United States Patent

[11] 3,601,282

[72] Inventor **Leo G. Vogel**
Box 227, Downingtown, Pa. 19335

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[22] Filed **June 23, 1969**
[45] Patented **Aug. 24, 1971**

[54] **APPARATUS FOR DISPENSING FLANGED ELEMENTS FROM A STACK THEREOF**
19 Claims, 32 Drawing Figs.

[52] **U.S. Cl.** **211/251,** 222/298
[51] **Int. Cl.** **B65g 59/06**
[50] **Field of Search** 221/251, 273, 274, 295, 297, 223, 298

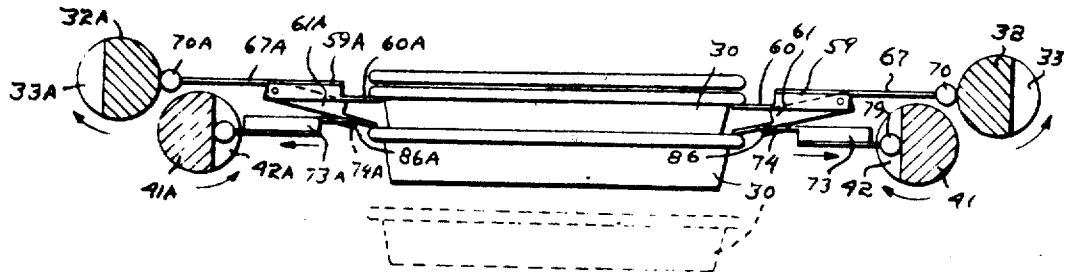
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Primary Examiner—Lloyd L. King
Assistant Examiner—John J. Love
Attorney—Abbott Spear

ABSTRACT: Apparatus is disclosed for dispensing such flanged elements as trays and plates from a stack thereof. The apparatus has a pair of units spaced apart to receive the stack between them and each unit includes a pair of blades vertically spaced by a distance equal to the thickness of the margins of the elements and movable into and out of margin supporting position. Operating means provide a cycle in which the stack is first supported by the upper blades, then by the lower blades, the upper blades then returned to their supporting position and the lower blades retracted to release the lowermost element. When the lowermost elements may adhere to the stack, pry means are provided to become operative when the lower blades are retracted. Fluid-pressure and cam-operated embodiments of the apparatus are detailed.



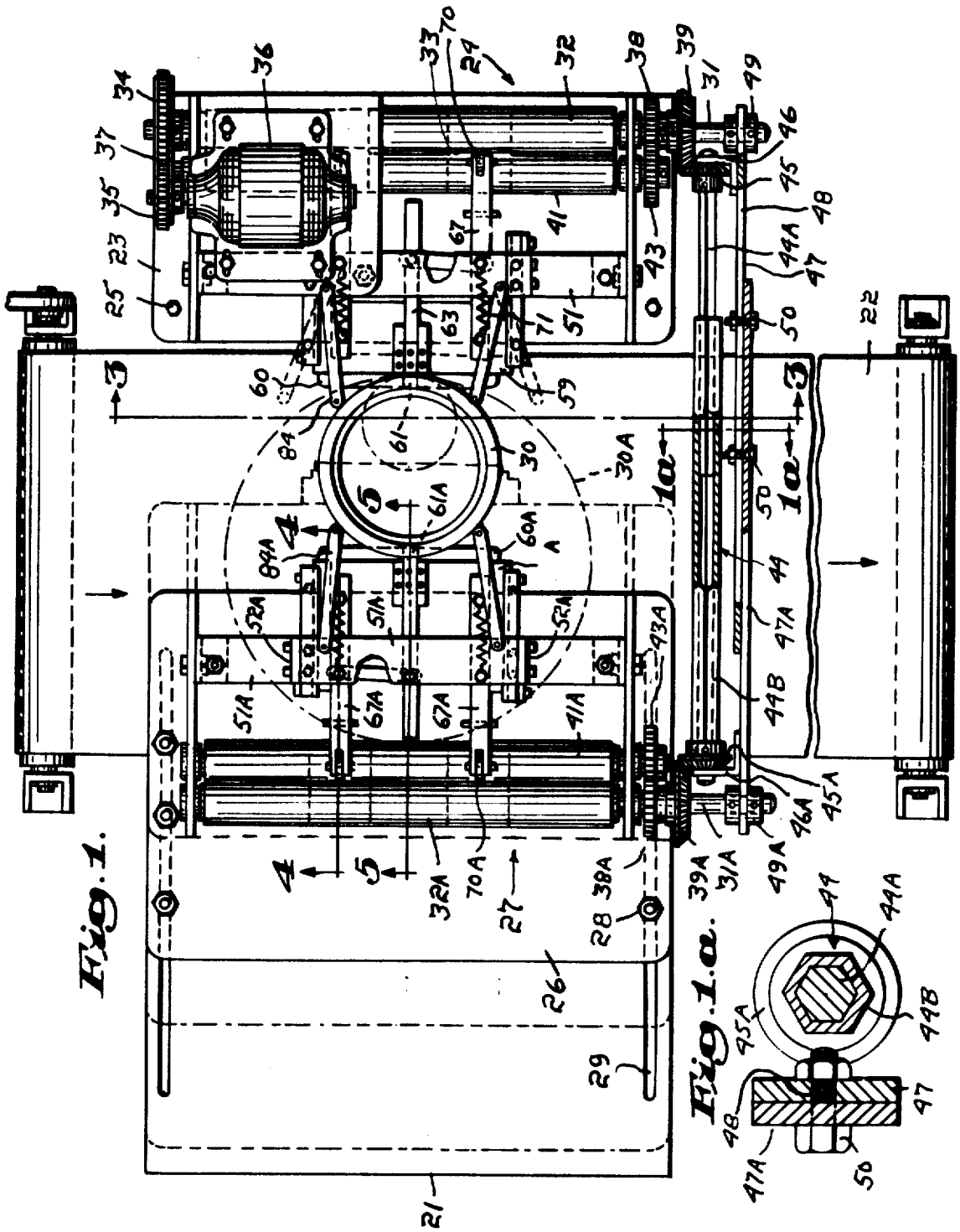


Fig. 1.

Fig. 1a.

Inventor:
Leo G. Vogel,
By Abbott Spear,
Attorney

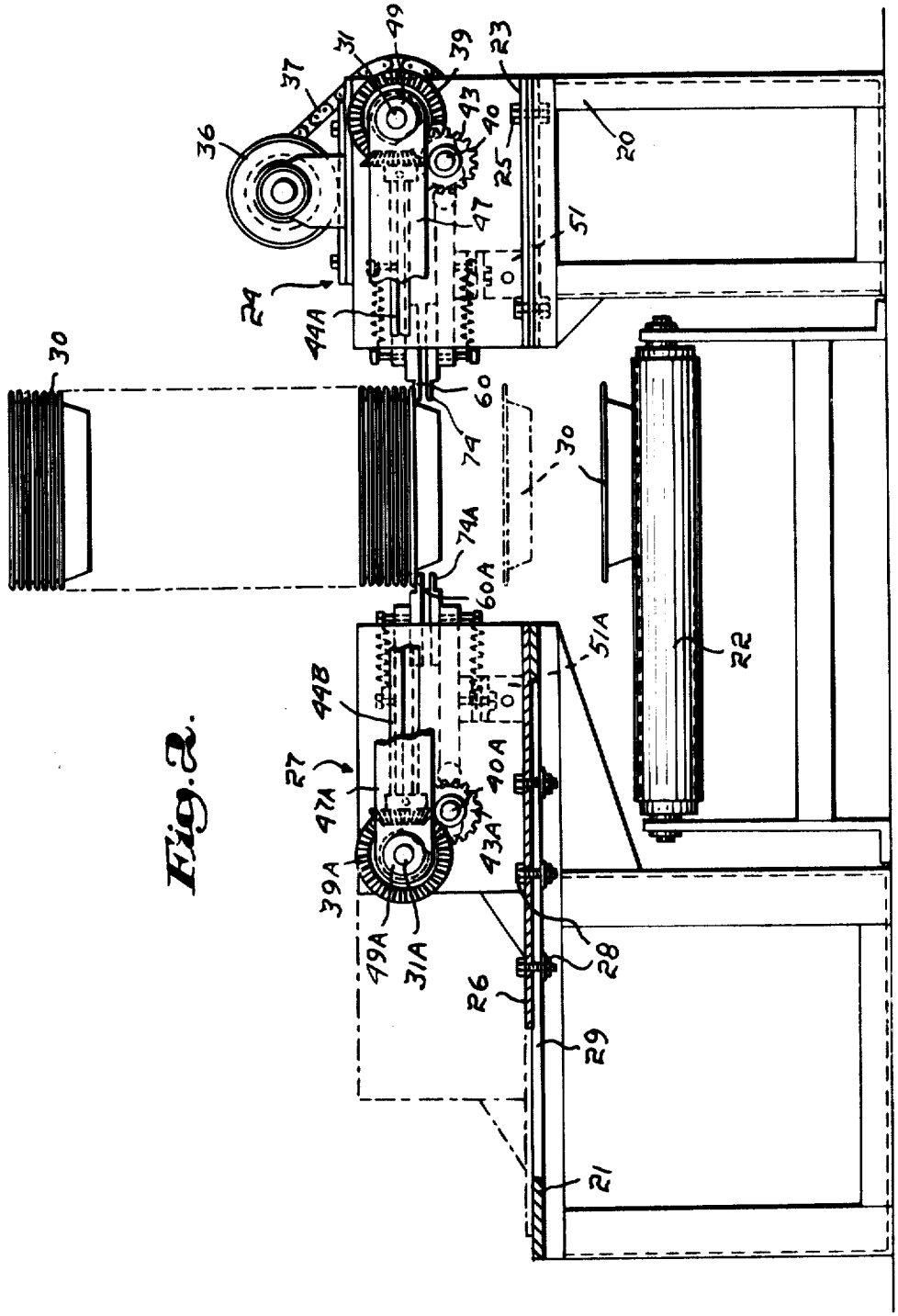


Fig. 2.

Inventor:
Leo G. Vogel,
by Albert Spencer
Attorney

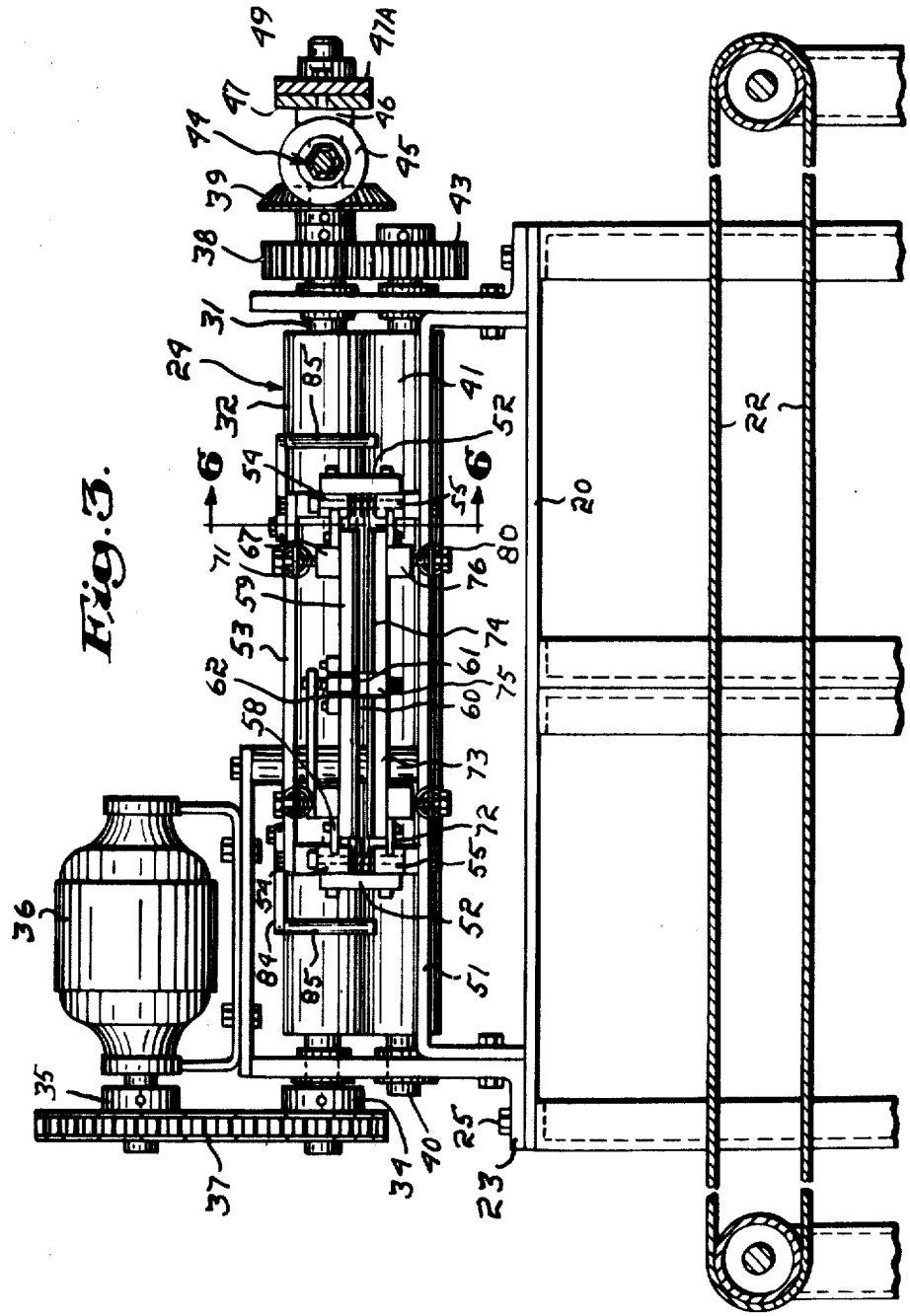


Fig. 3.

Inventor:
Leo G. Voget,
by Abbott Spear,
Attorney

Fig. 4.

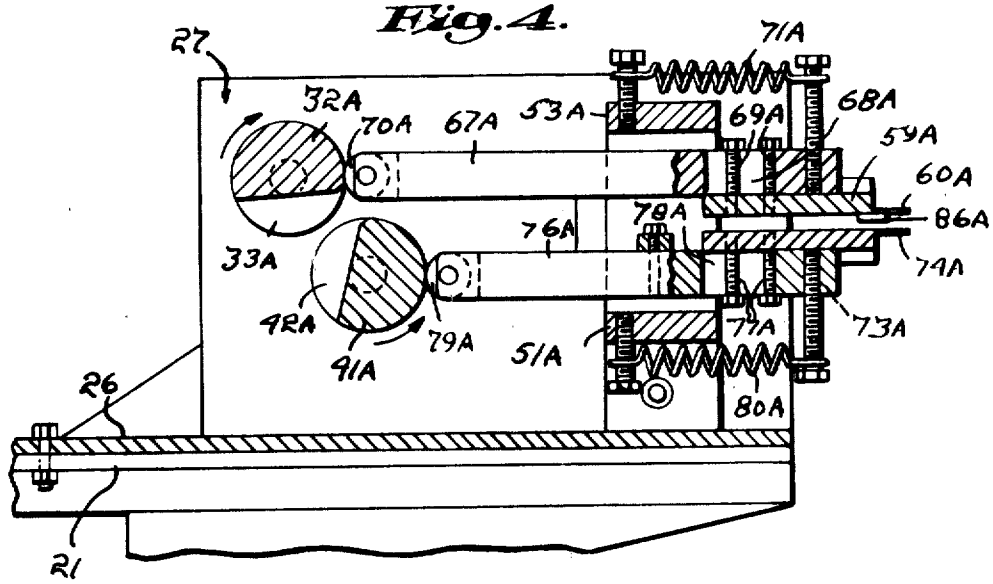


Fig. 5.

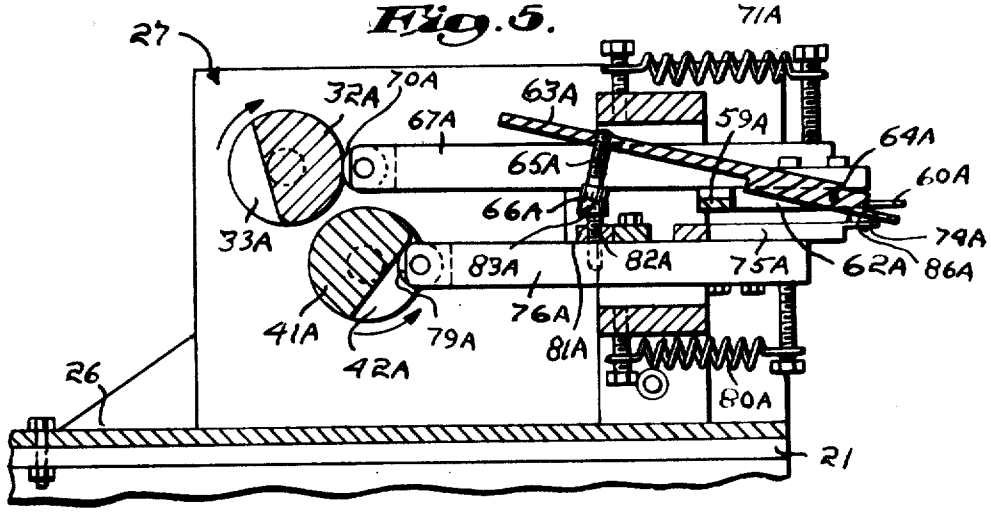
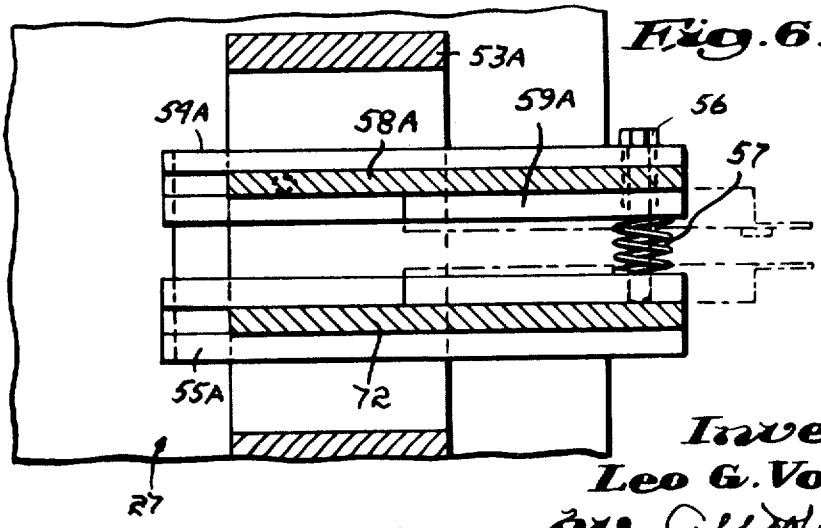
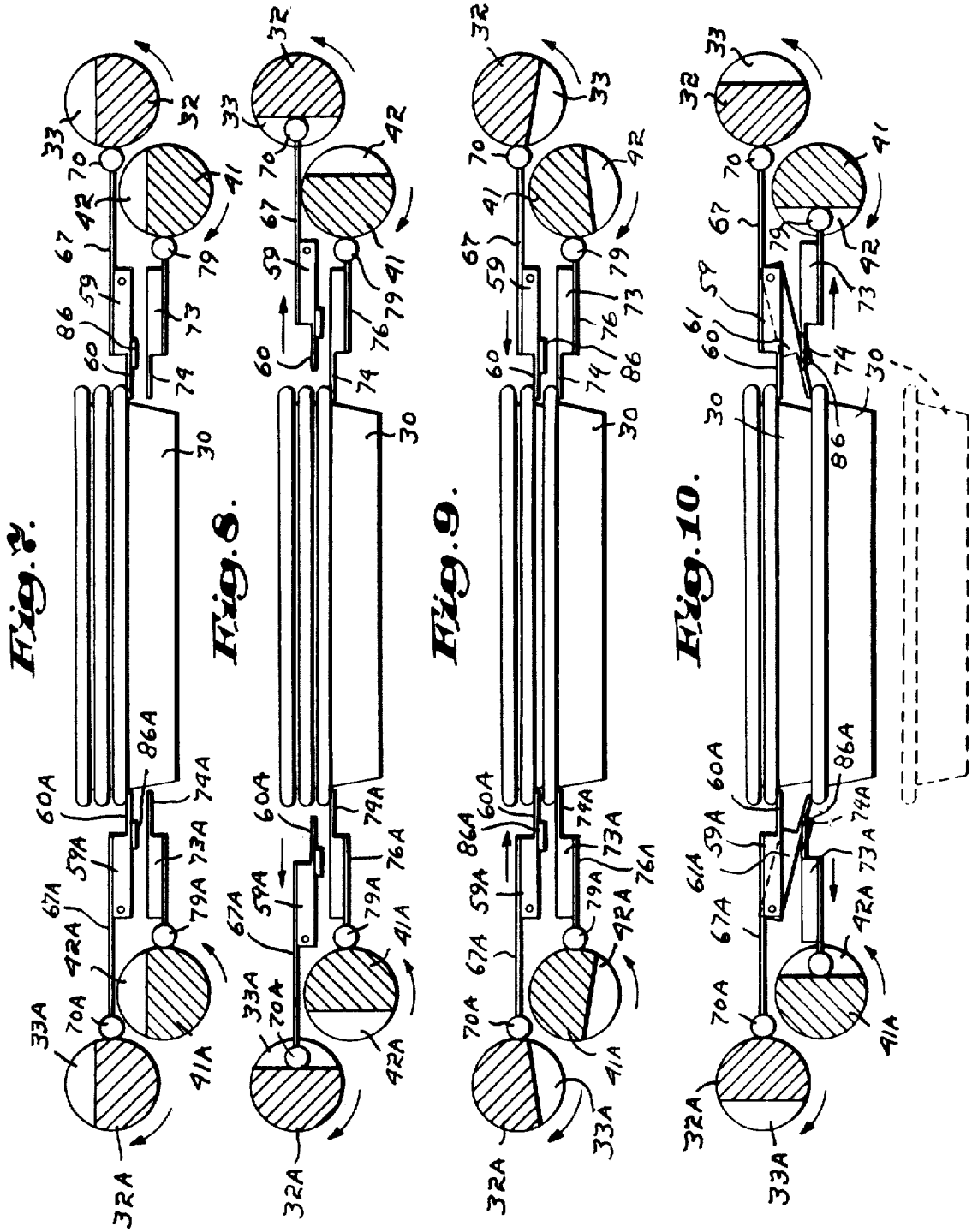


Fig. 6.



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

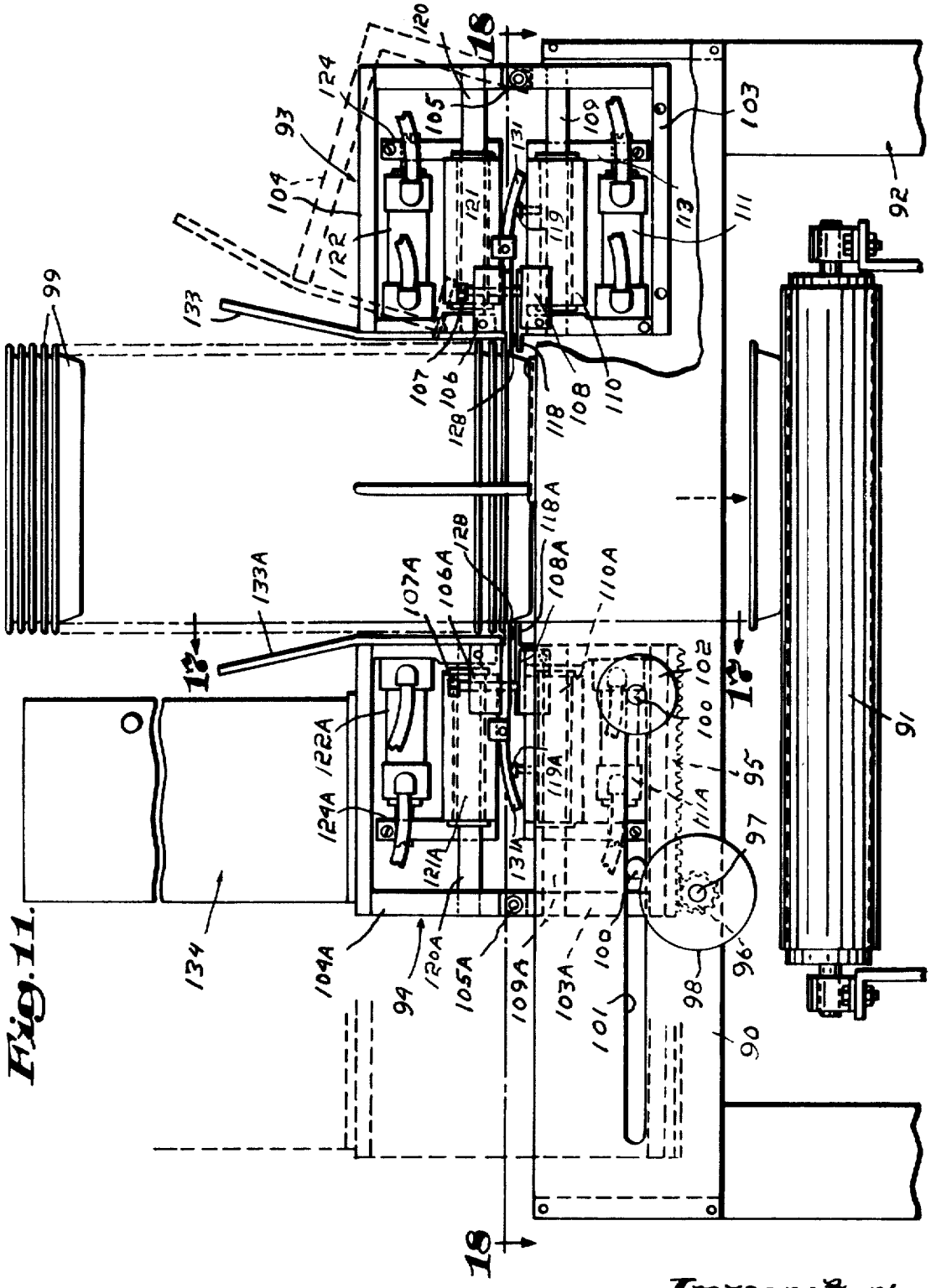
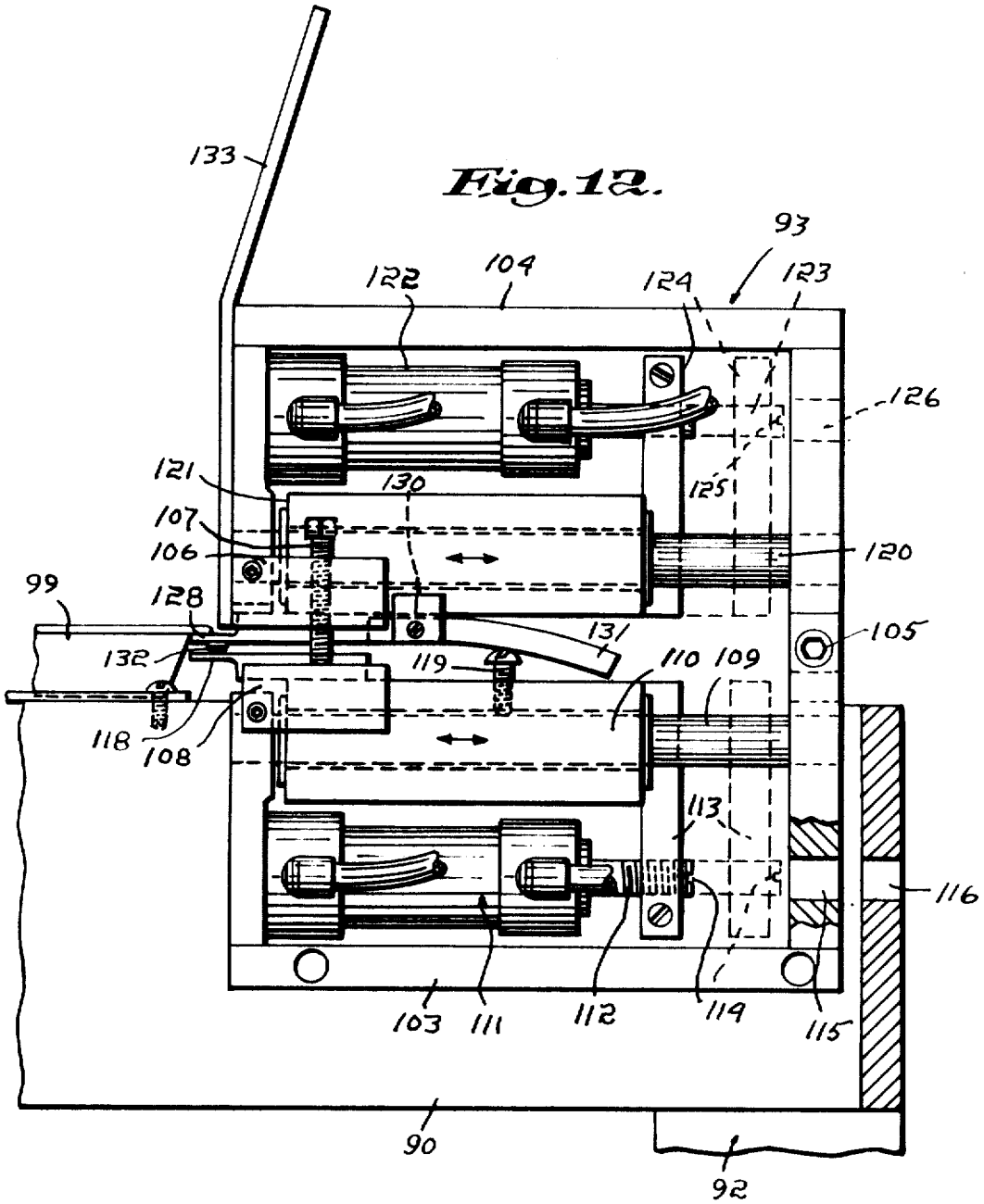


Fig. 11.

Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

Fig. 12.



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

Fig. 13.

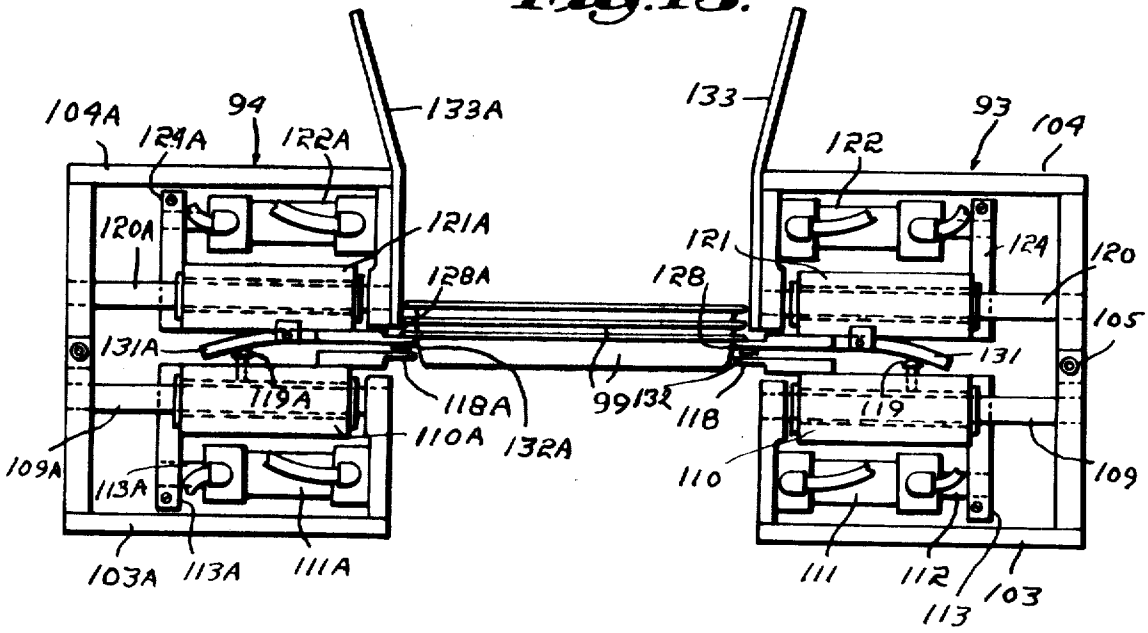
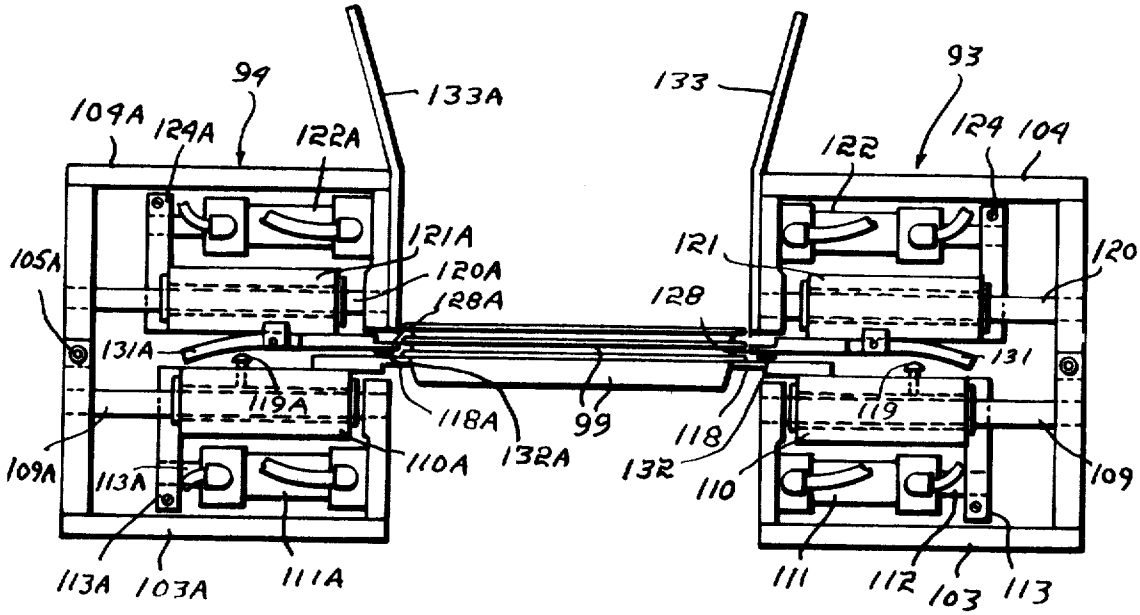


Fig. 14.



Inventor:
Leo G. Vogel,
by Abbott Spear
Attorney

Fig. 15.

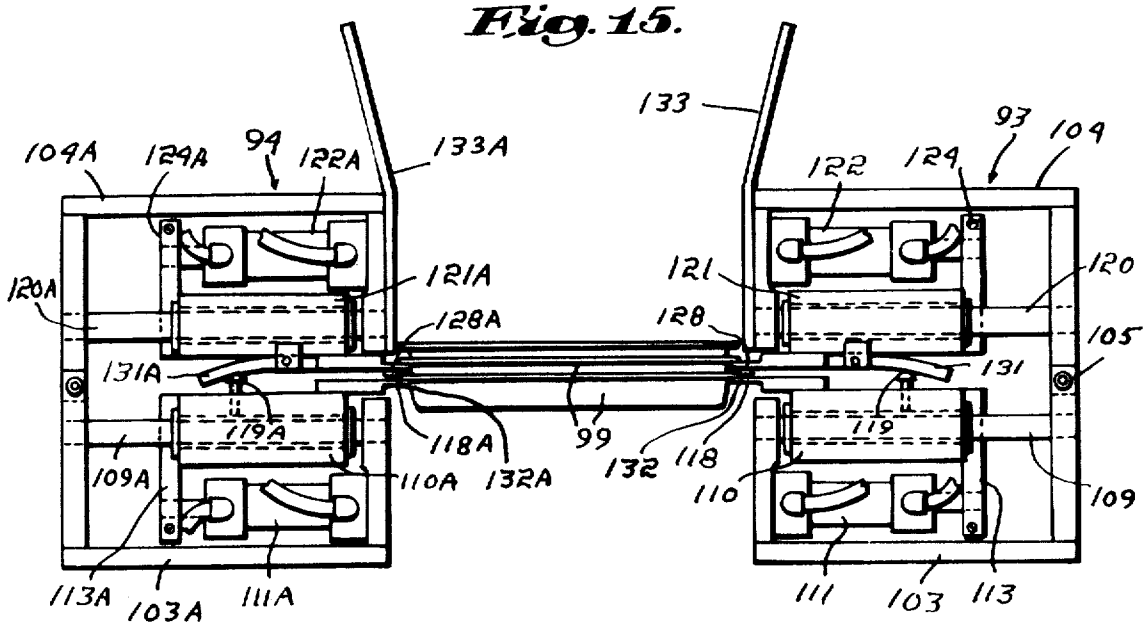
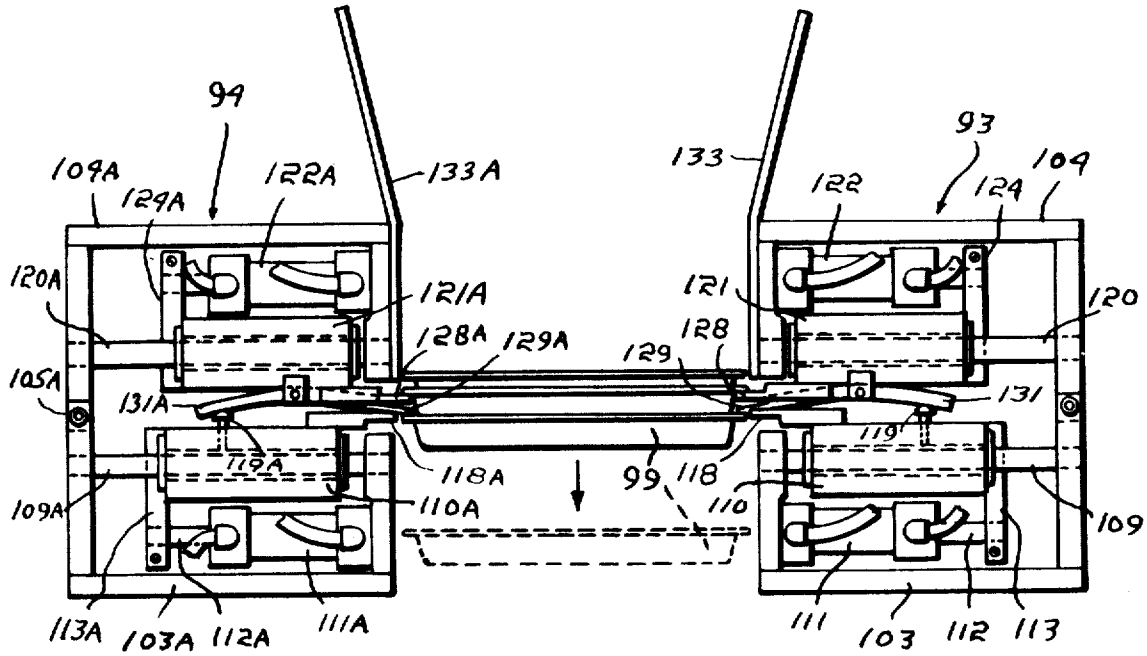


Fig. 16.



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

Fig. 18A.

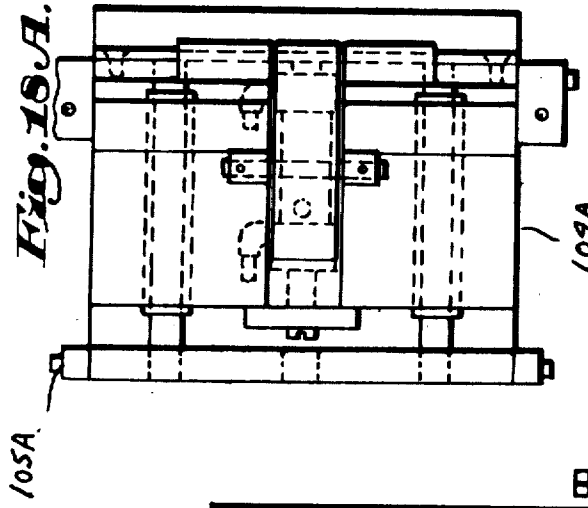
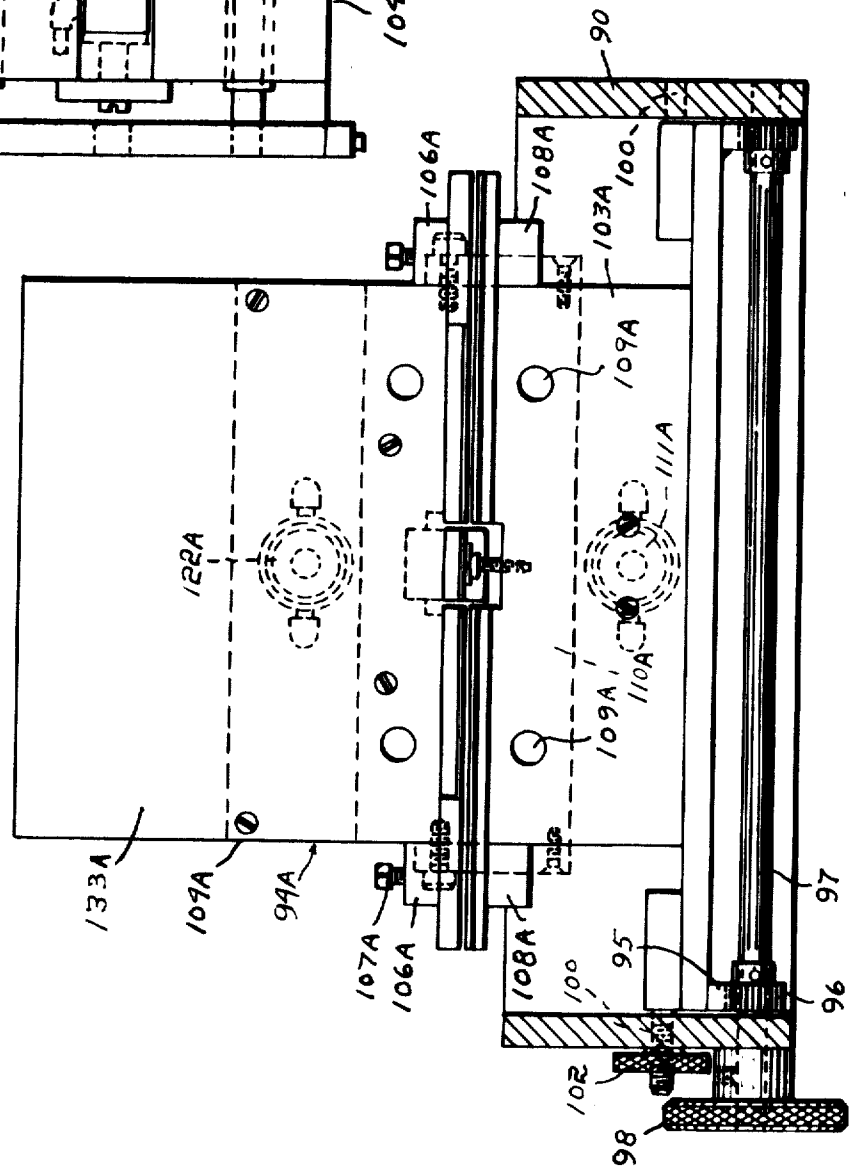


Fig. 18.



Inventor:
Leo G. Vogel,
By Abbott Spear
Attorney

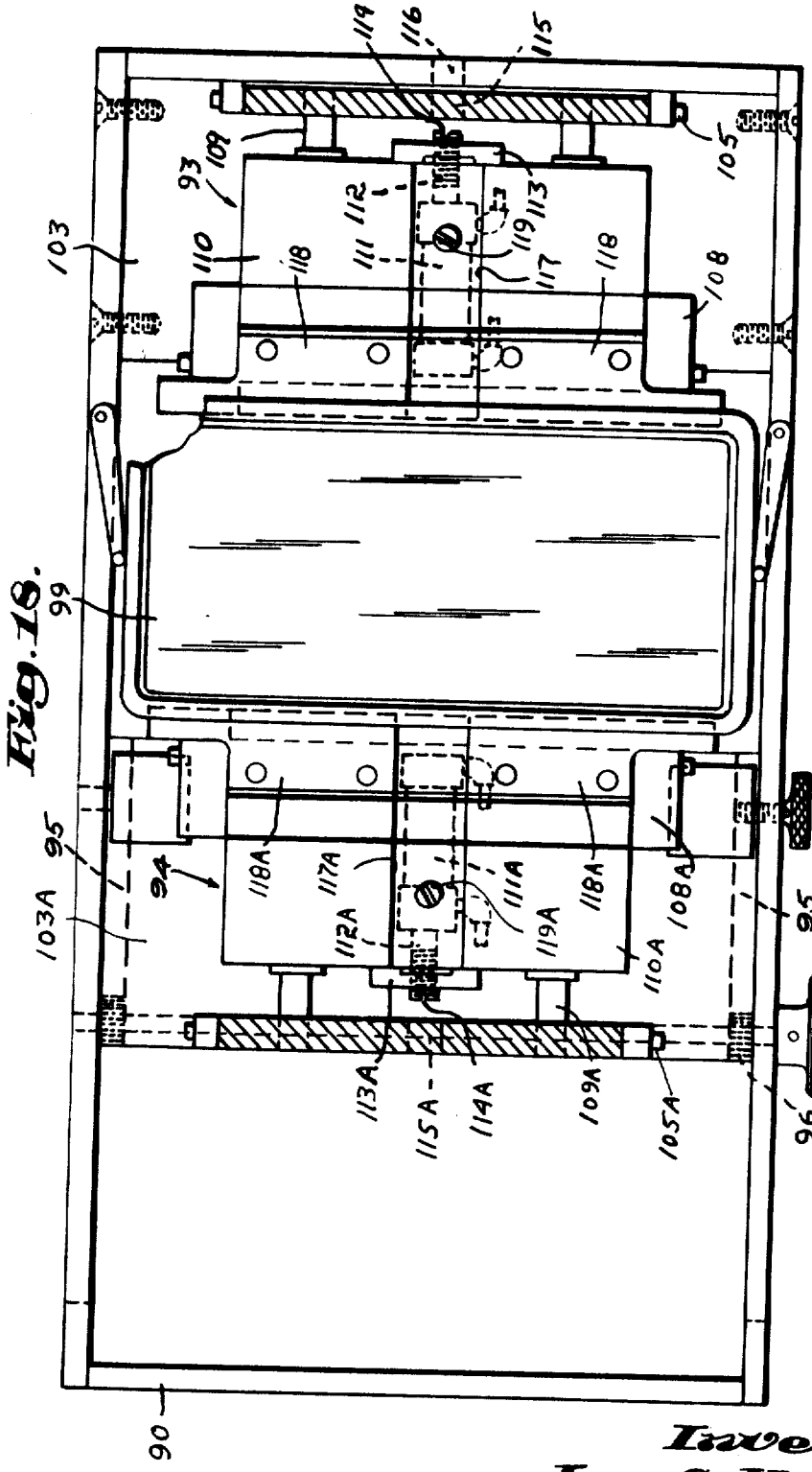
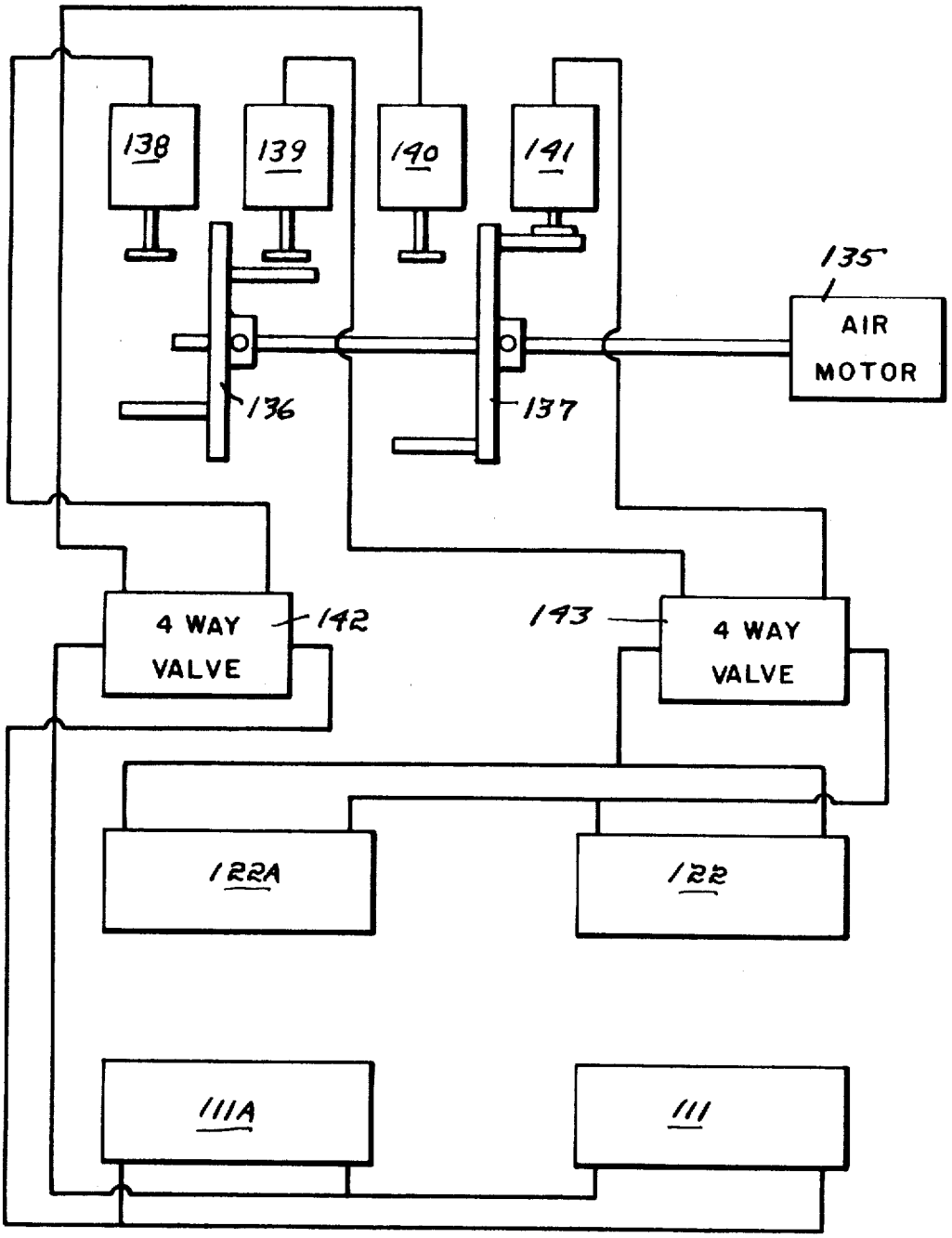


Fig. 18.

Inventor:
Leo G. Vogel,
by
Attorney

Fig. 19.



Inventor:
Leo G. Vogel,
by Albert Spear,
Attorney

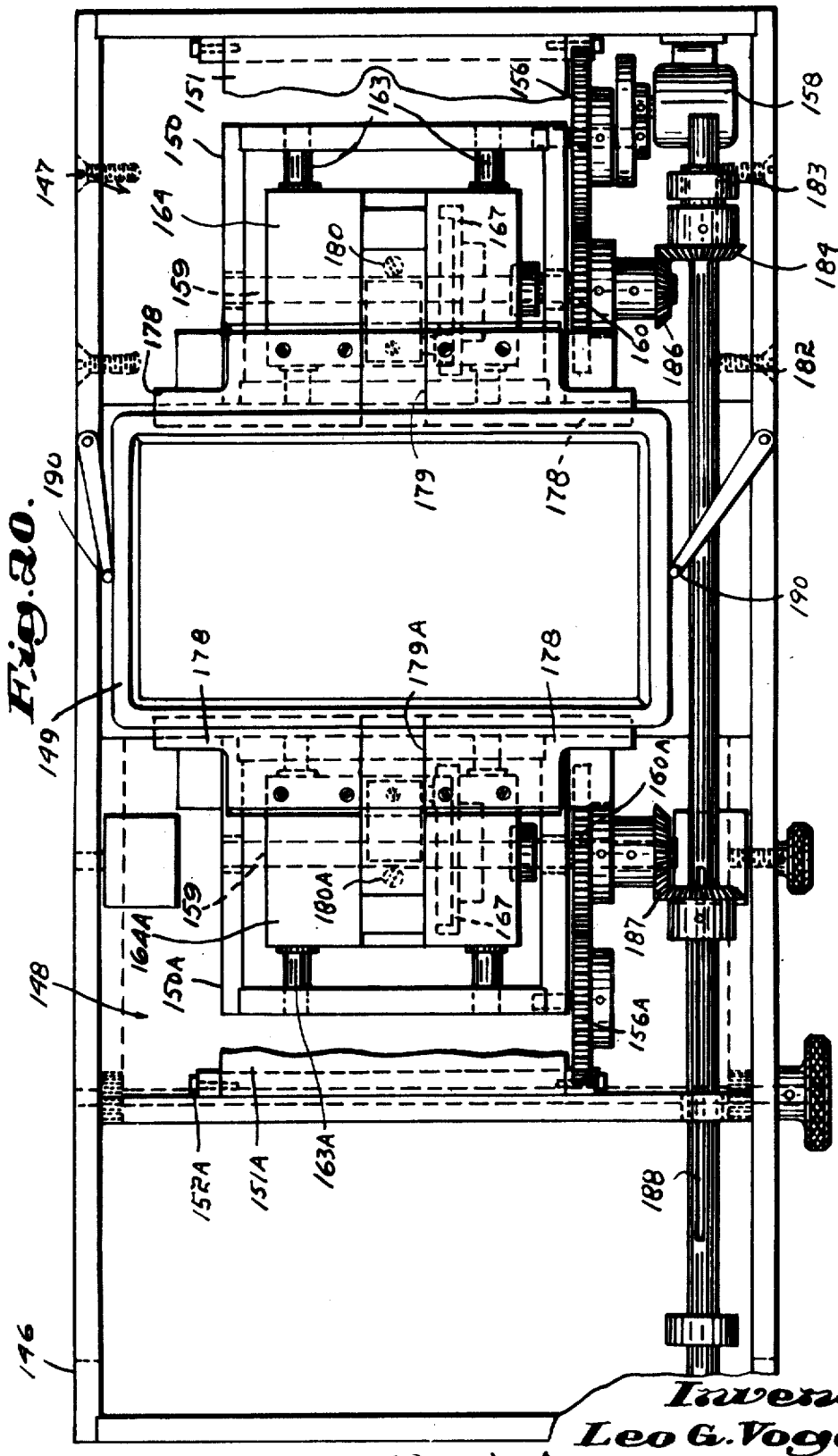


Fig. 20.

Inventor:
Leo G. Vogel,
By Abbott Spear, Attorney

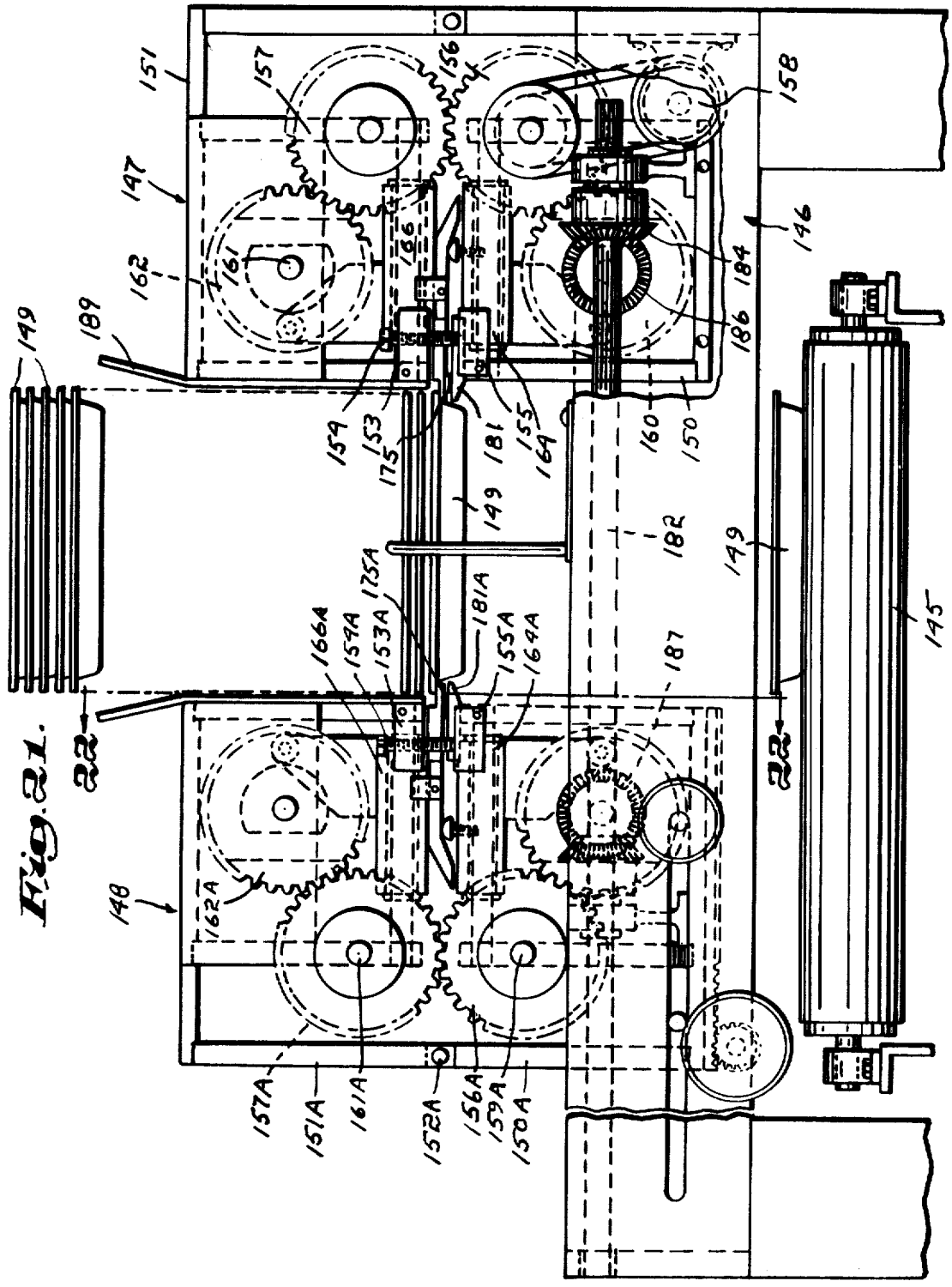


Fig. 21.

Inventor:
Leo G. Vogel,
By Abbott Spear,
Attorney

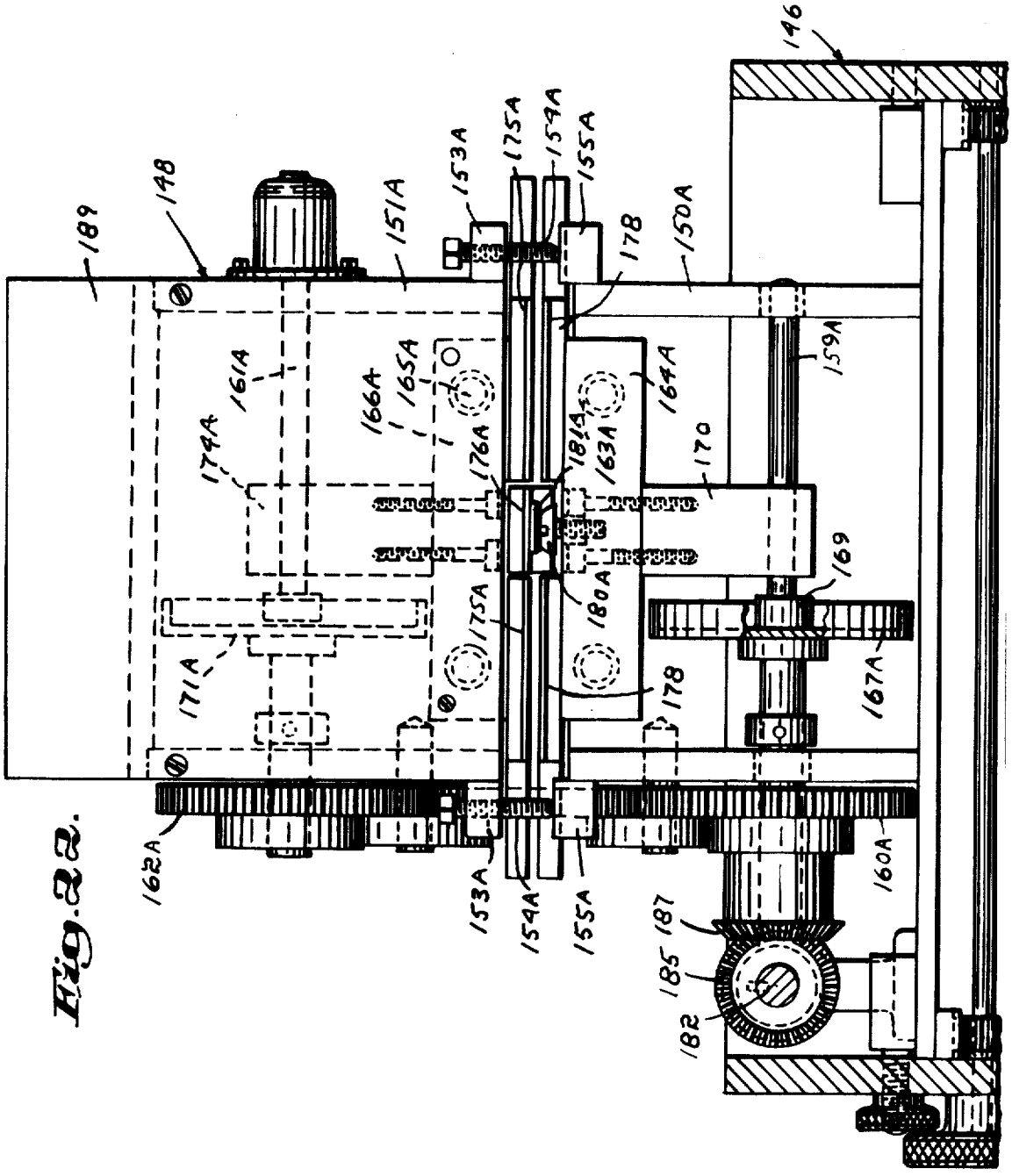


Fig. 22.

Inventor:
Leo G. Vogel,
by Attorney

Fig. 24.

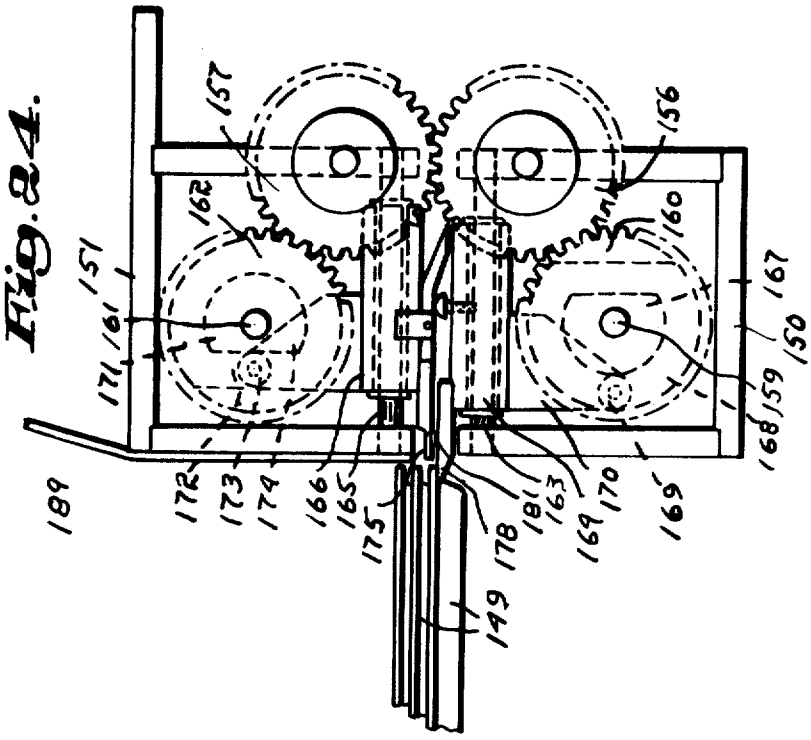
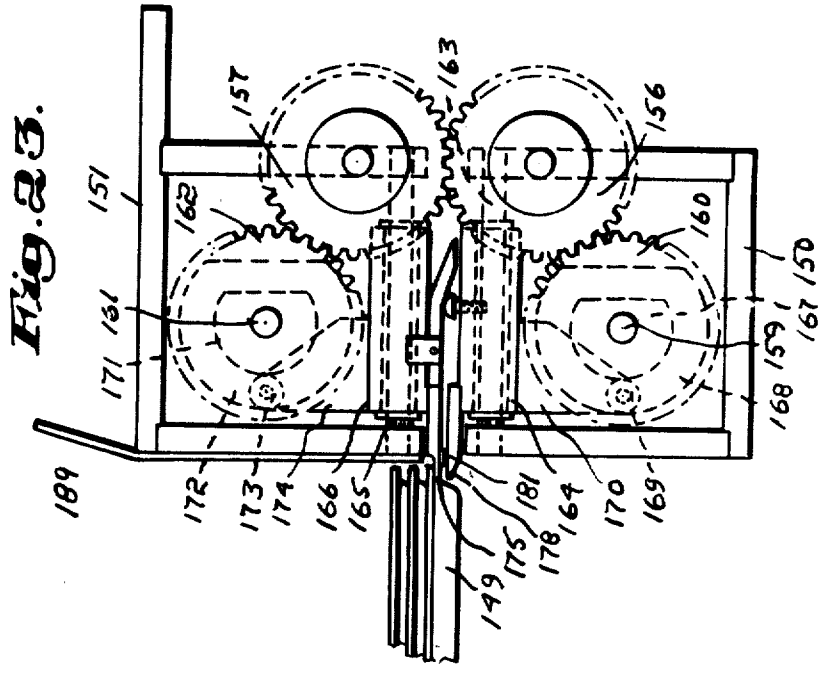


Fig. 23.



Inventor:
Leo G. Vogel,
by Albert Sperry
Attorney

Fig. 26.

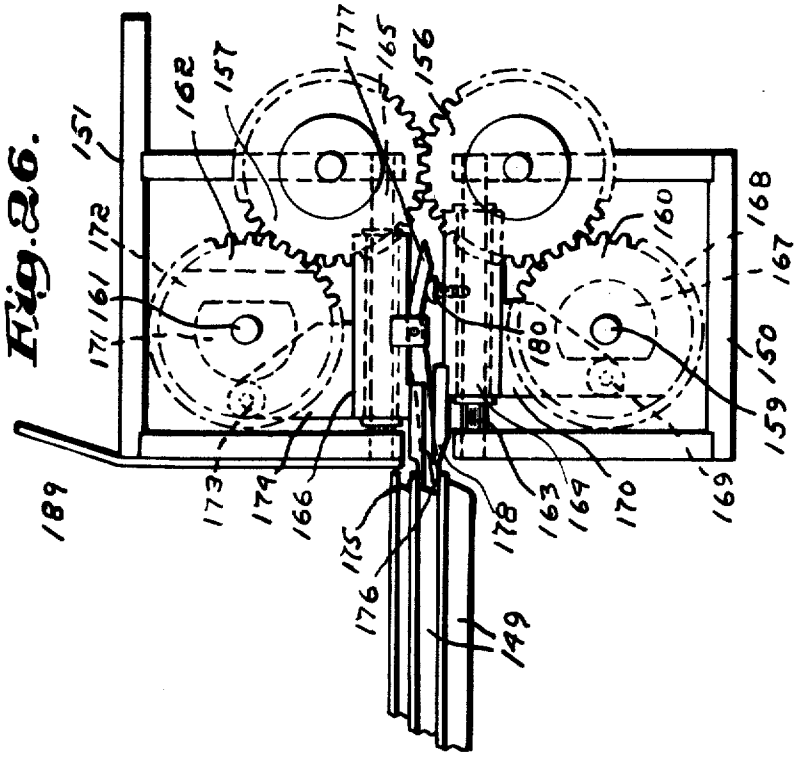
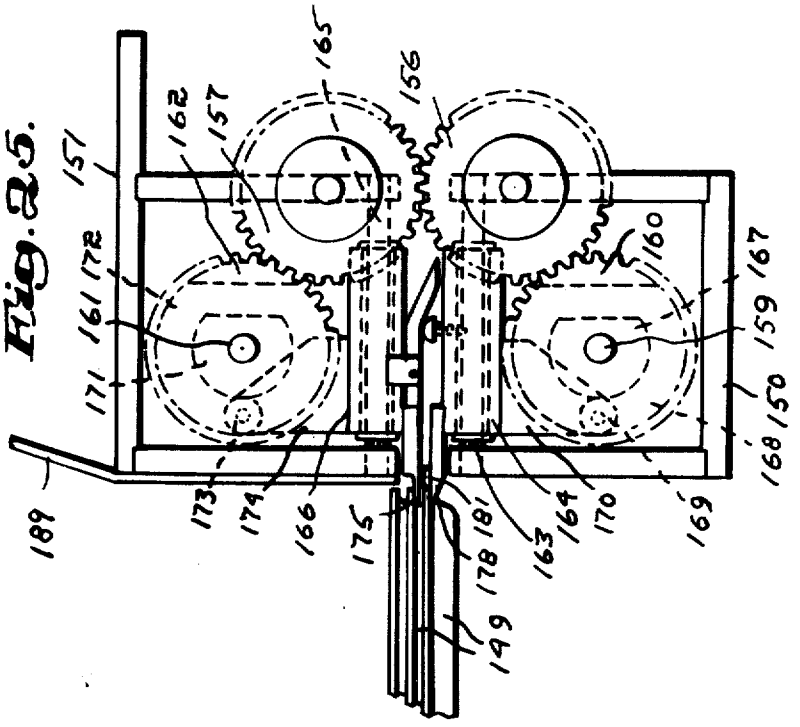


Fig. 25.



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

Fig. 27.

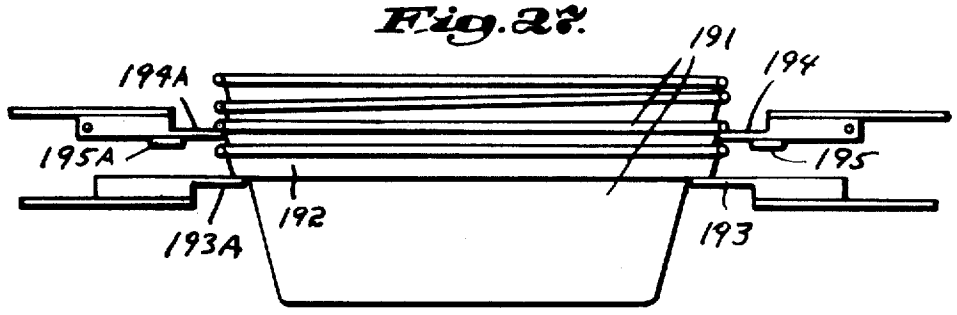


Fig. 28.

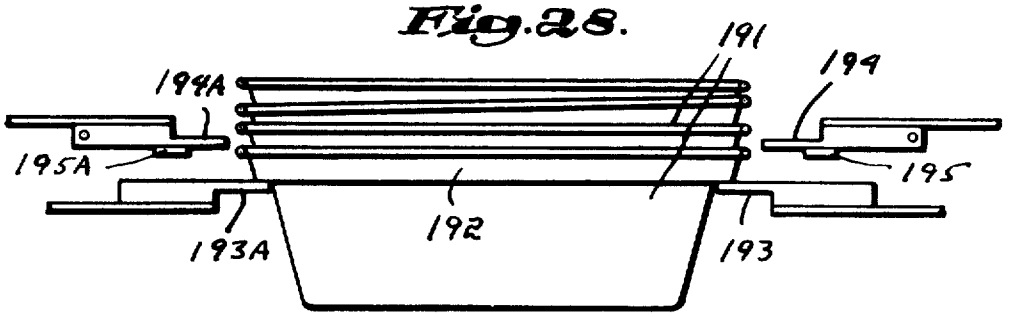


Fig. 29.

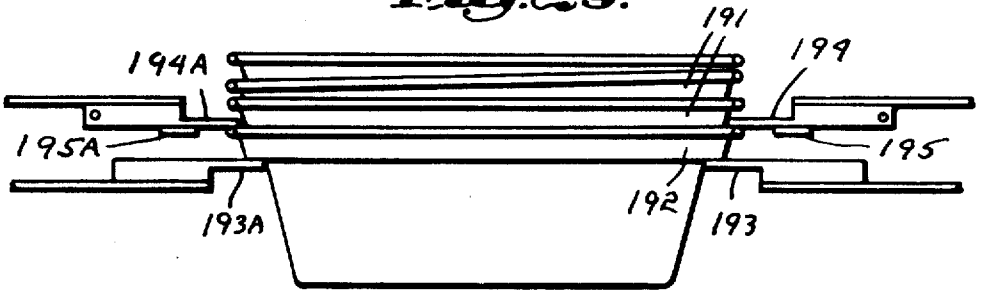
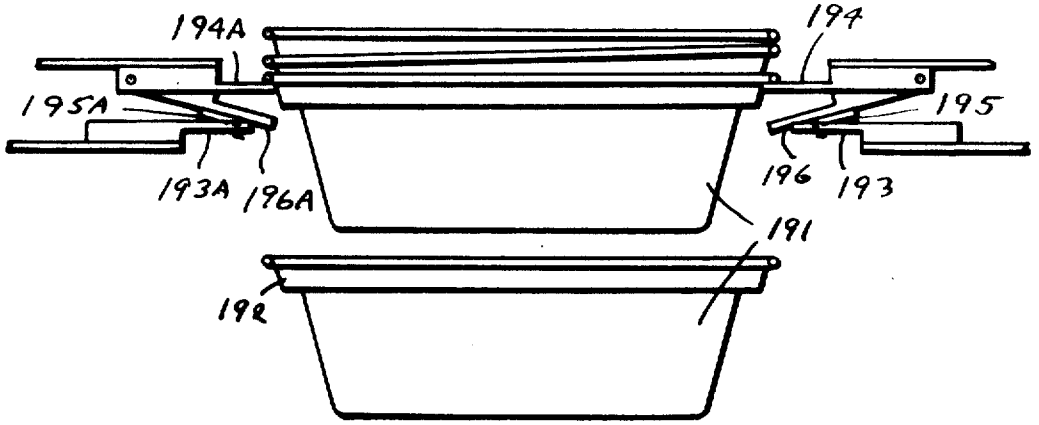


Fig. 30.



Inventor:
Leo G. Vogel,
by Abbott Spear,
Attorney

APPARATUS FOR DISPENSING FLANGED ELEMENTS FROM A STACK THEREOF

The present invention relates to apparatus for dispensing elements from a stack.

While apparatus in accordance with the invention may be used in dispensing elements from a stack of any articles where blades may be entered between them without injury to the articles, the invention is herein discussed with particular reference to baking industry problems arising from the requirements that containers of various sizes, shapes, and constructions be dispensed from a stack onto a conveyor, later to be filled with a food product. Such containers are trays, dishes, pans, cups, and plates, by way of example, and may be made of plastics, aluminum foil, pulp, or combinations thereof and characteristically have marginal structures by which they may be supported in the form of a flange or lips, usually having a rolled edge. The elements will hereafter, for convenience, be referred to as trays and their marginal structures will also subsequently be referred to as flanges. At this time, it should be noted that while stacks of trays, as delivered to the bakery, are so securely nested that they often tend to adhere to each other, their marginal structure presents, between each two trays, a recess defining a blade entrance enabling a blade to be forced into a position underlying a flange without injury to either tray.

The principal objective of the present invention is to provide tray-dispensing apparatus taking advantage of that fact, an objective attained with apparatus provided with a pair of units spaced apart to receive the stack of trays between them. Each unit includes a pair of vertically spaced blades with the distance between them equal to the flange thickness. Each blade of each unit is transversely aligned with and disposed towards the corresponding blade of the other unit and movable between advanced positions in which corresponding blades underlie the flange of a tray and retracted positions in which they are disengaged therefrom. Means are provided to establish an operating cycle in which both blades of both units are in their operative position with the stack supported by the upper blades, the upper blades are then retracted to let the stack drop and be supported by the lower blades, the upper blades are then returned into their stack-supporting position and, finally, the lower blades are retracted to free the lower most tray.

Another objective of the invention is to provide, where the lowermost tray may adhere, when the lower blades are retracted, to the bottom of the tray held by the upper blades, pry means to dislodge the lowermost plate, the pry means being operated on the retraction of the lower blades. Yet another objective of the invention is to provide the pry means with a part operable as a block to prevent lateral movement of a tray with one of the lower blades.

Other objectives of the invention are to provide for adjustment of the units relative to each other as required by tray sizes, the adjustment of the vertical spacing between the blades of each unit to provide for different flange thickness and the adjustment of the blades relative to their supporting structure to adjust their operative positions relative to flange widths.

Another objective of the invention is to provide for cam operation of the blades and yet another objective is to effect blade movements by fluid-pressure-operated means.

In the accompanying drawings, there are shown embodiments of the invention illustrative of these and other of its objectives, novel features, and advantages.

In the drawings:

FIG. 1 is a top plan view of apparatus in accordance with one embodiment of the invention,

FIG. 1A is a section taken approximately along the indicated lines 1A—1A of FIG. 1,

FIG. 2 is a view of the apparatus as seen from the outfeed end of the conveyor,

FIGS. 3, 4, and 5 are sections taken approximately along the indicated lines 3—3, 4—4, and 5—5, respectively, of FIG. 1,

FIG. 6 is a section taken approximately along the indicated lines 6—6 of FIG. 3,

FIG. 7 is a schematic view showing the stack of trays supported by the upper blades,

FIG. 8 is a like view showing the stack supported by the lower blades,

FIG. 9 is a like view showing the return of the upper blades to again support the tray stack,

FIG. 10 is a like view with the lower blades retracted and the pry blade actuated to ensure the release of the lowermost tray,

FIG. 11 is a view of another embodiment of the invention as seen from the outfeed end of the conveyor,

FIG. 12 is a fragmentary view of the apparatus showing, on an increased scale, the blade actuating means of the unit on its right hand side, as viewed in FIG. 11,

FIG. 13 is a view of the blade actuating means as seen from the same position as the apparatus is seen in FIG. 11 with the stack of trays supported by the lower blades,

FIG. 14 is a like view but with the stack of trays supported by the lower blades,

FIG. 15 is another like view but with the upper blades returned into their stack-supporting position,

FIG. 16 is yet another like view showing the lower blades retracted and the lowermost tray released,

FIG. 17 is a section taken approximately along the indicated lines 17—17 of FIG. 11,

FIG. 18 is a section taken approximately along the indicated lines 18—18 of FIG. 11,

FIG. 18A is a view taken approximately along the indicated lines 18—18 of FIG. 7 but in the opposite direction to show the upper blades and blade actuating means of one of the units,

FIG. 19 is a somewhat schematic view of the control system,

FIG. 20 is a top plan view of apparatus in accordance with another embodiment of the invention,

FIG. 21 is a view thereof as seen from the outfeed end of the conveyor,

FIG. 22 is a section taken approximately along the indicated lines 22—22 of FIG. 21,

FIG. 23 is a fragmentary and partly sectioned view of the right hand unit as the apparatus is viewed in FIG. 21 with the upper blade in support of a stack of trays,

FIG. 24 is a like view but with the upper blade retracted and the stack supported by the lower blade,

FIG. 25 is a like view showing the upper blade returned into its stack-supporting position,

FIG. 26 is another like view but with the lower blade retracted,

FIG. 27 is a schematic view showing a stack of trays of a type requiring the blades to be spaced apart vertically a substantial distance, the stack being supported by the upper blade,

FIG. 28 is a like view but with the stack supported by the lower blades,

FIG. 29 is a like view but showing the return of the upper blades, and

FIG. 30 is a like view but with the lower blades retracted and the pry blades actuated.

In the embodiment of the invention illustrated by FIGS. 1–10, supports 20 and 21 are located on opposite sides of the conveyor 22. The base 23 of a first generally indicated unit 24 is secured to the support 20 as by bolts 25 and the base 26 of a second generally indicated unit 27 is also secured to the support 21 by bolts 28 but with the support 21 having slots 29 through which the bolts 28 extend thereby to enable the unit 27 to be moved towards or away from the unit 24 as required by the size and shape of the trays being dispensed and to be secured in such adjusted position. In FIG. 1 the apparatus is shown with the units spaced as required for dispensing trays 30 but adjustable for use in dispensing trays of larger sizes such as that indicated at 30A.

The units 24 and 27 are substantially identical so that both will not be detailed except as to different features. The

reference numerals employed for parts of the unit **27** that correspond to those of the unit **24** are distinguished by the suffix addition "A."

The unit **24** has a transverse shaft **31** carrying a cam **32** having a flat **33**, and provided at one end with a sprocket **34** connected to the sprocket **35** on the drive shaft of the motor **36** by a chain **37**. The other end of the shaft **31** is provided with a gear **38** and a bevel gear **39**. The unit **24** also has a transverse shaft **40** below and inwardly of the shaft **31** carrying a cam **41** having a flat **42** and provided with a gear **43** in mesh with the gear **38**. It will be noted that the corresponding camshafts of the two units are in the same plane. The cams may best be seen in FIGS. **7–10**.

The shafts **31** and **31A** are shown as interconnected by a telescoping shaft generally indicated at **44** and including a first part **44A** of hexagonal cross section and slidably entered within a tubular part **44B** of a mating cross-sectional size and shape, see FIG. **1A**. The opposite ends of the parts **44A** and **44B** are provided with bevel gears **45** and **45A** meshing with the bevel gears **39** and **39A**, respectively, and are journaled in supports **46** and **46A**, respectively, see FIG. **1**. The support **46** is carried by a member **47** having a lengthwise slot **48** and supported by a bearing **49** fixed on the end of the shaft **31**. The support **46A** is carried by a member **47A** supported by a bearing **49A** fixed on the end of the shaft **31A**. Bolts **50** carried by the member **47A** extend through the slot **48**. By these or equivalent means the driving connection between the camshafts of the two units may be adjusted to changes in the spacing of the two units.

The unit **24**, as may best be seen in FIG. **3**, is provided with a support **51** for framework including sides **52** and a cross support **53**. The sides support transversely aligned upper channels **54** and transversely aligned lower channels **55**. The channels **55** are fixed while the upper channels **54** are pivotable and adjustably connected to the channels **55** by bolts **56** extending through interposed springs **57**, thus to enable the vertical spacing between the channels to be varied as required by the flange thickness of the trays **30**. Reference is also made to FIGS. **4–6** where many of these and other details are shown in connection with the unit **27**.

The channels **54**, see FIG. **3**, receive the marginal supports **58** of a slide **59** including a blade, hereinafter referred to as the upper blade and shown as consisting of main sections **60** and a central, pry blade section **61**. The slide **59** has a slot **62** opening through its leading edge for the pry blade section **61** which has an arm **63** connected to the slide **59** by a pivot **64** and extending rearwardly over the slide **59** and provided with a depending, adjustable post **65** having a bevelled face **66**, see FIG. **5**. The arm **63** is, in effect a counterweight normally resting on the slide **59** and maintaining the pry blade section **61** in alignment with the main sections **60** of the upper blade. Rearwardly extending arms **67**, see FIG. **4**, each have a slot **68** through which attaching bolts **69** extend for use in adjusting the operative blade positions and each arm **67** includes a roller **70** held in engagement with the cam **32** by a spring **71** connected to the cross support **53** of the framework.

The channels **55** receive the marginal supports **72** of a slide **73** including a blade **74**, hereinafter referred to as the lower blade and centrally slotted as at **75** to accommodate the pry blade section **61**. The slide **73** has rearwardly disposed arms **76** connected thereto by bolts **77** extending through slots **78** enabling a desired operative position of the blade **74** to be accurately adjusted. Each arm **76** has a roller **79** held in engagement with the cam **41** by a spring **80** anchored to the support **51**. One arm **76** has a transversely disposed support **81** for an upwardly disposed adjustable member **82** having a bevelled face **83** disposed for engagement with the face **66** of the member **65** when, with the blades **60** operatively positioned, the lower blade **74** is retracted thereby to pivot the pry blade section **61** into a tray-releasing direction.

The crossmembers **72** and **72A** include pivoted arms **84** and **84A**, respectively, adjustable to provide a guide for a released tray **30** as will be apparent from FIG. **1**.

With the structure thus far detailed, it will be apparent that when the motor **36** is in operation, the corresponding blades of the two units are moved into and out of their operative, tray supporting position. The operating cycle is illustrated by FIGS. **7–10** with FIG. **7** showing the upper blades and the lower blades in their operative position with the stack of trays **30** supported by the upper blades. As illustrated by FIG. **8**, the upper blades **61** are then retracted and, as a result, the stack of trays drops and becomes supported by the lower blades **74**. The next step in the cycle, illustrated by FIG. **9**, is the return of the upper blades **61** into their operative position so that the rim of the lowermost tray **30** is confined between the upper and lower blades and the remainder of the stack supported again by the upper blades. The cycle is completed, as illustrated by FIG. **10**, by the retraction of the lower blades **74** to permit the lowermost tray **30** to drop with the pry sections **61** and **61A** actuated to ensure that result and then by the return of the lower blades **74** to their FIG. **7** position. It is also necessary with many types of trays to provide the undersurface of each pry blade with a depending block **86** disposed to be engaged by any tray **30** that starts to move laterally with a lower blade and thereby be dislodged.

The embodiment of the invention illustrated by FIGS. **11** through **19** includes a base **90** adapted to be supported over a conveyor **91** as by supporting structures generally indicated at **92**.

The base **90** has a pair of generally indicated units **93** and **94** spaced apart to be on opposite sides of the conveyor. As the units **93** and **94** are substantially identical, the unit **94** will not be detailed except as to its features that are not present in the unit **93** and its corresponding parts will be distinguished by the suffix addition "A" to the appropriate reference numerals. A distinguishing feature of the unit **94** is that it is adjustable towards and away from the unit **93**, the adjustability being attained by providing the unit **94** with a rack **95** in mesh with a pinion **96** on a shaft **97**. The shaft **97** extends transversely of and is supported by the base **90** and is provided with a knob **98** to enable the unit **94** to be accurately positioned relative to the unit **93** for the support between them of trays **99** as required by their dimensions. The unit **94** has supports **100** slidably confined in transversely disposed slots **101**. A locking knob **102** is threaded on one such support **100** to enable such adjustments to be secured.

The unit **93** includes a lower holder **103** and an upper holder **104** connected thereto by a transverse hinge **105** thus to enable the upper holder to be swung in a vertical direction between open and closed positions relative to the lower holder. While the holder **103** is fixed in the base **90**, the supports **100** are part of the unit **103A**. The holder **104** has a block **106**, see FIG. **12**, at one side through which a stop **107** is threaded to engage a block **108** on the subjacent holder **103** thus to enable the closed positions of the upper holders to be accurately adjusted for purposes subsequently to be explained.

The lower holder **103** has a pair of longitudinally disposed parallel rods **109** in slidable support of a mount **110**. The cylinder of a piston-cylinder unit **111** is secured in the holder **103** with its piston rod **112** threaded through a bracket **113** connected to the mount **110** between the rods **109** with its threaded end provided with a kerf **114** enabling the position of the mount to be adjusted by means of a screwdriver, the kerfed end **114** being accessible through aligned holes **115** and **116** in the end walls of the holder **103** and the base **90**, respectively.

The mount **110**, see FIG. **18**, has a centrally located, lengthwise channel **117** in its upper surface. A pair of blades **118** are secured to the forward part of the mount **110**, one on each side of the channel **117**. A post **119** is adjustably threaded into the bottom of the channel **117** to protrude upwardly therefrom for purposes presently to be described.

The upper holder **104** has a pair of parallel rods **120** extending lengthwise thereof in slidable support of a mount **121**. The cylinder of a piston-cylinder unit **122** is secured to the holder

104 and its piston rod 123 is threaded through a bracket 124 secured to the mount 121 between the rods 120. The threaded end of the piston rod 123 has a kerf 125 exposed through a hole 126 in the end wall of the holder 104 to enable the position of the mount 121 to be adjusted.

Each mount 121, see FIG. 18A, has a central, lengthwise channel 127 in its bottom face. A pair of blades 128 is secured to the forward part of the bottom face of the mount 121, one on each side of the channel 127. A pry blade 129 is disposed between the blades 128 and is pivotally secured to the mount 121 as at 130. The pry blade 129 has a rearwardly disposed and downwardly curved end 131 extending lengthwise of the channel 127 providing a cam surface engageable with the subjacent post 119. In its normal position, the pry blade 129 is transversely aligned with the blades 128 being held in that position by the post 119 until the mount 121 is retracted to bring the post 119 into engagement with the cam surface 132 thereby to swing the pry blade downwardly. The pry blades 129 and 129A are provided with stop blocks 132 and 132A, respectively, to prevent transverse movement of the plate 99 being dispensed from the stack, see FIG. 12.

From the foregoing, it will be apparent that each unit has vertically spaced blades that protrude beyond the guide plates 133, 133A with which the upper holders are provided thus to support trays 99 and that can be retracted by the piston-cylinder units from such supporting position.

The means by which the piston-cylinder units are operated to effect the desired movement of the blades into and out of tray-supporting position to effect the release of the trays, one at a time, will now be detailed and reference is made to FIG. 19.

A housing 134, see FIG. 11, is secured to the unit 94 and it contains, see FIG. 19, an air motor 135 turning cams 136 and 137 for actuating bleeder valves 138, 139, 140, and 141 in a predetermined order by which the four-way valves 142 and 143 are operated, the valves 142 and 143 controlling the piston-cylinder units which are of the double acting type.

The bleeder valves 138 and 140 control the valve 142, the opening of the bleeder valve 138 causing the valve 142 to shift and deliver air to the cylinders 111 and 111A in a manner causing retraction of the lower blades 118 and 118A while the opening of the bleeder valve 140 causes their advance into a tray-holding position.

Similarly, the bleeder valves 139 and 141 control the valve 143 with the opening of the bleeder valve 139 causing the valve 143 to shift and deliver air to the cylinders 122 and 122A of the piston-cylinder units to cause retraction of the upper blades 128 and 128A while the opening of the bleeder valve 141 causes the valve 143 to shift to provide for their return to their tray-holding position. The cams 136 and 137 control the operating cycle illustrated by FIGS. 13–16 so that first the upper blades support the stack of trays and then are retracted to permit the stack to drop and be supported by the lower blades. The upper blades are then returned to support the stack and, following that step, the lower blades are withdrawn and during such withdrawal, the posts 119, 119A strike the cam surfaces 131, 131A of the pry blades 129, 129A causing the forcible ejection of the lowermost tray if it does not fall free. The cycle is completed by the return of the lower blades into their holding position. This cycle is the same as that illustrated by FIGS. 7–10.

The embodiment of the invention illustrated by FIGS. 20 through 30 is cam operated and like the other embodiments includes two units, one on each side of the conveyor 145 and mounted on a support indicated generally at 146. The units are generally indicated at 147 and 148 and as they are substantially identical, a description of the unit 147 will suffice with corresponding parts of the unit 148 being distinguished by the suffix addition "A" to the appropriate reference numeral. It will be noted, however, that the unit 148 is connected to the support 146 to enable it to be moved towards and away from the unit 147 as required by the dimensions of the trays 149 being dispensed. As the adjustments are effected in the manner shown in FIG. 11, the adjustable connection between the unit 148 and the support 146 is not again detailed.

The unit 147 consists of a lower holder 150 and an upper holder 151 connected thereto by a hinge 152 so that the upper holder may be swung upwardly and downwardly relative thereto. The upper holder 151 has side blocks 153 through which are threaded adjustable stops 154 in engagement with supporting blocks 155 fixed on the sides of the lower holder 150 thus to provide for vertical adjustments in relation to flange thickness.

The holders 150 and 151 have rotatably supported, meshing gears 156 and 157, respectively, with the gear 156 driven by an electric motor 158. The holder 150 has a transverse shaft 159 provided with a gear 110 in mesh with the gear 156 and the holder 151 supporting a transverse shaft 161 having a gear 162 in mesh with the gear 157.

The holder 157 has a pair of transversely aligned rods 163 in slidable support of a mount 164 and the upper holder 151 has similarly disposed rods 165 in slidable support of a mount 166. The shaft 159 is below the mount 164 and includes a cam 167 having a cam track 168 which receives a roller 169 on an arm 170 depending from the mount 164. The shaft 161 extends above the mount 166 and is provided with a cam 171 having a cam track 172 receiving the roller 173 carried by the upwardly extending arm 174 fixed on the mount 166. The cams are best seen and their function followed in FIGS. 23–26.

The mounts are identical to those of the embodiment of the invention illustrated by FIGS. 11–19 and, accordingly, are not detailed. The mount 166 has a pair of laterally spaced blades 175 attached to its front part. The pry blade 176 is pivotally connected to the undersurface of the mount 166 and includes a rearwardly extending and downwardly inclined cam portion 177 also functioning as a counterweight yieldably maintaining the pry blade 164 in alignment with the blades 163.

The mount 164 has a pair of blades 178 connected to the front part of its upper surface, one on each side of a slot 179, see FIG. 20, dimensioned to receive the pry blade 176. The mount 164 has a vertically adjustable post 180 supporting the rear portion of the pry blade and when it engages the cam portion 177 thereof, as it does when the mount 164 is retracted, the pry blade 176 is swung downwardly. Like the pry blades of the previously discussed embodiments, the pry blades 176 and 176A have stop blocks 181 and 181A, respectively.

In operation, the rotation of the cams results in the mounts being so moved that first, see FIG. 23, the stack of trays 149 is supported by the upper blades 175 and 175A and then, as shown in FIG. 24, solely by the bottom blades 178 and 178A. As illustrated by FIG. 25, the upper blades are then returned into their stack-supporting position with one tray 149 confined between them and the lower blades.

The units 147 and 148 are connected in a manner enabling one to be moved towards and away from the other in a manner slightly different from that shown in the previously discussed embodiments of the invention. To that end the opposite ends of a shaft 182 are journaled in mounts 183. The shaft 182 carries bevel gears 184 and 185 in mesh, respectively, with bevel gears 186 and 187. The bevel gear 186 is fast on the shaft 159 while the bevel gear 187 is fast on the shaft 159A. While the gear 184 is fast on the shaft 179, the bevel gear 185 is slidably splined thereto as at 188 thus to enable the adjustments for different sized trays to be made. Guide plates 189 are fixed on the proximate ends of the units 147 and 148 and adjustable guides 190 for the ends of the stack of trays.

It will be apparent that trays of a wide range of sizes and shapes can be readily accommodated by varying the space between the units. In addition, the vertical spacing between the upper and lower blades may be adjusted to meet a wide range of marginal characteristics. In some instances, such marginal characteristics have proved extremely troublesome and in some instances the fact that trays do not always properly nest in the stack has been a problem.

Both of these factors are encountered in dispensing trays 191, the trays 191 being of the type having its marginal struc-

ture in the form of an upstanding rim **192** of substantial height. This type of tray, after being filled, has a cover , not shown, placed therein with the rim **192** then folded inwardly to seal the cover in place.

In FIGS. **27–30**, the dispensing of such trays is schematically illustrated and it will be noted that some of the trays **191** are tilted and that it is necessary that the bottom blades **193, 193A** be spaced closer together than the upper blades **194, 194A**.

In FIG. **27**, the lowermost tray **191** is confined between the upper and lower blades while in FIG. **28**, the upper blades have been retracted so that the stack is supported entirely by the lower blades. In FIG. **29**, the upper blades have been returned and even should the next tray **191** be tilted, there is no problem since the upper blades will enter between closely spaced flanges. In FIG. **30**, the lower blades are retracted with the blocks **195, 195A** preventing travel of the lowermost tray therewith and the pry blades **196, 196A** being actuated by such retraction to ensure its release.

From the foregoing, it will be appreciated that tray dispensers in accordance with the invention are well adapted to meet a wide range of operating requirements and conditions.

I claim:

1. Apparatus for dispensing elements from a stack thereof, the elements being of the type having flanges between which blades may be inserted, said apparatus comprising a pair of units spaced apart to receive the elements between them, each unit including upper and lower blades, and means separately connecting the upper and lower blades to the appropriate units with the distance between them equal to the flange thickness of an element and with corresponding blades of the units being transversely aligned with and disposed towards each other and movable between advanced operative positions in which they underlie the flange of an element and retracted inoperative positions in which they are disengaged therefrom, and means in control of the blades providing that the upper and lower blades of both units are first operatively positioned with the stack supported by the upper blades, the upper blades are retracted to permit the stack to drop and be supported by the lower blades, the upper blades are again operatively positioned and finally the lower blades are retracted to release the lowermost element, the upper blade of at least one of the units including a transversely pivoted intermediate section yieldably held in alignment with the lower blade thereof, and means connected to and movable with the lower blade thereof and operable to pivot said section as an element-releasing pry when the lower blades are retracted.

2. The apparatus of claim **1** in which the lower blade includes sections that are spaced apart by a distance such that the pry blade section may swing downwardly between them.

3. The apparatus of claim **1** in which the pry blade section includes a stop member on its undersurface that is exposed for engagement by a tray if it adheres to the lower blade as the lower blade is retracted.

4. The apparatus of claim **1** in which each upper blade includes a depending stop exposed for engagement by a tray if it adheres to a lower blade as the lower blades are retracted.

5. The apparatus of claim **1** in which the upper blade of at least one of the units includes a transversely pivoted section provided with a rearward, downwardly disposed cam portion, and the lower blade includes an upwardly disposed cam portion coacting with the cam portion of the upper blade section as the lower blade is retracted thereby to pivot the upper blade section as an element-releasing pry.

6. The apparatus of claim **1** in which the pry blade section is counterweighted.

7. The apparatus of claim **1** and spring means yieldably urging the pry blade section into alignment with the remainder of the upper blade.

8. The apparatus of claim **1** in which the blade control means includes cam carried by each unit, one for each blade and including a driving connection with the other, each blade includes a cam follower in operative engagement with the appropriate one of the cams, a driving connection between corresponding cams of the two units, one unit is adjustable towards and away from the other unit, the driving connection includes a shaft consisting of telescopic sections of a mating noncircular section.

9. The apparatus of claim **8** in which the driving connection includes a shaft, a gear on each end of said shaft, said shaft having an elongated keyway for one of said gears, and said one gear including a part entrant of said keyway.

10. The apparatus of claim **1** in which the means in control of the blades include fluid-pressure-operated devices, one for each blade and connected thereto, a source of fluid under pressure, and means to connect said devices to said source in predetermined order.

11. The apparatus of claim **9** in which the fluid pressure devices are double-acting piston-cylinder units.

12. The apparatus of claim **10** in which the piston of each unit is adjustably connected to the appropriate one of the blades.

13. The apparatus of claim **10** and bleeder valves for each device, and cam means for operating the bleeder valves in a predetermined manner.

14. The apparatus of claim **12** and an air motor including a drive for the cams operating the bleeder valves.

15. The apparatus of claim **1** in which each unit includes upper and lower slideways and the blades include mounts, one slidable in the upper slideway and one slidable in the lower slideway, one of the slideways is movable relative to the other to vary the spacing of the blades, and adjustable means limits the extent to which the slideways may move toward each other.

16. The apparatus of claim **14** in which one of the slideways of each unit is pivoted at its rear to swing upwardly and downwardly relative to the other slideway of that unit, and a threaded connection between first portions of the slideways is operable to establish and maintain the desired spacing between the blades.

17. The apparatus of claim **16** in which the base includes vertical walls having lengthwise, transversely aligned slots and the slidable unit includes supports extending through the slots.

18. The apparatus of claim **1** in which each unit includes a reciprocable member for each blade and each blade is connected thereto to enable its operative position to be advanced or retracted.

19. The apparatus of claim **1** in which each unit includes a reciprocable member for each blade and each blade is connected thereto to enable its operative position to be advanced or retracted to enable its vertical position to be varied.