Oct. 10, 1967 J. B. WEST 3,345,801

AUXILIARY UNIT FOR PACKAGING MACHINE

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FIG. 1.

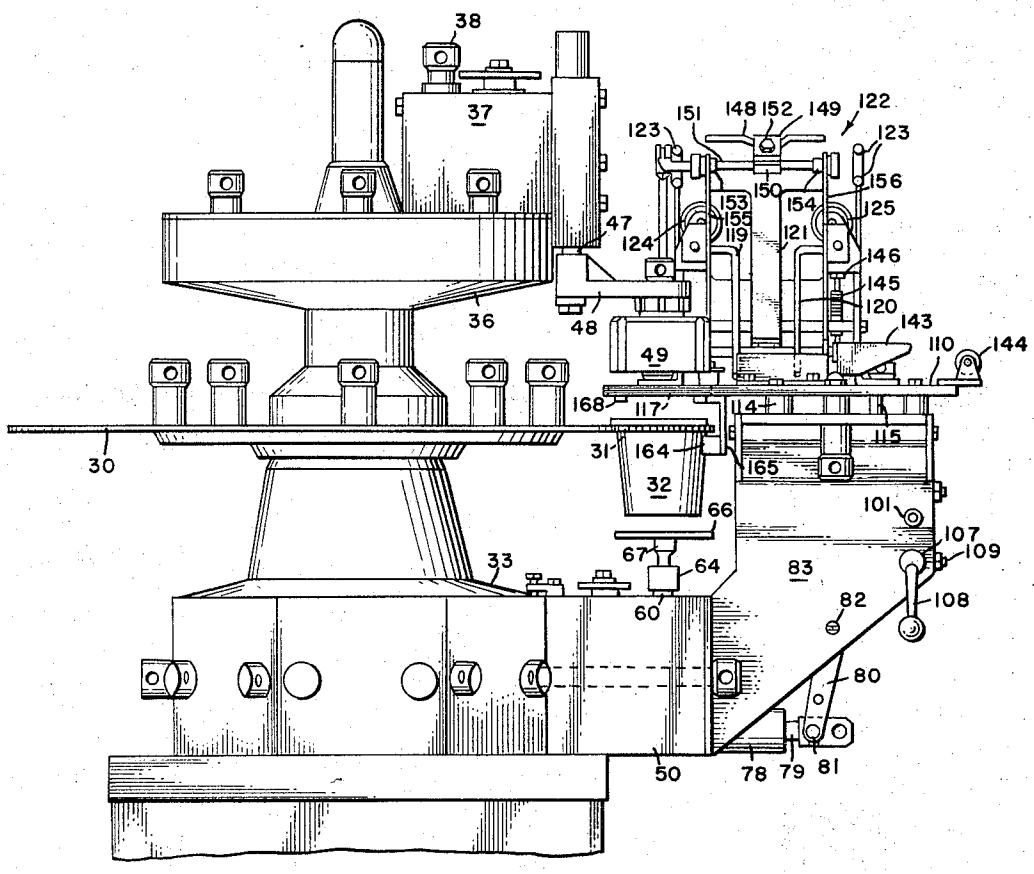
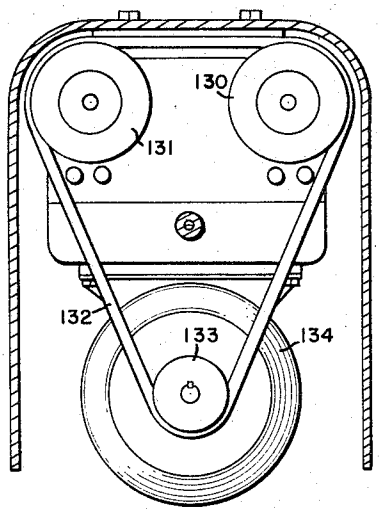


FIG. 7.



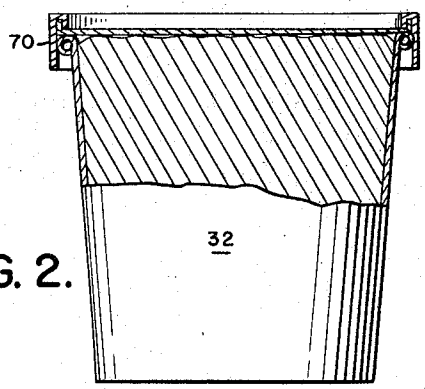


FIG. 2.

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AUXILIARY UNIT FOR PACKAGING MACHINE

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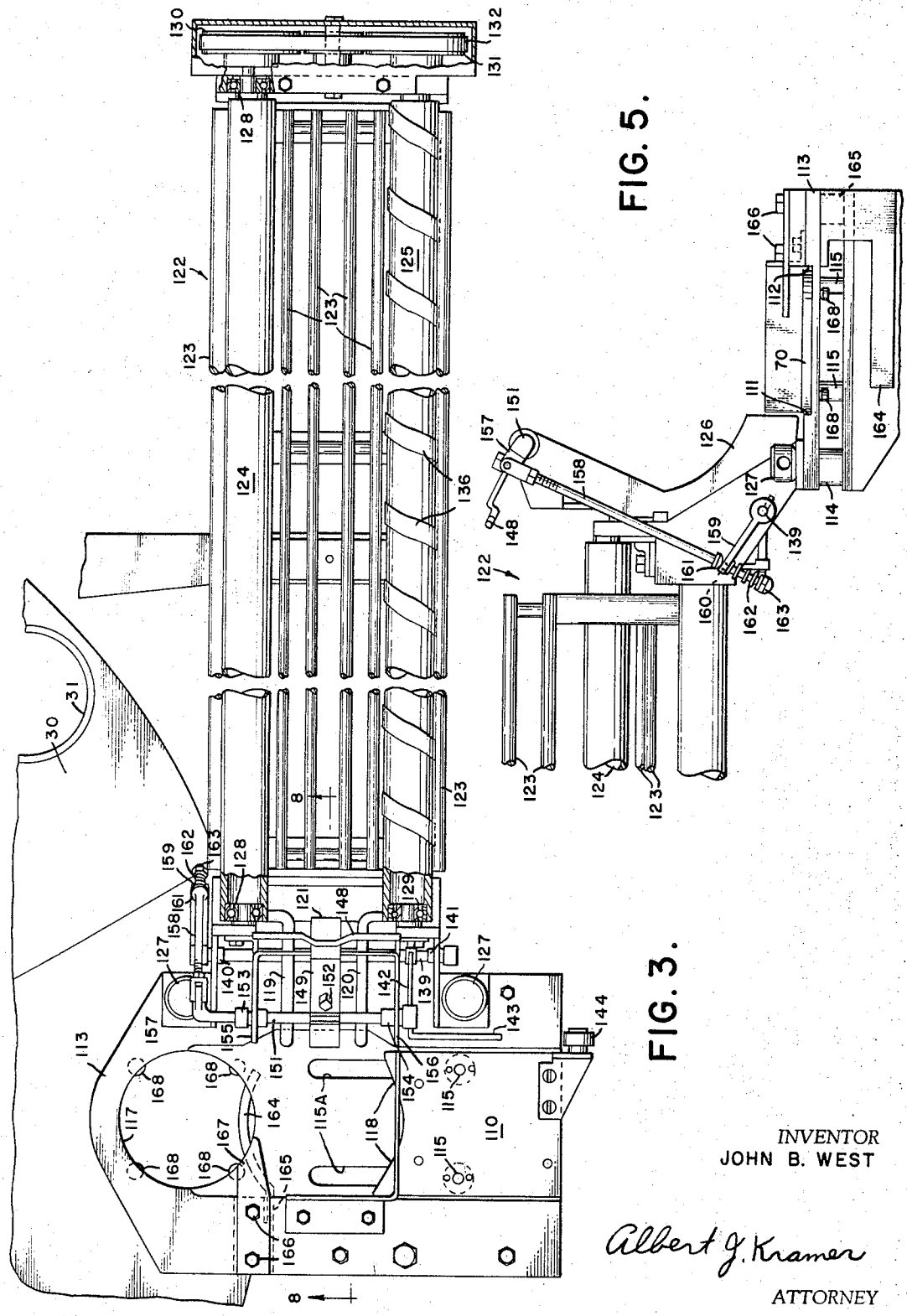


FIG. 5.

FIG. 3.

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AUXILIARY UNIT FOR PACKAGING MACHINE

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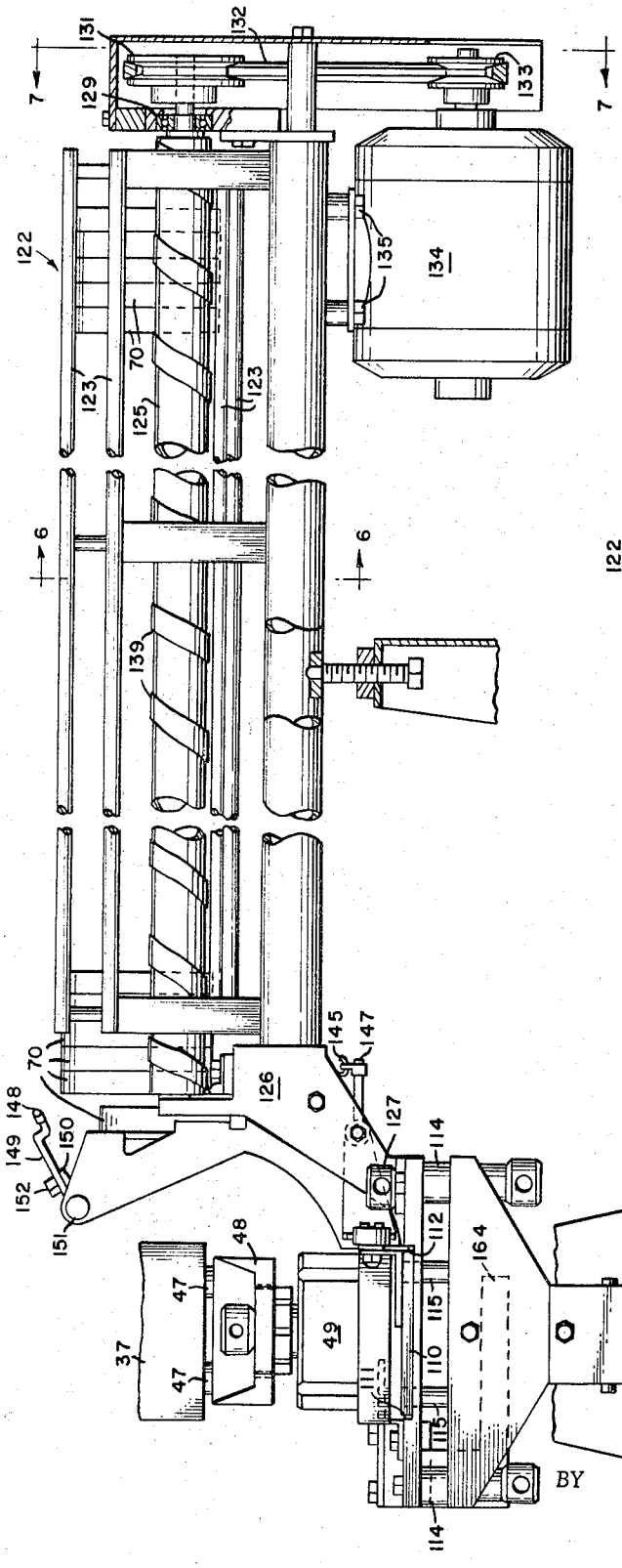


FIG. 4.

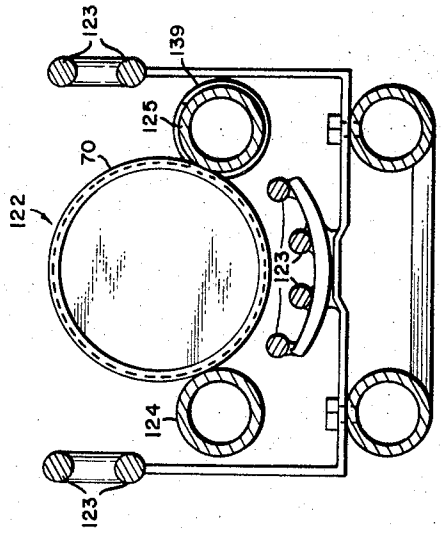


FIG. 6.

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FIG. 8.

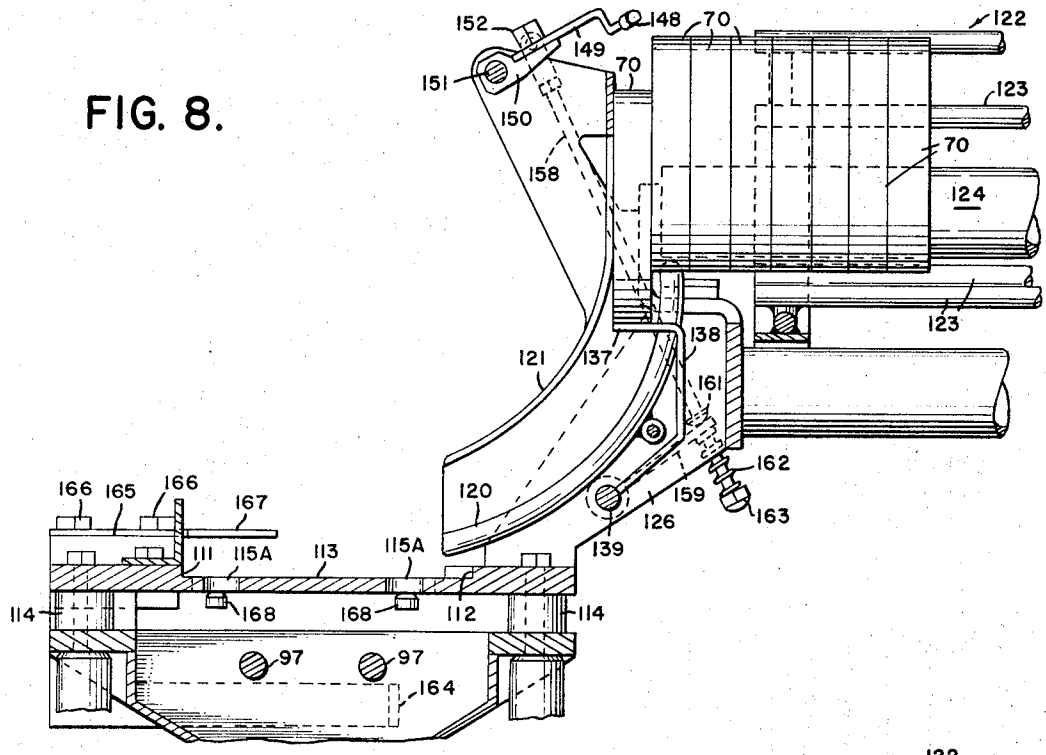
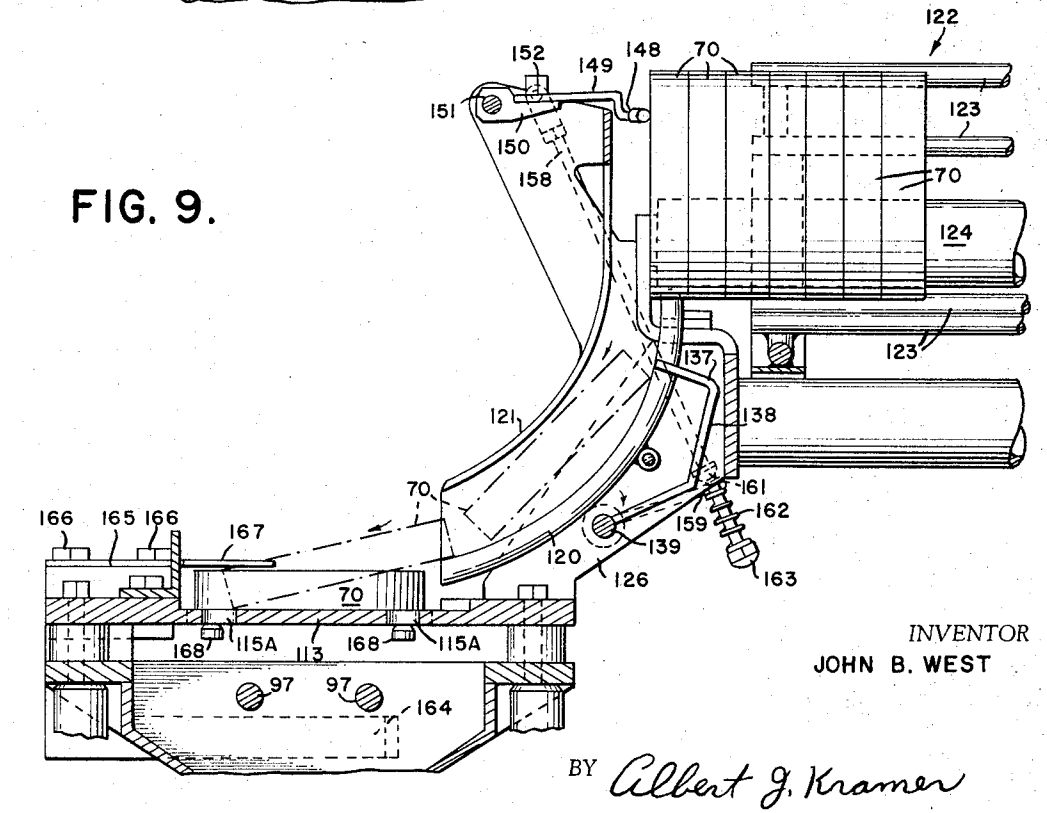


FIG. 9.



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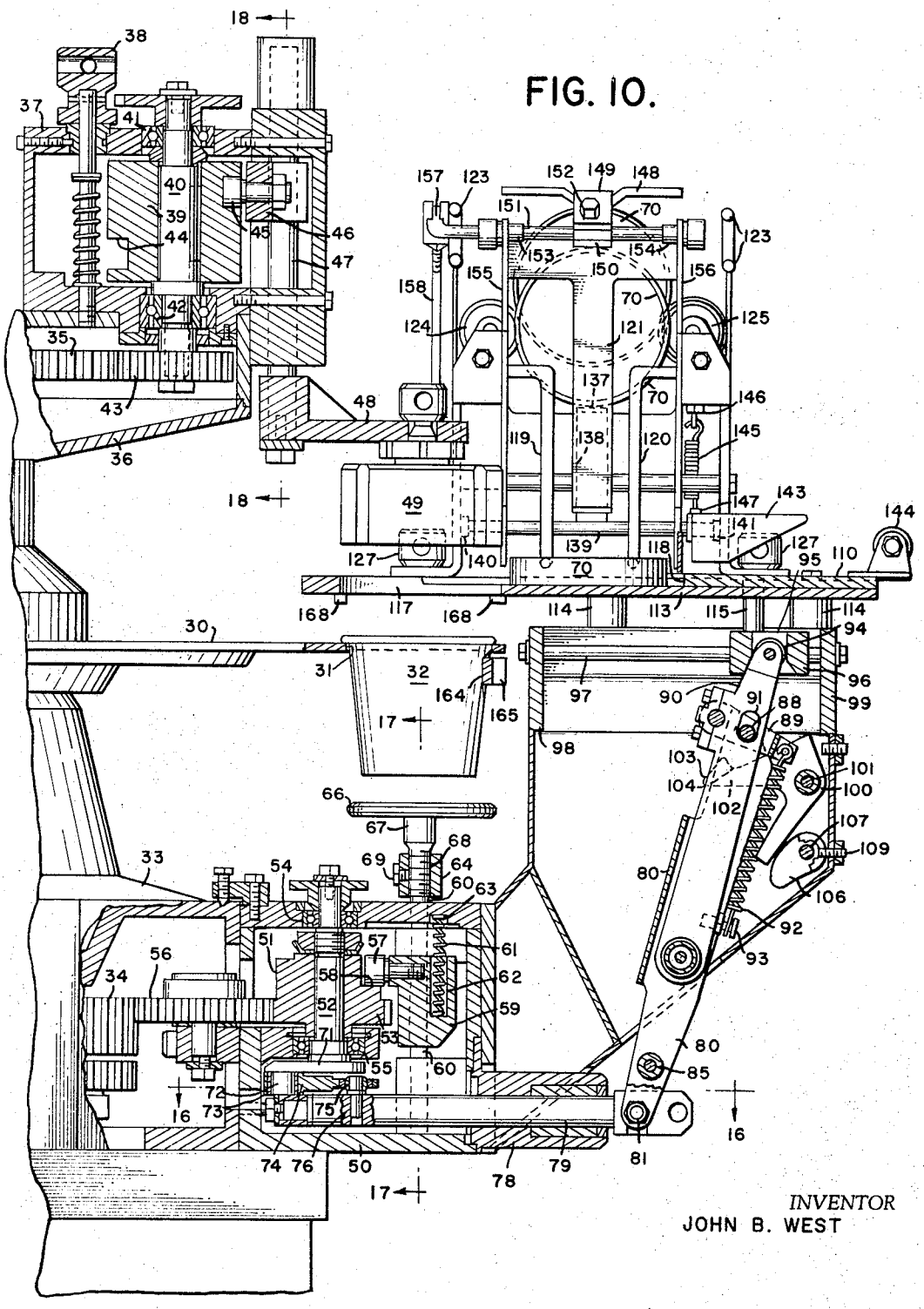
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FIG. 10.



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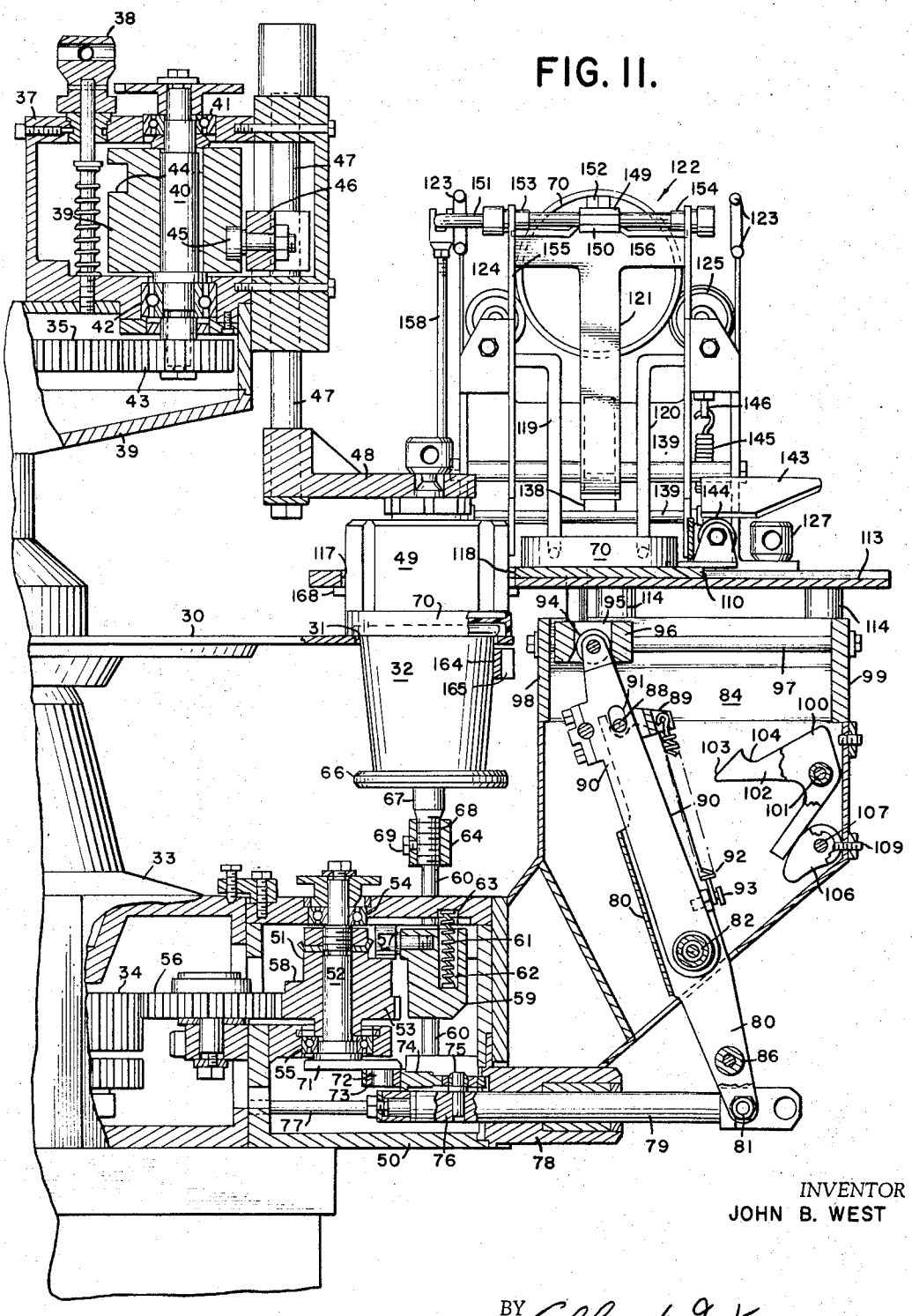
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FIG. 11.



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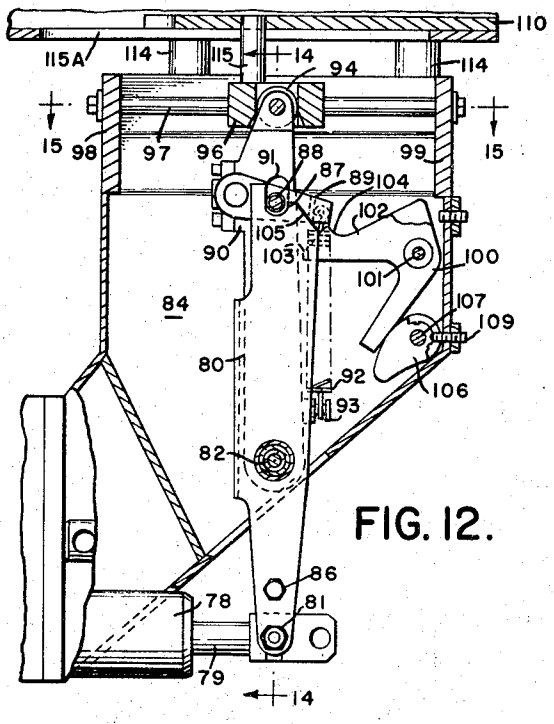


FIG. 12.

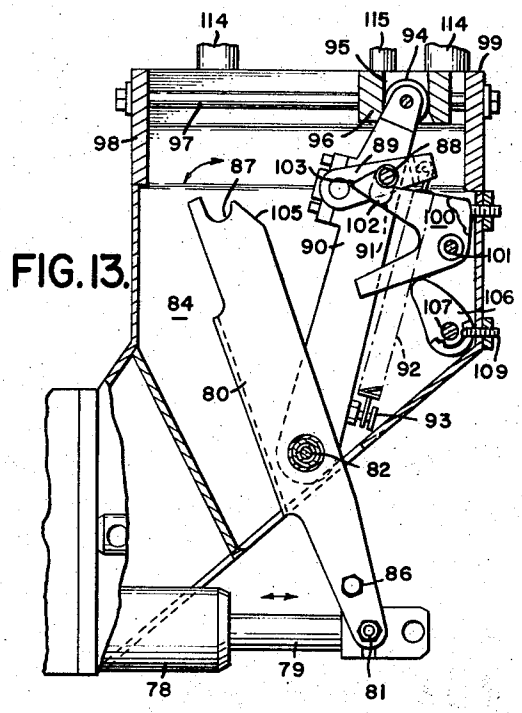


FIG. 13.

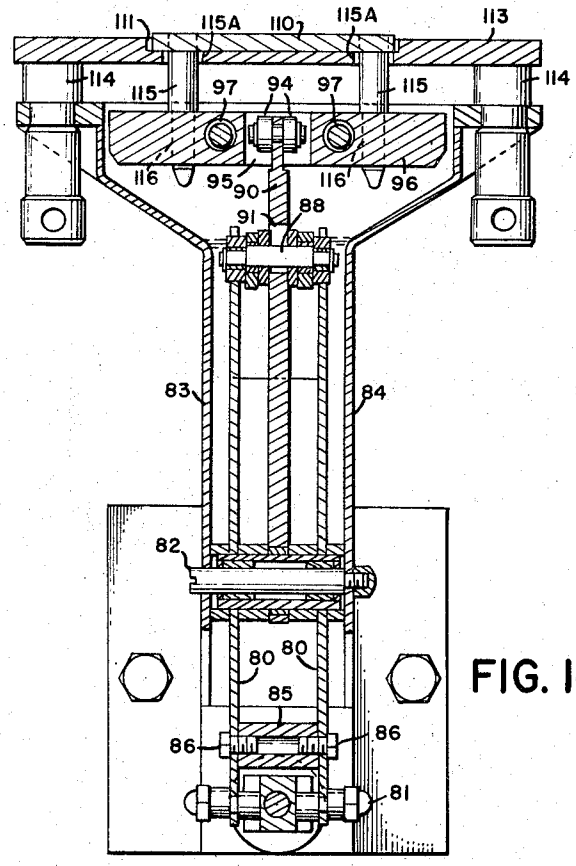
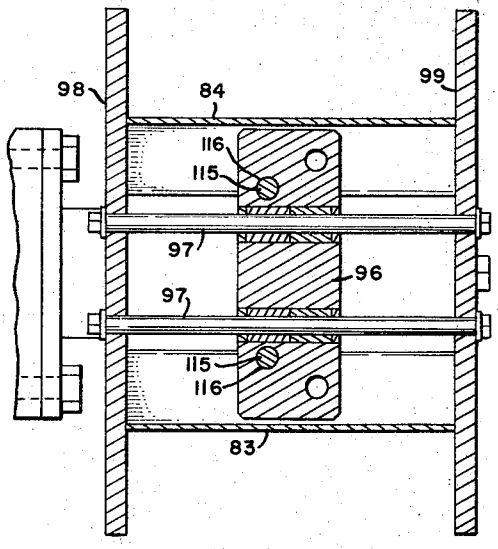


FIG. 14.

FIG. 15.



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FIG. 16.

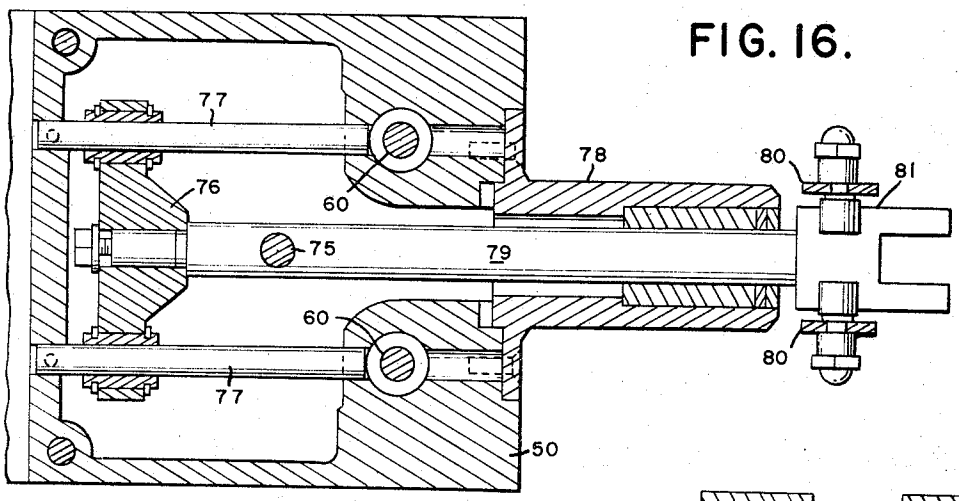


FIG. 17.

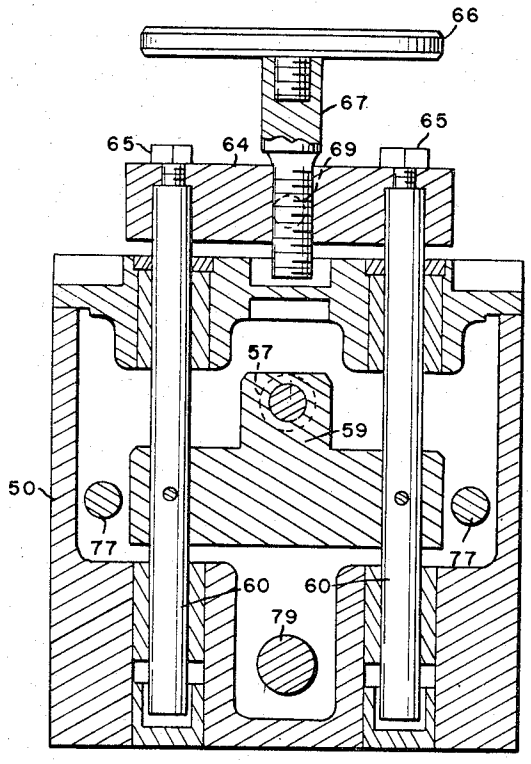
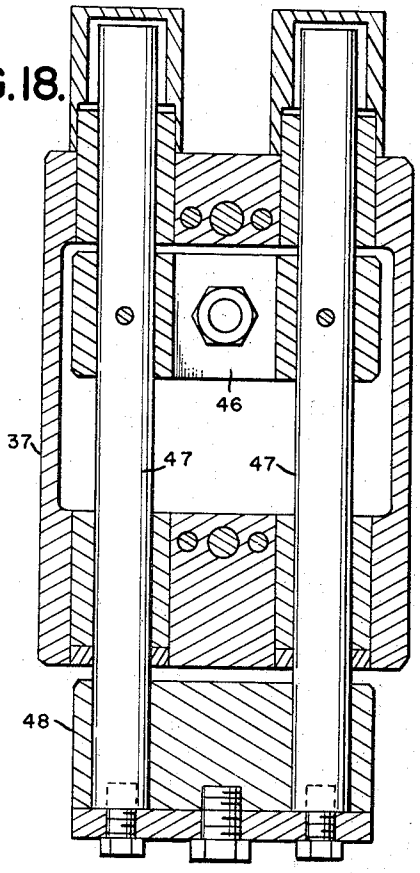


FIG. 18.



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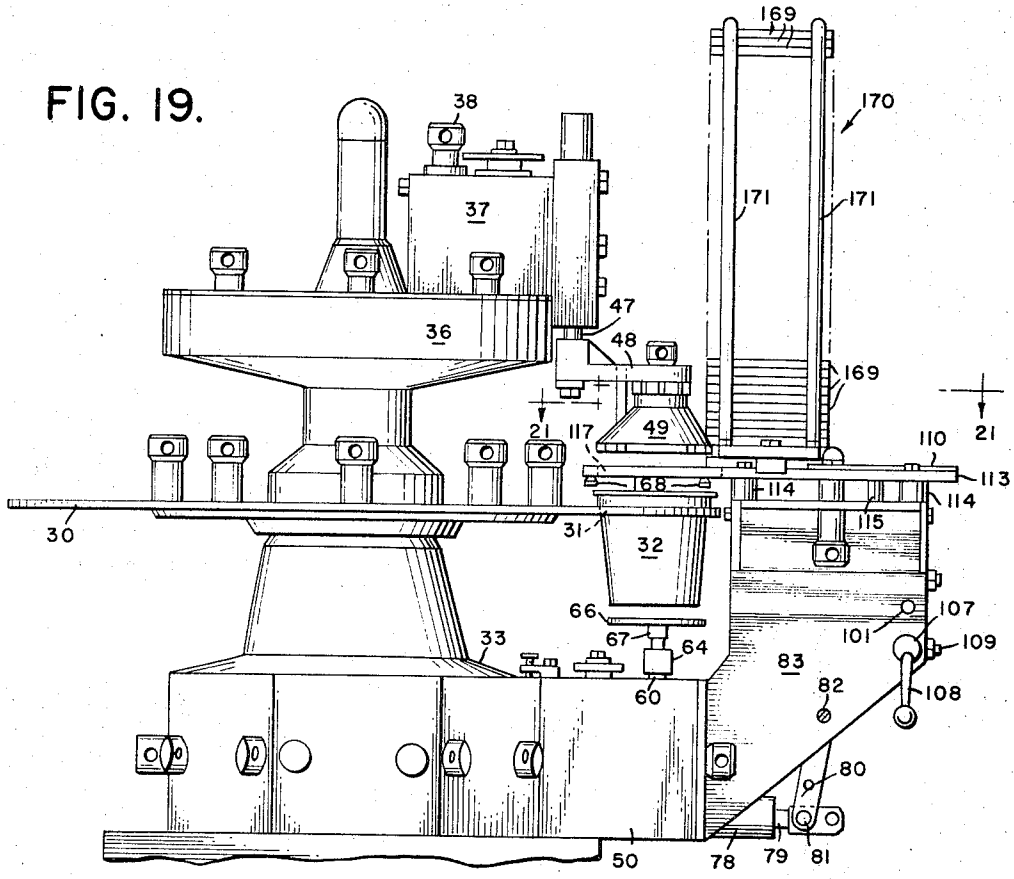
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FIG. 19.



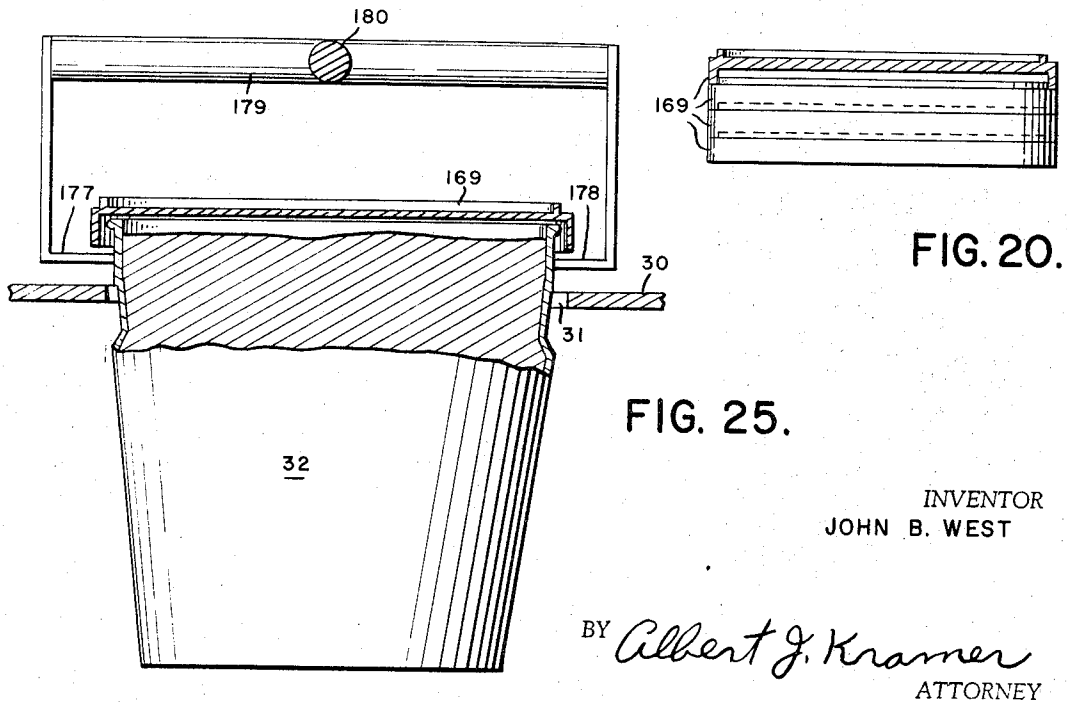


FIG. 20.

FIG. 25.

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AUXILIARY UNIT FOR PACKAGING MACHINE

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FIG. 21.

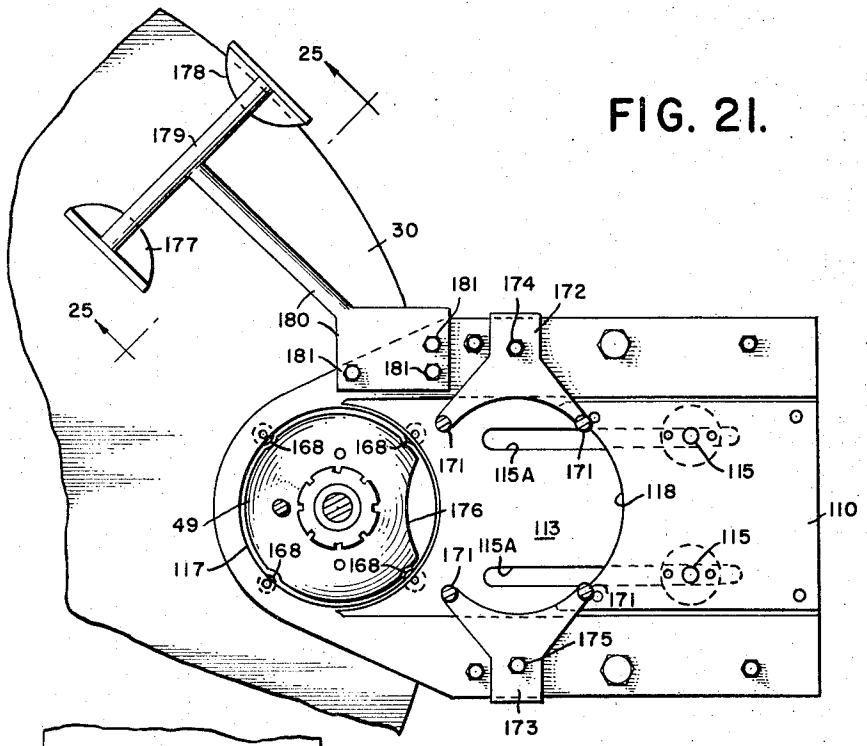
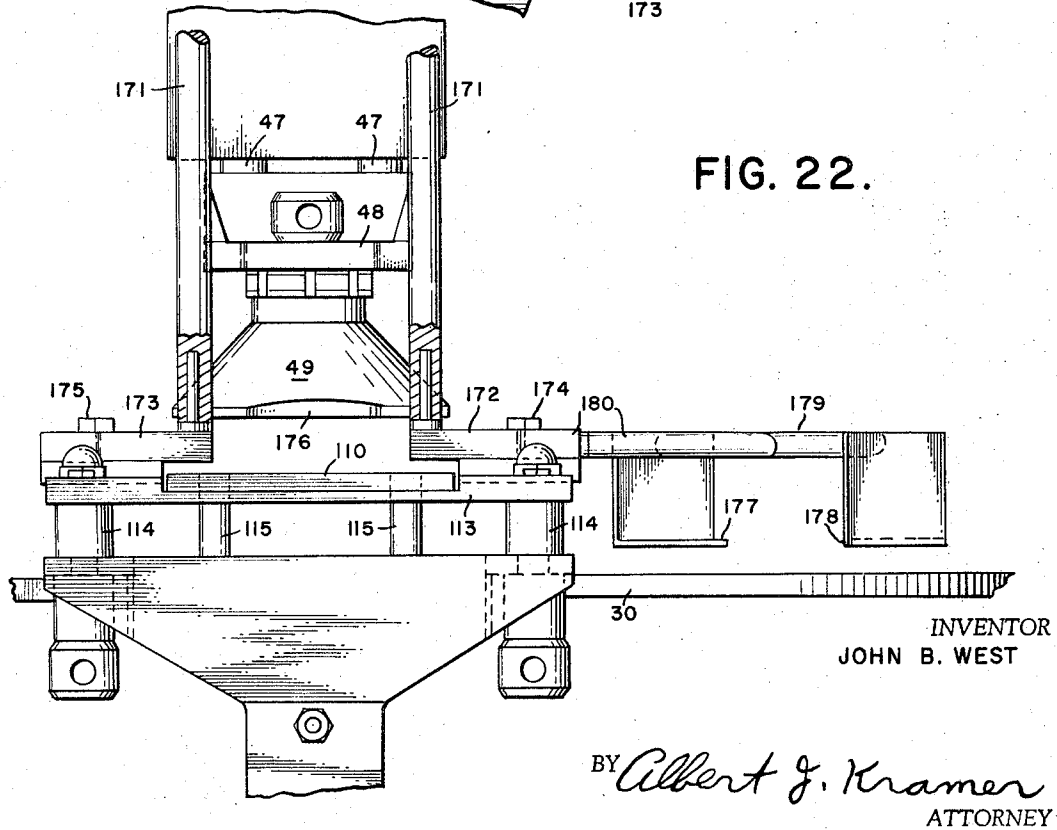


FIG. 22.



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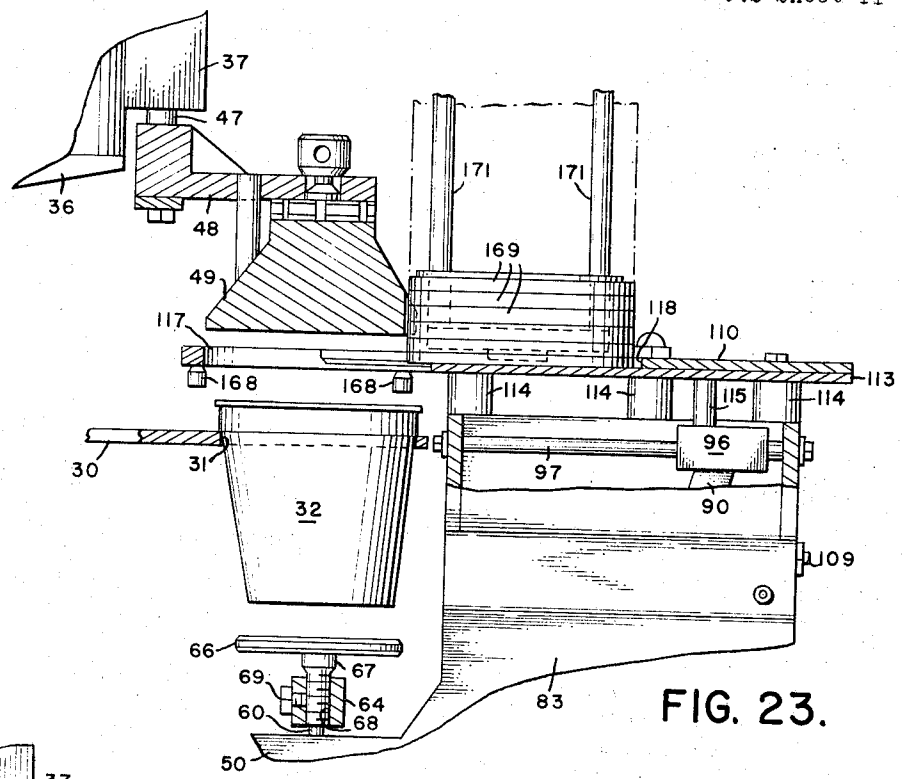


FIG. 23.

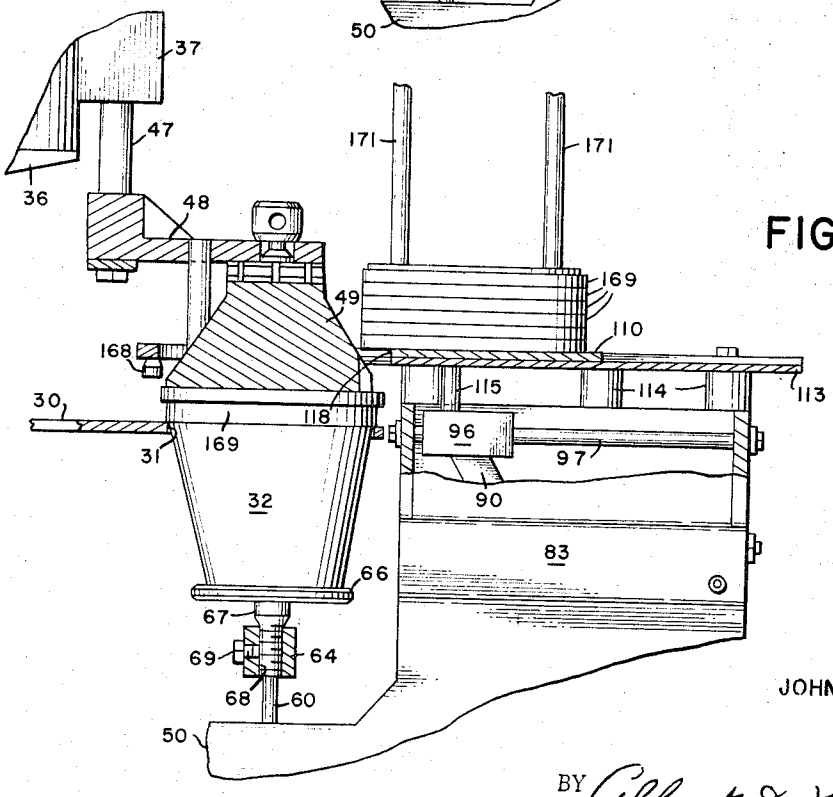


FIG. 24.

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United States Patent Office 3,345,801 Patented Oct. 10, 1967

3,345,801

AUXILIARY UNIT FOR PACKAGING MACHINE

John B. West, Pikesville, Md., assignor to Maryland Cup Corporation, Owings Mills, Md., a corporation of Maryland

Filed Jan. 4, 1965, Ser. No. 423,112
3 Claims. (Cl. 53—311)

This invention relates to packaging machines and it is more particularly concerned with devices adapted to be attached to a packaging machine for the purpose of feeding lids of containers to a point where the lids can be secured in position on the containers after being filled with various products, such as ice cream, cheese, sour cream, et cetera.

In copending patent application, Ser. No. 292,359, there is described a machine for packaging food products which comprises: horizontal loading wheel having a series of circumferentially arranged apertures adapted to support open containers to be filled, a vertical cylindrical sleeve concentrically secured to the wheel, means for rotatably supporting the sleeve, a shaft rotatably mounted in the sleeve coaxially, means for rotatably supporting the shaft and one or more driving gears connected to the shaft and sleeve adapted to drive auxiliary units of the machine. Means are also provided for connecting a source of power to intermittently rotate the sleeve and continuously rotate the shaft. The gear means are contained in housings having openings through which driven gears can be meshed with the driving gears for powering the auxiliary units.

One of the objects of the present invention is the provision of auxiliary units that can be attached to and supported by a machine of this general type and engaged with the driving mechanism thereof at one or more points for the purpose of feeding container lids of various kinds to the loading wheel at selected stations and for securing the lids on the containers as the containers pass through the station.

Another object of the invention is the provision of such auxiliary units which can function with various types of lids including: (1) flanged, non-nestable type lids; and (2) lids which can be provided in the form of a stack and from which they can be withdrawn one by one.

A further object of the invention is the provision of means capable of receiving certain lids in a haphazard relation relative to each other and orienting them for correct disposition to be fed to the station where they are to be applied to the containers.

A still further object of the invention is the provision of auxiliary units which are rugged in construction, dependable in operation, which are long-wearing and which are not likely to get out of working order during prolonged periods of use.

These and still further objects, advantages and features of the invention will be apparent from the following description considered together with the accompanying drawing.

In the drawing:

FIGURE 1 (sheet 1) is a front elevational view of one embodiment of the invention attached to the basic packaging machine, the latter being partly broken away.

FIGURE 2 (sheet 1) is an elevational view, partly broken away, of a filled container having a lid thereon of the general type employed in the first embodiment as the same would appear after being operated upon by the embodiment.

FIGURE 3 (sheet 2) is a top plan view of the embodiment of FIGURE 1, partly broken away.

FIGURE 4 (sheet 3) is a side elevational view, partly broken away, of the same embodiment taken from the right side of FIGURE 1.

FIGURE 5 (sheet 2) is a fragmentary side elevational view of the embodiment taken from the left side of FIGURE 1.

FIGURE 6 (sheet 3) is a sectional view along the line 6—6 of FIGURE 4.

FIGURE 7 (sheet 1) is a sectional view along the line 7—7 of FIGURE 4.

FIGURE 8 (sheet 4) is a sectional view along the line 8—8 of FIGURE 3 showing the escapement mechanism in its holding position.

FIGURE 9 (sheet 4) is a view similar to FIGURE 8 with the escapement mechanism in a release position.

FIGURE 10 (sheet 5) is a vertical sectional view of the embodiment, generally on a larger scale, showing the feeding mechanism in one of its two extreme positions.

FIGURE 11 (sheet 6) is a view similar to FIGURE 10 with the mechanism in the opposite extreme position.

FIGURES 12 and 13 (sheet 7) are fragmentary views showing portions of FIGURES 10 and 11 relating to the feed stopping mechanism in its locked and unlocked positions, respectively.

FIGURE 14 (sheet 7) is a section along the line 14—14 of FIGURE 12.

FIGURE 15 (sheet 7) is a section along the line 15—15 of FIGURE 12.

FIGURE 16 (sheet 8) is a section along the line 16—16 of FIGURE 10.

FIGURE 17 (sheet 8) is a section along the line 17—17 of FIGURE 10.

FIGURE 18 (sheet 8) is a section along the line 18—18 of FIGURE 10.

FIGURE 19 (sheet 9) is an elevational view similar to FIGURE 1 illustrating a second embodiment of the invention.

FIGURE 20 (sheet 9) is an elevational view of a group of stacked lids partly in section of the type with which the second embodiment of the invention is adapted to function.

FIGURE 21 (sheet 10) is a sectional view along the line 21—21 of FIGURE 19.

FIGURE 22 (sheet 10) is a side elevational view of the second embodiment from the right side of FIGURE 19.

FIGURE 23 (sheet 11) is a vertical sectional view, generally, of the second embodiment, with some parts removed and with the mechanism in its open position for receiving a lid to be secured on a container.

FIGURE 24 (Sheet 11) is a view similar to FIGURE 23 with the mechanism in position to seat a lid on the container.

FIGURE 25 (Sheet 9) is a sectional view along the line 25—25 of FIGURE 21.

Referring with more particularity to the drawings, in which like numerals designate like parts throughout the various figures, the embodiment illustrated in FIGURES 1–18 is adapted to the machine described in application for patent, Ser. No. 292,359, filed July 2, 1963, Patent No. 3,225,889, to which reference is made for a complete description. In general, however, the machine of said prior application comprises a loading wheel 30 provided with apertures 31 for holding containers 32 of the tapered

open top type to be filled and capped at various stations defined by auxiliary units attached to the machine. A housing 33 below the loading wheel 30 contains a driving gear 34.

Another driving gear 35 is contained in a housing 36 above the loading wheel 30. The housings 33 and 36 are structurally capable of supporting the auxiliary equipment which comprise embodiments of the present invention hereinafter described.

An upper housing 37 is disposed on the top of the upper housing 36 and secured by bolts 38. On the interior of the housing 37 is a vertical barrel cam 39 secured to a vertical shaft 40 for rotation therewith. The shaft is rotatably mounted in bearings 41 and 42 and its lower end is provided with a pinion 43 which meshes with the driving gear 35. The barrel cam 39 has a peripheral camming groove 44 which receives a cam follower in the form of a roller 45 mounted on a crosshead 46. The crosshead is securely clamped to vertical reciprocating shafts 47 within the housing. The lower ends of the shafts 47 extend downwardly through the housing 37 to the exterior thereof and are fixed to a horizontal arm 48 to the outer end of which a pressure pad 49 is attached in alignment with an aperture 31 at the lidding station where the lids are placed on the containers.

To the lower housing 33 there is attached another portion of the device in the form of a housing 50. The housing 50 contains a rotary cam 51 mounted on a vertical shaft 52 for rotation therewith. A gear 53 is integral with the cam 51 for rotation therewith. The shaft 52 is rotatably mounted in bearings 54 and 55 and is driven through the gear 53 by means of an idler or reversing gear 56 in meshed relation with it and with the driving gear 34.

A cam follower in the form of a roller 57 engages the upwardly facing camming surface 58 of the cam 51. The roller 57 is mounted on a crosshead 59 that is secured to a pair of vertical reciprocating shafts 60. The crosshead 59 is biased downwardly by a coil spring 61 disposed between a retaining well 62 therein and a well 63 thereabove in the housing 50. The upper ends of the shafts 60 project upwardly through the housing 50 to which a pedestal carrier 64 is removably attached by means of bolts 65. This carrier is adapted to support one or a pair of pedestals, such as the pedestal 66, through its stem 67 set in a socket 68 of the carrier and releasably secured to it by a set screw 69.

The pedestal 66 is adapted to engage the bottom of a filled container 32 carried by the wheel 30 and elevate it to a position for receiving a non-nestable lid 70 according to the first embodiment from the lid feeding mechanism hereinafter more fully described.

To the lower end of the shaft 52 there is secured a horizontal crank arm 71. The outer end of the arm 71 has a vertical pin 72 which engages a socket 73 at one end of a connecting rod 74. The opposite end of the connecting rod is connected by a pin 75 to the arm 79 of a crosshead 76 which slidably reciprocates on a pair of fixed horizontal shafts 77.

The arm 79 slidably engages and extends outwardly through a block 78 attached to the housing 50. The lower ends of a pair of levers 80 are pivotally connected to the arm 79 at 81. The levers 80 are fulcrumed on a horizontal transverse shaft 82 rotatably supported on side walls 83 and 84 that comprise a housing for the upper part of the levers. The levers are tied together for comovement by a connecting block 85 and bolts 86.

The upper ends of the levers 80 are each provided with open slots or notches 87 to releasably engage the outer ends of a latch pin 88 carried by a lever 89 on a pivoted arm 90. The arm 90 is straddled by the levers 80 and its lower end is pivoted on the same shaft 82 to which the levers 80 are fulcrumed. (See FIG. 14.)

The pin 88 has a limited longitudinal movement relative to the arm 90 by virtue of a slot 91 through which it is disposed and it is biased to the lower position in the slot by means of a coil spring 92 connected at one end to the lever 89 and at its other end, to a point 93 on the arm 90.

The upper end of the arm 90 carries rollers 94 which engage a vertical slot 95 in a carrier 96 slidably mounted on a pair of parallel bars 97 fixed to structural members 98 and 99.

When the levers 80 are latched to the arm 89 by engagement of the pin 88 in the notches 87, reciprocation of the arm 79 causes co-oscillation of the arm 90 and levers 80 to cause the carrier 96 to reciprocate on the bars 97. However, when the levers 80 are unlatched from the arm 90 by disengagement of the pin 88 from the notches 87, oscillation of the levers 80 is not transmitted to the arm 79, thereby resulting in an arrest of movement of the carrier 96.

Disengagement of the pin 88 with the notches 87 is effected by means of a bell crank 100 pivoted on a shaft 101. The upper arm 102 has a camming edge 103 adjacent to a notch 104. In its upper position, as shown in FIG. 13, the camming edge 103 is in alignment with the path of movement of the pin 88 whereby, as the pin contacts the edge 103, it is moved upwardly out of the notches 87 against the force of the spring 92 and is seated on the notch 104. When the bell crank is in its lower position, as shown in FIG. 12, camming edges 105 of the oscillating levers 80 force the pin 88 into the notches 87.

The bell crank 100 is lifted to its uppermost position by an ecentric cam 106 mounted for rotation on a crank shaft 107. A crank arm 108, attached to the crank shaft, is disposed on the outside of the wall 84 in a position accessible to the operator. In the upper position of the cam 106, it holds the bell crank in an elevated position to raise the arm 102 to the unlatched position. In the lower position of the cam 106, the upper arm of the bell crank is lowered first under the force of the spring 92 acting against it through the pin 88, and then under the force of gravity alone. The cam 106 can be held in the upper position by a set screw 109.

The carrier 96 supports a platen 110 which is slidably mounted in a recess 111 of a platform 113. The platform 113 is mounted on posts 114, and the platen 110 is connected to the carrier 96 by means of pins 115 passing through slots 115A of the platform and engaging apertures 116 of the carrier. The platform 113 extends inwardly over the apertures 31 of the loading wheel 30, and is provided with a discharge opening 117 for the lids to be placed on the containers. The opening 117 is aligned with the container supporting pedestal 66.

The lids 70 are placed one at a time in a position on the platform 113 by means hereinafter described, and they are fed to the opening 117 by engagement with the inner edge 118 of the reciprocating platen 110.

The lids reach the platform by means of a chute the lower discharging end being disposed on one side of the platform. The chute is formed of a pair of bottom arcuate rods 119 and 120 and a top arcuate plate 121 in spaced relation to the rods. The upper end of the chute is opened to the inner end of a semi-cylindrical cradle 122 formed of separate stationary frame rods 123 connected with suitable struts and a pair of diametrically opposed parallel feed rollers 124 and 125 mounted as a unit on the frame structure 126 and attached to the platform 113 by bolts 127.

The rollers 124 and 125 are mounted on suitable bearings 128 and 129, respectively, of the frame structure and are connected at their outer ends to pulleys 130 and 131. These pulleys are driven by a belt 132 engaging the takeoff pulley 133 of an electric motor 134 mounted on and carried by the frame structure by bolts 135. One or both of the rollers is provided with a raised helical configuration 136 on the surface thereof, whereby when lids 70 are placed in the trough, they are forced thereby toward the inner end into the chute.

Contact with the rotating rollers **124** and **125** by the lids **70** also results in their proper orientation in vertical planes at right angles to the longitudinal axis of the cradle so as to properly enter the chute. Thus, lids placed in the chute in generally disoriented positions are urged to a vertical position of proper orientation for reception by the chute.

Lids falling in the chute are controllably discharged one by an escapement mechanism which comprises a transverse detent **137** at the end of an arm **138** carried by a rocker shaft **139**. The rocker shaft is supported on bearings **140** and **141** and has a crank arm **142** on one side provided with a cam plate **143** in alignment with the path of travel of a roller **144** mounted on the reciprocating platen **110**.

Due to the reciprocation of the platen **110**, the roller **144** is brought into contact with the cam plate **143** cyclically to raise the plate and thus oscillate the rocker shaft **139** and the detent **137** to which it is attached. This has the effect of periodically releasing one of the lids **70** which are normally held in the chute by the detent (see FIGS. 8 and 9). The cam plate **143** is biased to the lower position by means of a spring **145** attached at one end to a stationary point **146** of the frame and at the other end to a rocker arm **147** of the rocker shaft **139**.

An upper detent for the lids at the discharge end of the cradle **122** is provided in the form of a horizontal bar **148**. The bar **148** is secured to one end of a radial arm **149**; the other end of the arm being secured to a rocker bar **150** of a shaft **151** by a bolt **152**. The shaft **151** is mounted in bearings **153** and **154** in frame numbers **155** and **156** respectively.

One end of the shaft **151** is bent to form a crank arm **157** which is pivotally connected to one end of a connecting rod **158**. The opposite end of the rod **158** is connected in a special way to a rocker arm **159** of the rocker shaft **139**. The outer end of the arm **159** has an eye **160** through which the rod **158** is slidably engaged. An abutment **161** is fixed to the rod **158**. The rod **158** carries a coil spring **162**, concentrically, which is held in position by a nut **163** and tensioned to urge the arm **159** in contact with the abutment **161**.

By these means oscillation of the rocker shaft **139** is effected to oscillate the detents **137** and **148** and effect an escapement of lids **70** one at a time from the cradle **122** into the chute and from the chute onto the platform **113**. Each lid on the platform is moved by the leading edge **118** of platen **110** to a position over the discharge opening **117** and is pressed on to an underlying container **32** on the pedestal **66** by the pad **49**. The pedestal **66** is elevated by the mechanism to which it is attached, described above, sufficient to raise the rim of the container **32** above the loading wheel **30** so that the lid may be pressed down far enough without being interfered with by the loading wheel (see FIG. 11). At this station also the side of the container, at a point just below the loading wheel **30** is pressed inwardly by a pressure bar **164** to cause a slight deformation in the container sufficient to effect a release of the trapped air therein and thereby preventing the lid from popping off after the container is discharged from the machine.

The pressure bar **164** is supported along the side of the locus of a container **32** resting on the pedestal **66** by means of a bracket **165** attached to the platform **113** by bolts **166**.

A plate **167** is integral with the bracket **165** and extends over the platform **113** on the side opposite the cradle **122** to engage the top of the lids **70** as they are disposed on the platform, thereby retaining them in a proper horizontal position until they reach the discharge opening **117** (see FIG. 9). A group of pins **168** is attached to the bottom of the platform **113** about the opening **117** the purpose of which is to frictionally engage the periphery of the lids and prevent them from slipping through under the force of gravity until positively forced through by pressure from the pad **49**. In this way, proper orientation is maintained of the lids for application to the container.

In FIGS. 19 to 24, there is illustrated another embodiment of the invention for use with nestable lids **169** that are capable of being arranged in a stack with the bottom-most lid of the stack being removable by lateral displacement. This embodiment is essentially the same as the first, except as indicated hereinafter, and to the extent that these embodiments are the same, like numerals are used in the drawing to designate like parts. The modification consists essentially of dispensing with the cradle **122** of the first embodiment together with the auxiliary escapement mechanism and in place thereof substituting a vertical lid rack **170** comprising a group of spaced vertical bars **171** for holding the stack of lids **169** directly over the platform **113** in front of the edge **118** of the reciprocating platen **110** when in its retracted position. The bars **171** are supported on brackets **172** and **173** attached to the platform **113** by bolts **174** and **175** in a horizontal plane above the platform and spaced from it a distance substantially equal to the thickness of one of the lids **169**, whereby the lowermost lid of the stack of lids can be moved laterally by protraction of the reciprocating platen **110** while the remaining lids of the stack thereabove are restrained by the bars **171**.

A portion **176** of the pressure pad **49** in this embodiment is cut away to accommodate the lids in their proximity.

A further modification of this second embodiment involves the elimination of the pressure bar **164** of the first embodiment and providing instead a pair of lobes **177** and **178** between which the containers are carried by the wheel **30** after the lids have been applied. These lobes are carried at the opposite ends respectively, of a rod **179** which rod is in turn supported on a cantilever bracket **180** secured to the platform **113** by bolts **181**. The lobes are effective to push the walls of the container inwardly on opposite sides adjacent the lid to cause air pressure inside the container to be released.

Having thus described my invention, I claim:

1. A machine having a rotatable horizontal wheel, said wheel having openings for supporting open top tapered containers and for carrying them stepwise to a station for the disposition of closure lids on the containers, a holder for a group of closure lids, means for separating a lid of the group and moving it from the holder to a position above the container, means for moving the lid and container held in the opening at the station relative to each other to effect mutual engagement, and a pressure bar adjacent said station, said bar being adapted to engage and deform a portion of the wall of the container adjacent the lid so as to release from the container entrapped air under pressure.

2. A machine for applying lids to containers comprising a container supported at a defined station, a holder for a group of container lids, means for selectively feeding the lids one by one from the holder, a platform overlying the container support for receiving lids fed from the holder by said means, a lid retaining plate overlying the platen on the side opposite the holder to slidably engage the top of lids as they are received by the platform, a reciprocatable platen overlying said platform, said platform having an opening for the discharge of lids received by the platform, means for reciprocating the platen to move the lids on the platform over said opening, detents adjacent the opening to contact the edges of the lids in said opening and restrain them frictionally from passing therethrough under the force of gravity alone, a reciprocating pedestal for engaging and elevating on its upward stroke the container relative to the wheel, a reciprocating pressure pad above the pedestal for engaging on its downward stroke the lid in its position above the container and means for actuating and for synchronizing

the reciprocating movements of the pedestal and pad so that the pad moves downward when the pedestal moves upward to effect an engagement of the container with the lid, said means for reciprocating the platen being in synchronization with the movements of the pedestal and pad to cyclically position a lid in the opening of the platform.

3. A machine as defined by claim 2 in which the means for reciprocating the platen comprises a reciprocating shaft, an unconstrained linkage connecting the shaft with the platen and means for constraining the linkage while the reciprocating shaft is in motion to cause transmission of motion from the shaft to the platen.

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