the second endless belt and closely spaced therefrom; air suction means associated with said transverse belts for sucking mail off of the second endless belt onto said transverse belts; means for moving said transverse belt, a gravity chute at the end of each transverse belt adapted to receive the mail carried by said adjacent transverse belt; and a slide chute operatively connected to each gravity chute for guiding mail to a movable endless belt, said latter belt leading to a collection receptacle.

2. Equipment as defined in claim 1 wherein the air suction means in said second trough includes an air suction chamber associated with the end of the endless belt in said second trough and a suction pump operatively connected to said suction chamber.

3. Equipment as defined in claim 1 wherein the air suction means associated with each transverse endless belt includes a suction chamber associated with the respective transverse endless belt, a suction pump, and a manifold operatively interposed between the pump and suction chamber.

4. Equipment as defined in claim 1 wherein the air suction means in said second trough includes an air suction chamber associated with the end of the endless belt

5

in said second trough and a suction pump operatively connected to said suction chamber, and wherein the suction means associated with each transverse endless belt includes a suction chamber associated with the respective transverse endless belt, a suction pump, and a manifold operatively interposed between the pump and suction chamber.

5. Equipment as defined in claim 1 wherein the slide chutes each includes an elongated channel-shaped body, with one side of the body tapering toward the other side thereby producing a restricted end of the body leading to the adjacent endless belt.

6. Equipment as defined in claim 1 wherein the first trough has an opening in the bottom thereof and wherein the adjacent end of the first endless belt extends through said opening and extends upwardly to the top of said trough, and wherein the second trough has an opening in the bottom thereof and the adjacent end of the second endless belt extends through said latter opening, and extends upwardly to the top of said second trough.

7. Equipment as defined in claim 1 wherein the troughs and endless belts are supported on a mezzanine floor and wherein the mezzanine floor has openings to receive the gravity chutes, and wherein the slide chutes lead to a main floor on a lower level than the mezzanine floor.

8. Equipment as defined in claim 1 wherein the suction chamber includes a base wall, side walls and end walls and being open at the top, and a wire mesh spanning the open top.

9. Equipment as defined in claim 1 wherein the suction chamber includes a base wall, side walls and end walls and being open at the top, a wire mesh spanning the open top and a bar extending across the space between the side walls for reinforcing the chamber.

6

10. Equipment for effecting a first culling followed by delivery to final collection receptacles of flat articles such as pieces of mail or cards, comprising: trough for receiving mail promiscuously; an elongated movable endless belt, one end of the belt extending to the bottom of said trough, the mail on said extension adapted to be culled manually, said belt extending forwardly of said trough carrying the culled mail, means for moving said endless belt, a series of space transverse movable perforated endless belts disposed across the top of said endless belt and closely spaced therefrom, air suction means associated with said transverse belts for sucking mail off of the first named endless belt onto said transverse belts, means for moving said transverse belts, a gravity chute at the end of each transverse belt adapted to receive the mail carried by said adjacent transverse belt and a slide chute operatively connected to each gravity chute for guiding mail to a movable endless belt, said latter endless belt leading to a collection receptacle.

11. Equipment as defined in claim 10 wherein the slide chutes each has a channel-shaped body.

12. Equipment as defined in claim 10 wherein the slide chutes terminate at different horizontal planes thereby conserving space.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

30	2,609,912	9/1952	Engel	-----	198—48
	2,941,653	6/1960	Kniemelmeyer	-----	198—31
	2,961,085	11/1960	Stovall	-----	198—30

MARVIN A. CHAMPION, *Primary Examiner.*

35 RICHARD E. AEGERTER, *Examiner.*