June 27, 1967 R. C. TALBOT 3,327,680

HOT MELT GLUING MACHINE

Filed Feb. 6, 1964 5 Sheets-Sheet 1

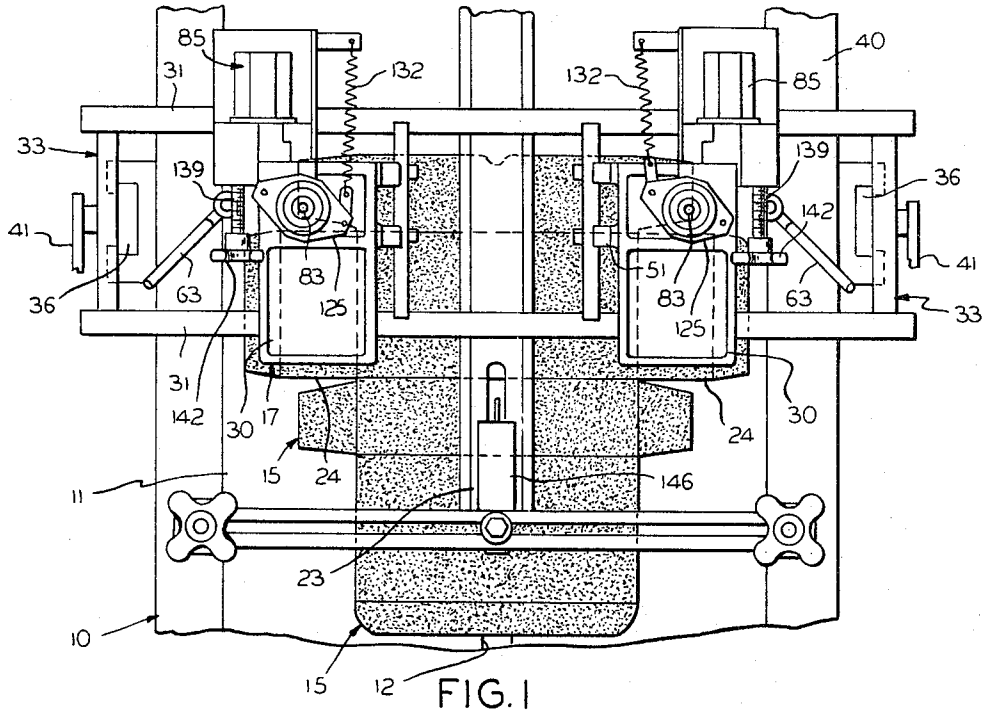


FIG. 1

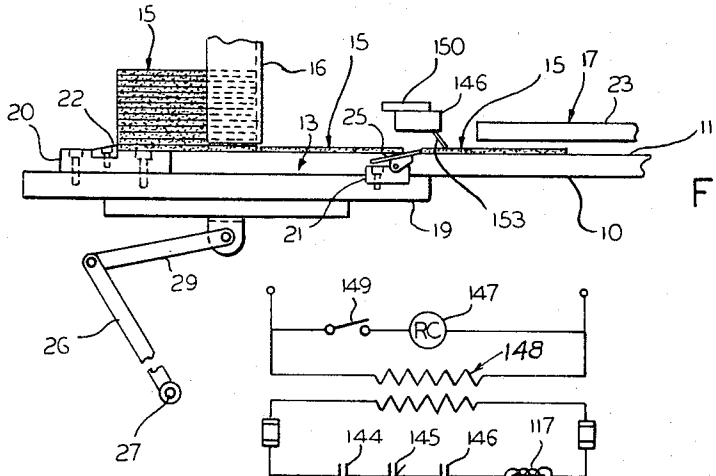


FIG. 10

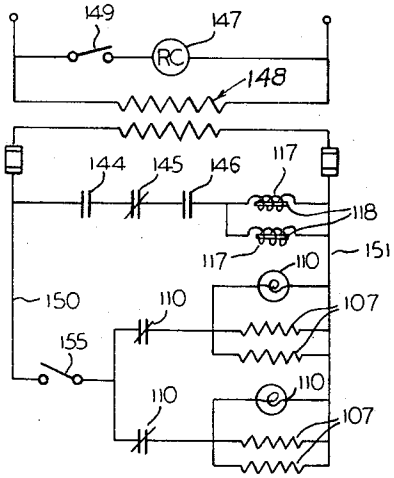


FIG. 11

INVENTOR.
RICHARD C. TALBOT
BY Hill, Sherman, Meroni, Gross & Simpson
ATTORNEYS

June 27, 1967 R. C. TALBOT 3,327,680

HOT MELT GLUING MACHINE

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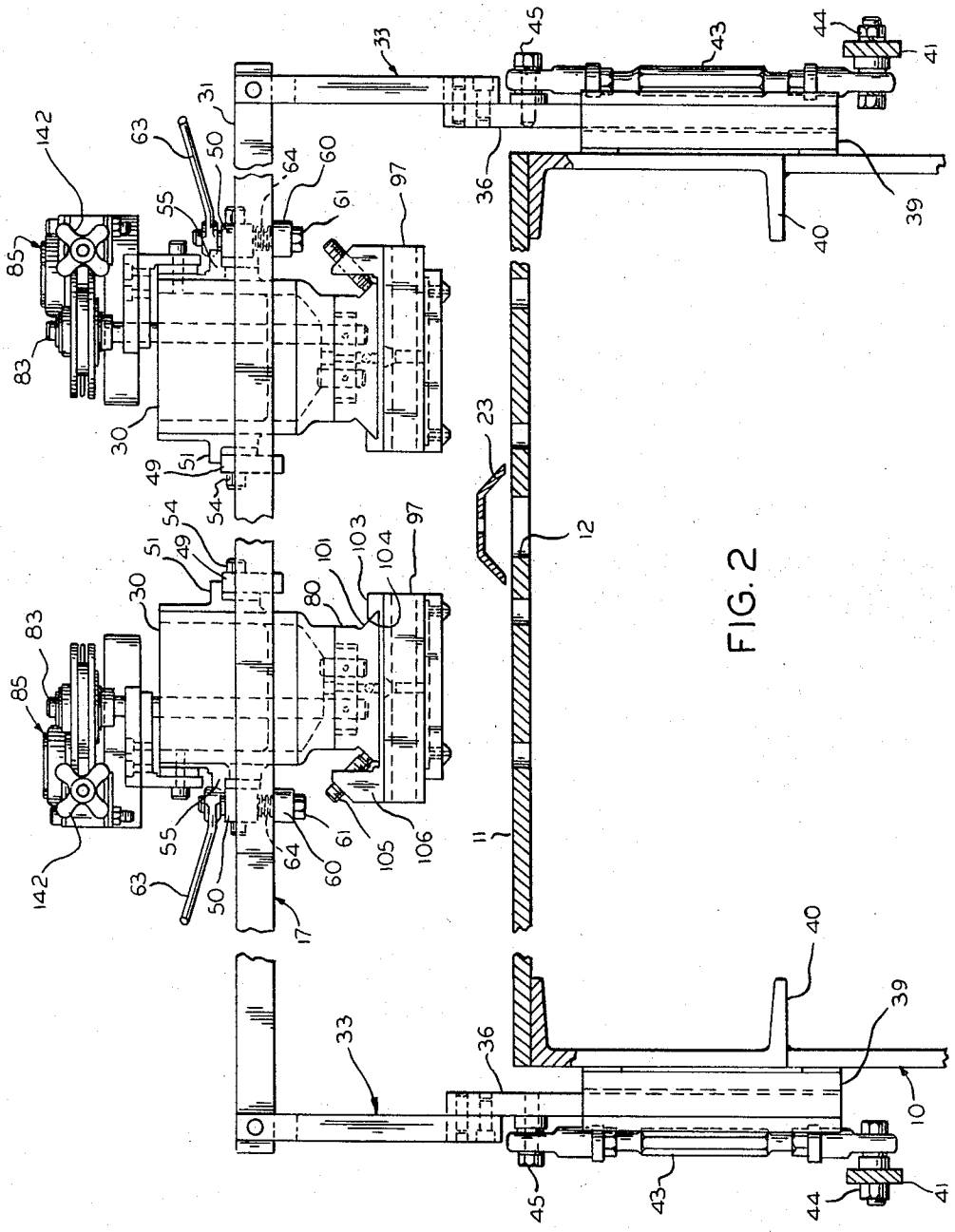


FIG. 2

INVENTOR.
RICHARD C. TALBOT

BY Hill Sherman Meroni Gross & Simpson.
ATTORNEYS

June 27, 1967 R. C. TALBOT 3,327,680

HOT MELT GLUING MACHINE

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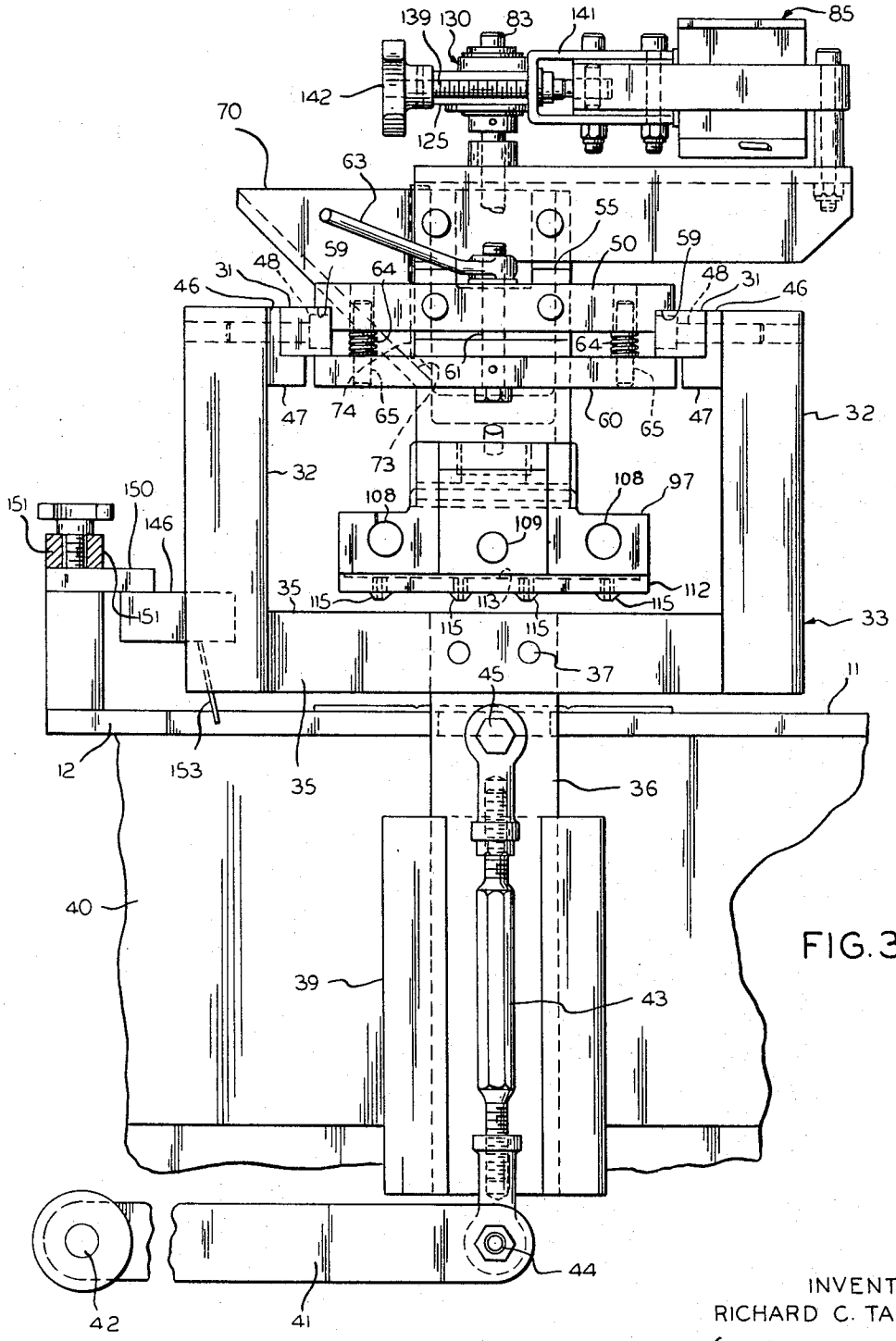


FIG. 3

INVENTOR.
RICHARD C. TALBOT

BY Dill, Sherman, Meroni, Gross & Simpson

ATTORNEYS

June 27, 1967 R. C. TALBOT 3,327,680

HOT MELT GLUING MACHINE

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FIG. 4

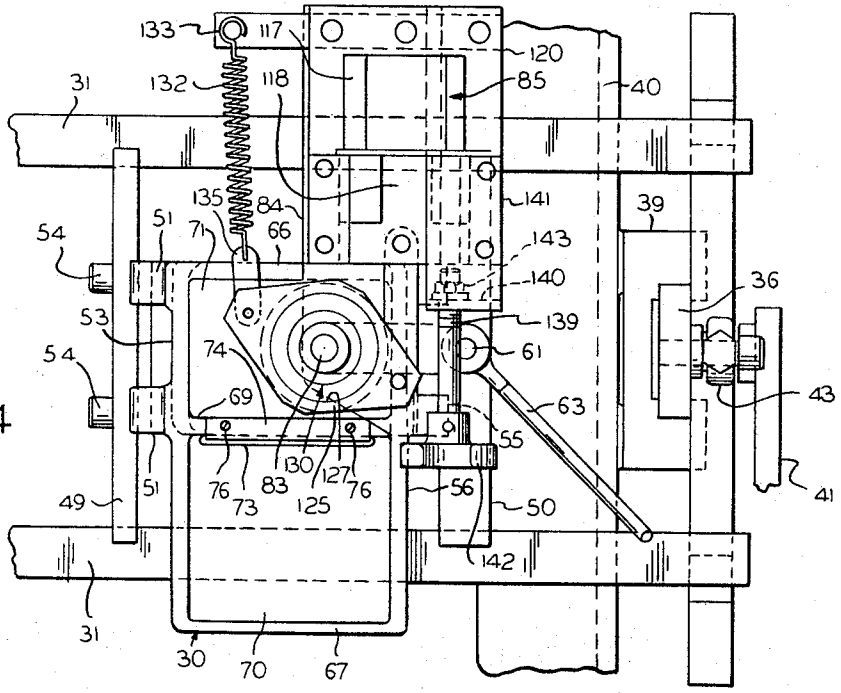
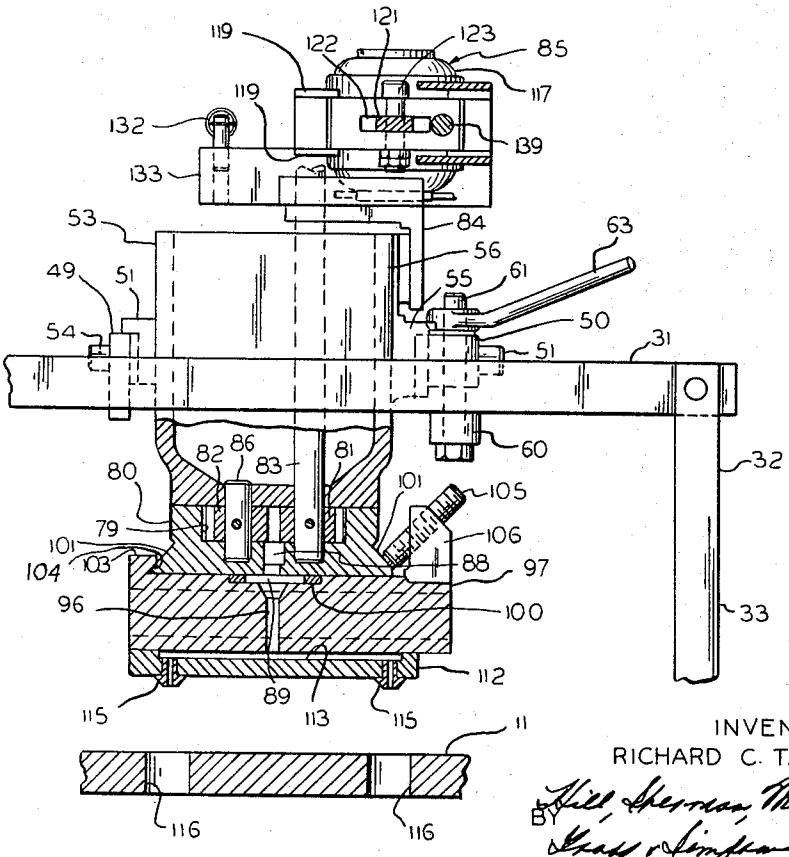


FIG. 5



INVENTOR.
RICHARD C. TALBOT

BY Hill, Sherman, Meroni, Gross & Simpson

ATTORNEYS

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HOT MELT GLUING MACHINE

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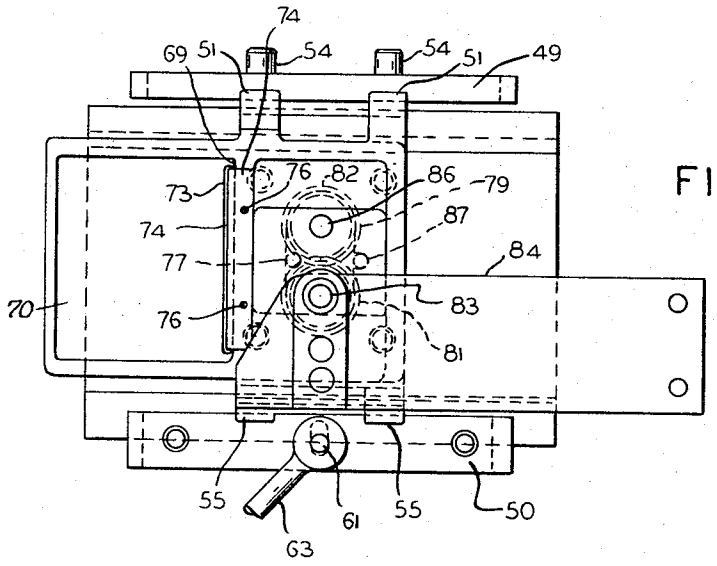


FIG. 6

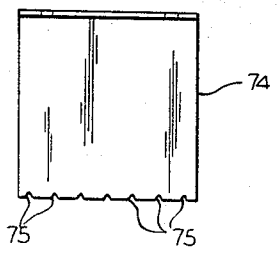


FIG. 9

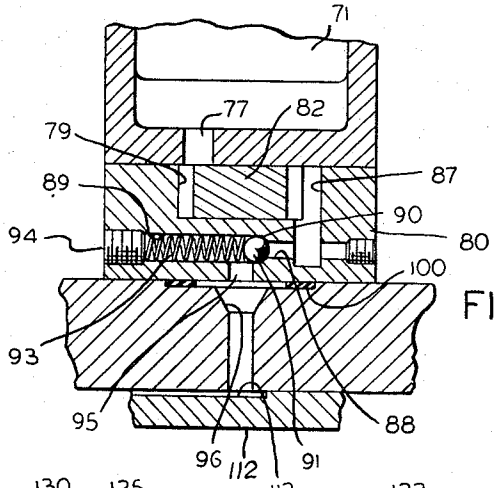


FIG. 7

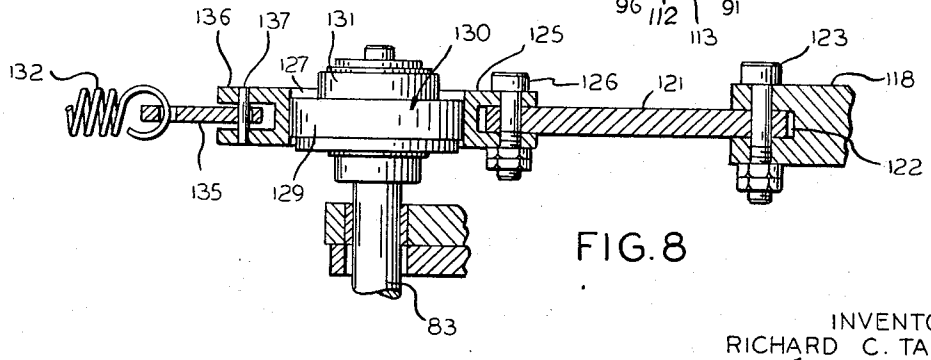


FIG. 8

INVENTOR.
RICHARD C. TALBOT

BY Hill, Sherman, Meroni, Gross & Simpson

ATTORNEYS

United States Patent Office 3,327,680 Patented June 27, 1967

3,327,680

HOT MELT GLUING MACHINE

Richard C. Talbot, Skokie, Ill., assignor to Peters Machinery Company, Chicago, Ill., a corporation of Illinois

Filed Feb. 6, 1964, Ser. No. 343,047
12 Claims. (Cl. 118—2)

This invention relates to improvements in apparatus for forming cartons and the like and more particularly relates to an improved apparatus for applying hot melt glue to cartons prior to forming.

Heretofore, glue has been applied to carton blanks, prior to forming, by cold melt gluing apparatus, one form of carton forming and gluing apparatus, commonly used being a type shown and described in Patent No. 3,056,-337, which issued to George K. Bahr and Edward Rose on Oct. 2, 1962, and is entitled, "Forming and Gluing Machine" and assigned to the assignee of the present invention.

The gluing apparatus of that patent performs a satisfactory job, but since the glue is of a cold melt type, the setting time of the glue is relatively long and the formed carton must be held under pressure until the glue sets. This slows down the production of the apparatus and where the holding time of the carton under pressure is reduced in an effort to increasse production, the cartons frequently spring apart in further processing.

A principal object of the present invention is to remedy the foregoing disadvantages in the forming of cartons by providing a novel and improved form of apparatus for applying hot melt glue to certain flaps of the carton blank prior to forming, for thereafter adhesively retaining the carton to form, during the subsequent carton forming operation.

Another object of the invention is to provide a gluing apparatus in a carton forming machine for automatically applying hot melt glue to certain flaps of a carton blank, and so arranged as to meter the glue to the carton blanks and to prevent the gluing operation from occurring when a carton is not present at the gluing station.

A further object of the invention is to provide an improved form of glue pot for hot melt gluing machines in which the glue pot has a pre-melt section receiving glue flakes, pellets and the like, in which the glue is initially melted, and a main reservoir section for storing the melted glue, with strainer means between the sections, and glue metering means in communication with the bottom of the main reservoir section.

A still further object of the invention is to provide an improved form of gluing apparatus for applying hot melt glue to carton blanks having a glue pot and applicator plate extending along the bottom of the glue pot, in which the glue pot and applicator plate are vertically movable into engagement with the flap of a carton blank, and in which the glue is metered to the applicator plate by a gear pump in the bottom of the glue reservoir and cycled a part of a revolution, as the applicator plate moves downwardly into glue applying relation with respect to a carton blank.

A still further object of the invention is to provide a gluing device for carton blanks and the like including a heated glue reservoir and applicator plate extending across the bottom of the glue reservoir and having glue nozzles opening to the bottom thereof, a glue pump in the bottom of the glue reservoir for metering glue to the nozzles, and a check valve in the passageways from the pump to the nozzles creating a vacuum when the pump is not in use and preventing the dripping of glue from the nozzles.

A still further object of the invention is to provide an improved form of glue pot and metering device for glue

in the form of a gear pump in the bottom of the glue pot, and a solenoid energizable to actuate the glue pump in accordance with one stroke of the armature of the solenoid, each time a carton blank comes into a gluing position.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a generally diagrammatic plan view showing a carton blank in position in the apparatus to have glue applied to the center flaps thereof, prior to forming;

FIGURE 2 is a fragmentary transverse sectional view taken through the apparatus, with certain parts removed and certain other parts broken away;

FIGURE 3 is a fragmentary view in side elevation of the apparatus shown in FIGURES 1 and 2 with certain parts broken away;

FIGURE 4 is a fragmentary plan view of the apparatus with certain parts broken away;

FIGURE 5 is a fragmentary end view of the apparatus with certain parts broken away and certain other parts shown in section in order to illustrate certain details of the glue pump and applicator plate;

FIGURE 6 is a plan view of one of the glue pots with the actuating mechanism for the pump removed;

FIGURE 7 is a transverse sectional view taken through the pump in order to show the check valve in the passageway to the applicator plate for the apparatus;

FIGURE 8 is a vertical srectional view taken through the drive linkage for the glue pump;

FIGURE 9 is a side view of the strainer plate, straining the glue passing from the pre-melt section to the main reservoir section of the glue pot;

FIGURE 10 is a diagrammatic view looking along the feeder slot of the apparatus and diagrammatically showing a means for supplying cartons to the gluing and forming stations of the apparatus; and

FIGURE 11 is a schematic wiring diagram of the gluing control circuit.

In the embodiment of the invention illustrated in the drawings, I have shown a hot melt gluing apparatus, forming the gluing station of a carton forming and gluing machine of a type similar to that shown and described in the aforementioned Bahr and Rose Patent No. 3,056,-337, dated Oct. 2, 1962. The carton feeding, folding and discharge stations of the apparatus operate on the principles disclosed in Patent No. 3,056,337, so need not herein be shown or described except where necessary to render my present invention readily understandable.

The machine generally includes a main frame **10** having a support plate or table top **11**, supporting cartons for gluing and folding of the flaps, and having a central slot **12** formed therein and extending therealong for a portion of the length thereof, to accommodate a carton blank feeder **13** to move therealong and advance a glued carton to a carton forming and discharge station, operating on principles similar to those shown and described in Patent No. 3,056,337, so not herein shown or described further. The machine also includes a magazine **16** for the carton blanks **15**, holding a stack of cartons in position to be taken from the bottom of the stack one by one and supplied to a gluing station **17**.

The feeder **13** is generally similar to that shown and described in Patent No. 3,056,337 and is diagrammatically shown in FIGURE 10 as including a slide **19** slidably guided beneath the table top or plate **11** in registry with the slot **12**. The slide **19** has spaced blocks **20** and **21** mounted at the respective rear and advance end portions thereof and extending upwardly therefrom through the

slot 12. The block 20 has an abutment member 22 mounted thereon and extending above the top thereof a distance substantially equal to the thickness of a carton blank 15 for engaging the edge of a bottom blank in the magazine 16 and ejecting a first blank from the magazine 16 and feeding a next advance blank to the gluing station 17 beneath a hold down shoe 23 at said gluing station into position to have glue applied to central flaps 24 of the carton blank, prior to folding.

The advance block 21 has a transversely pivoted abutment member 25 pivotally mounted thereon and projecting upwardly therefrom in position to engage the edge of a carton blank at the gluing station, and advance the carton blank to a forming station (not shown), forming the glued carton to its completed form for discharge for filling or other treatment. The pivoted abutment member 25 is biased by gravity in the upwardly extending position diagrammatically shown in 52 and tilts downwardly to a horizontal position beneath a carton blank during return travel of the slide 19, as shown and described in Patent No. 3,056,337.

The slide 19 is moved back and forth by operation of a lever 26 on a transverse shaft 27 rocked back and forth by operation of a suitable motor (not shown) through a drive connection similar to that shown and described in Patent No. 3,056,337. The lever 26 is connected to the slide 19 to move the slide back and forth through a connecting rod 29.

A motor driven vacuum pump (not shown) is also provided to hold the cartons in position on the top of the table or plate 11 to be contacted by the abutment 22 as in the aforementioned Patent No. 3,056,337.

The gluing station 17, as shown in FIGURES 1, 3 and 4 generally includes a pair of laterally spaced glue pots 30, 30 mounted on each side of the slot 12 and hold down plate 23 on parallel spaced transversely extending support bars 31, 31. The support bars 31 are supported at their opposite ends on the insides of upright parallel spaced legs 32, 32 of vertically movable yokes 33, guided in the main frame 10 for vertical movement with respect thereto to bring the glue pots 30 downwardly into gluing position with respect to a carton 15 as the carton is advanced to the gluing station 17.

Each yoke 33 has a base 35 extending between the bottoms of the legs 32 and supporting said legs to extend upwardly therefrom. A bearing bar 36 extends upwardly along the central portion of the base 35 and is secured thereto to depend therefrom as by machine screws 37. The bearing bars 36 form vertically reciprocable supports for the yokes 33 and glue pots 30 and may be made from brass or a like bearing material. The bearing bars 36 are shown in FIGURES 3 and 4 as being slidably guided in gibbed guides 39 mounted on the outsides of the webs of channels 40, forming a support for the plate 11. The slides 36 are held in position with respect to the gibbed guides 39 or are vertically moved along said guides by the operation of lever arms 41 disposed beneath and outwardly of the gibbed guides 39 and pivotally mounted on a transverse rock shaft 42 suitably journalled in the main frame 10. An adjustable connecting link 43 in the general form of a turn buckle is pivotally mounted to the outer end of a lever 41 on a pivot pin 44 and to the bearing bar 36 above the gibbed guide 39 on a pivot pin 45. The shaft 42 and lever arm 41 are rocked up and down in a predetermined sequence timed with the feeder 13 to bring the glue pots 30, 30 down into gluing relation with respect to a carton blank as a carton blank is advanced beneath said glue pots, and to retractibly move the glue pots 30, 30 above the carton blank to accommodate upward folding of the end flaps of the carton blank prior to the forming operation thereof, as in the aforementioned Patent No. 3,056,337. The drive to the rock shaft 42 and rocking arms 41 is through a suitable cam and lever arrangement (not shown) like that shown in Patent No. 3,056,337 so not herein shown or described further.

The vertical legs 32 of the yoke 33 have angle brackets 46 at the top inside portions thereof having vertical legs 47 extending inwardly of the legs 32 and forming supports for the support bars 31. The bars 31 are secured to the angle brackets 46 as by cap or machine screws 48.

The glue pots 30 are adjustably mounted on the bars or rails 31 on spaced support bars 49 and 50, extending along opposite sides of said glue pots and suitably insulated from the sides thereof. A support bar 49 is lapped by laterally spaced horizontally extending ledges 51 extending outwardly from a side wall 53 of the glue pot 30 and is secured to said wall by machine screws 54. The bar 49 has downwardly opening rectangular notches (not shown) at each end thereof slidably engaging the rails 31.

The bar 50 is lapped by laterally spaced horizontally extending ledges 55 extending outwardly of a side wall 56 of the glue pot 30 parallel to the side wall 53 and is secured to said side wall by machine screws 57. The bar 50 has downwardly opening rectangular notches 59 at each end thereof slidably engaging the tops and inner sides of the rails 31. A clamping bar 60 is mounted beneath the bar 50 and has a vertically extending bolt 61 secured thereto and extending upwardly therefrom through and above the bar 50. A clamping lever 63 is threaded on the upper end of the bolt 61 to clamp the bars 50 and 60 to the rails 31 and hold the glue pot in position. Compression springs 64 are interposed between the bars 50 and 60 and encircle pins 65. The pins 65 are shown as being mounted in the clamping bar 60 and as extending upwardly therefrom and having slidable engagement with the support bar 50.

The two glue pots 30 are of a similar construction and are adjustably mounted on the rails 31, 31 in a similar manner, with the clamping bars 60 on the outsides of the glue pots for ready accessibility from either side of the machine. One glue pot only, therefore, need herein be shown or described.

The glue pot 30 has the parallel spaced side walls 53 and 56 which are connected together at one end by a vertical end wall 66 and at the opposite ends thereof by an inclined wall 67. An intermediate wall 69 extends upwardly from the bottom inner side of the vertical wall 67 and divides the glue pot into a pre-melt chamber 70 and a glue reservoir 71. A port 73 forms a continuation of the inclined wall 67 and leads through the wall 69 into the glue reservoir 71. A metering plate 74 extends downwardly along the internal wall 69 in the pre-melt chamber 70 and has a bottom surface having spaced downwardly opening notches 75 therein. The plate 74 extends over the port 73 and meters melted glue into the glue reservoir 71 and also strains the glue as it passes into said glue reservoir. The metering plate 74 is secured to the top of the intermediate wall 69 as by machine screws 76 and is readily removable from said wall for cleaning.

The glue reservoir 71 has a port 77 leading through the bottom thereof and opening into a pumping chamber 79 formed in a pump housing 80. The pump housing 80 abuts the bottom of the glue reservoir and houses a gear pump in the form of two meshing gears 81 and 82, generally conforming to the form of the pumping chamber 79. The gear 81 is pinned or otherwise secured to a vertical drive shaft 83 rotatably mounted at its lower end in the pump housing 80 and extending upwardly therefrom through the bottom of the glue reservoir 71 and above the top thereof. The drive shaft 83 is journalled at its upper end portion in the horizontal leg of a bracket 84, secured to the outside of the side wall 53 on its vertical leg and extending inwardly over the top of the glue reservoir 71 (FIGURE 3). The shaft 83 and gear 81 are driven a portion of a cycle of rotation by means of a rectilinearly movable motor in the form of a solenoid 85 mounted on the horizontal leg of the bracket 84 and ex-

tending upwardly therefrom. The drive to the shaft 83 from the solenoid 85 will hereinafter be more clearly described as this specification proceeds. The gear 82 meshing with and driven from the gear 81 is mounted on a vertical shaft 86 rotatably mounted in the pump housing 80 at one end and in the bottom wall of the glue reservoir 71 at its opposite end.

A port 87 leads downwardly from the pumping chamber 79 on the opposite side of the region of mesh of the gears 81 and 82 from the port 77 and has communication with a transverse passageway 88 extending horizontally along the pump housing 80. The passageway 88 terminates into an enlarged diameter axially aligned passageway 89 forming a continuation thereof. A seat 90 is formed at the juncture of the passageways 88 and 89 and is engaged by a ball 91 of a ball check valve. The ball 91 is biased into engagement with the seat 90 by a spring 93 in the enlarged diameter passageway 89 and loaded by a plug 94 threaded in the passageway 89. A passageway 95 leads downwardly from the passageway 89 and opens through the bottom of the pump housing 80 into an enlarged diameter upwardly opening port 96 formed in a heater plate 97. The heater plate 97 is adjustably mounted on the bottom of the glue reservoir, and has a glue applicator plate 112, bolted or otherwise secured to its bottom (FIGURES 5 and 7). A gasket 100, which may be in the form of a spark plug gasket, seals the passageway 96 to the bottom of the pump housing 80 and the passageway 95 leading through the bottom of said pump housing.

The pump housing 80, as shown in FIGURE 5, has beveled ledges 101 extending outwardly therefrom at the bottom portion thereof and along opposite sides thereof. The beveled ledges in effect form a dovetail retainer or tongue and groove joint, for retaining the heater plate 97 to the bottom of the pump housing. The heater plate 97 has a gib 103 extending upwardly therefrom along one side thereof, having an inwardly facing inclined or beveled surface 104. The beveled surface 104 is of the same angle as the associated inclined surface 101. The gib 103 is maintained in engagement with the inclined surface 101 and the heater plate 97 is thereby maintained in engagement with the bottom of the pump housing 80 by a set screw 105 extending at the angle of the inclined surface 101 and threaded in a lug 106 extending upwardly of the heater plate 97, at the opposite side thereof from the gib 103. The set screw 105 is tightened into engagement with the inclined surface 101 to maintain the heater plate into firm engagement with the bottom of the pump housing 80, and to maintain a seal between the passageways 95 and 96. Heater plates of various sizes may thus be readily interchanged to accommodate the machine for various sizes of cartons.

The heater plate 97 is shown in FIGURE 3 as having two holes 108 drilled therethrough, adjacent opposite ends thereof, and adapted to carry heaters 107, which are preferably electric heaters and are diagramatically shown in FIGURE 11. A hole 109 is drilled through the heater plate 97 at the center thereof and is adapted to carry a thermostat 110 (FIGURE 11) controlling the temperature of the glue in the pot 30. The heaters 107 provide sufficient heat to heat the entire pot, to melt the glue in the pre-melt chamber 70, and accommodate the glue to flow into the glue reservoir 71. The heaters 107 may be well known forms of cartridge type resistor heaters.

A glue applicator plate 112 is secured to the bottom of the heater plate 97 and is shown in FIGURE 5 as having an upwardly opening passageway 113 in communication with the passageway 96 in the heater plate 97. The passageway 113 supplies glue to glue nozzles 115, 115, mounted in said glue applicator plate and depending therefrom. The glue applicator plate 112 may have a selected number of nozzles mounted therein in accordance with a required pattern of glue to be applied to the carton blank flap. The glue nozzles 115 apply dots of hot glue to the carton flap as the applicator plate 112 moves downwardly into engagement with a carton and the gear pump is operated for a part of a cycle of rotation thereof to eject measured quantities of glue through said nozzles. After the application of glue to the carton blank and upon withdrawal of the applicator plate 112, the ball check valve 91 will prevent air from getting to the passageways 96 and 113 and thereby create sufficient suction to prevent dripping of glue from said nozzles onto the carton or onto the plate or table top 11.

The table top 11, however, is provided with holes 116 which may be in vertical alignment with the nozzles 115 to accommodate glue to drip therethrough, in cases where the pump may be accidentally put into operation when no carton blank is on the table 11.

Referring now in particular to the operating means for the gear pump, the solenoid 85 includes a solenoid coil 117 having an armature 118 retractible within said solenoid coil upon the energization of said coil. The armature 118 is shown in FIGURE 4 as being in its extended position and is of a generally T-shaped form, having a stem retractible within the coil 117 with the cross of the T forming a head spaced outwardly of said coil, when said coil is deenergized. The head of the armature 118 is slidably guided and supported at one end between spaced guides 119 extending from a support 120 for the solenoid. A link 121 extends within a slot 122 in the head of the armature 118 and is pivotally connected to said armature as by a nut and bolt 123. The link 122 is pivotally connected to the free end of a lever arm 125 on a pivot pin 126. The lever 125 has an open widened central portion 127, the inner margin of which fits about and mounts said lever on a housing 129 for a one-way clutch 130. The housing 129 of the one-way clutch 130 is rotatably mounted for movement about the axis of the shaft 83 and about a driven member 131 for the clutch, mounted on the shaft 83 for driving said shaft a portion of a cycle of rotation thereof, upon energization of the solenoid coil 117, effecting the drawing of the armature 118 within said coil. The one-way clutch may be of any conventional form and is no part of the present invention so need not herein be shown or described further. The armature 118 is returned to its extended position shown in FIGURE 4, upon deenergization of the solenoid coil 117, by a tension spring 132. The tension spring 132 is connected at one end to a bracket arm 133 extending from the support 120 for the solenoid 85. The opposite end of the tension spring 132 is connected with a link 135 pivotally connected between the furcations of a bifurcated end portion 136 of the lever 125, on a pivot pin 137.

An adjustable stop 139 is provided to limit the stroke of the armature 118. The adjustable stop 139 is in the form of a threaded rod threaded in the vertical leg 140 of a support bracket 141 extending inwardly of the solenoid coil 85. The stop 139 has a knob 142 on its outer end, and is limited in outward movement by a nut and washer 143 threaded thereon on the inside of the vertical leg 140.

The end of the stop 139 engaging the head of the T-shaped solenoid 118, limits outward movement of said solenoid by the spring 132, and determines the length of stroke of said armature.

Thus upon energization of the solenoid coil 117, the armature 118 will be drawn inwardly along said coil and rock the lever 125 to drive the pump shaft 83 and gears 81 and 82 a portion of a cycle of rotation. This will force glue entering the pumping chamber 79 through the port 77, along the periphery of said chamber in opposite directions and will effect the discharge of glue through the port 86 and past the check valve 91, to be discharged through the glue nozzles 115 onto the flap of a carton blank, as the glue pot 30 is lowered to engage the glue applicator plate 112 with a carton blank. Upon deenergization of the solenoid coil 117 the spring 132 will return

the armature **118** to its extended position shown in FIGURE 4. During return movement of the armature there pump drive shaft **83** and glue will be held from passing will be no drive between the one-way clutch **130** and pump drive shaft **83** and glue will be held from passing through the glue nozzles **115** by the suction created by the ball check valve **91**.

Referring now to FIGURE 11 of the drawings, the solenoid coil **117** is energized through a relay switch **144**, a normally closed cam operated switch **145** and a carton sensing switch **146** in series. The relay **114** is closed upon the energization of a relay coil **147** in a primary circuit to a transformer **148** upon the closing of a switch **149** by hand. The relay **144** is connected in the secondary of the transformer **148** between conductors **150** and **151**. The relay will, therefore, close upon the closing of the switch **149** and the energization of the relay coil **147**.

The cam operated switch **145** is normally closed and is operated by a cam (not shown) and is opened upon upward movement of the glue pots to prevent the discharge of glue through the glue nozzles **115** as the glue pots move upwardly and a carton may remain in position or be brought into position to maintain the carton sensing switch **146** closed.

The cam operated connection to the cam operated switch **145** may be similar to that shown and described in the aforementioned Patent No. 3,056,337, so need not be shown or described herein.

The carton sensing switch **146** is mounted at the glue station at the entering end of the hold down shoe **23** on a bracket **150**, mounted on and extending forwardly of two parallel spaced bars **151**, spaced above the table top **11** and extending thereacross. The carton sensing switch **146** may have a feeler or switch arm **153** depending therefrom into the path of travel of a carton, and closed to close a circuit through said switch and energize the solenoid coils **117**, **117**, as a carton is in position beneath the glue applicator plates **112**, **112** as shown in FIGURE 1.

It should here be understood that the carton feeder **13** is operated in timed relation with respect to up and down movement of the glue pots **30**, **30** and glue applicator plates **112**, **112**, so that a carton is moved into position by the pusher abutment **22** as the glue pots and applicator plates move downwardly to apply spots of glue to the flaps of a carton, and the pivoted abutment **25** moves the carton away from the gluing station to a forming station, in the manner shown and described in the aforementioned Patent No. 3,056,337.

The heaters **107**, **107** for each glue pot are arranged in parallel and the energization of said heaters is controlled by the thermostatic switches **110** under the control of a manually operated switch **155** which may be closed to maintain the heaters **107**, **107** energized until opening of the circuits through said heaters by the thermostatic switches **110**.

It may be seen from the foregoing that a new and improved gluing apparatus has been provided, as the gluing station of a carton forming machine and that this apparatus makes it possible to dispense minute quantities of hot melt glue at predetermined locations on the carton blanks, providing a substantially instantaneous seal for the cartons when the proper flaps are folded into engagement with each other, and thereby making it possible to materially increase the speed of the carton forming process and attain a resultant superior carton, which may be formed from various materials and positively held in assembled relation at the termination of the forming operation.

It may further be seen that the glue pots and glue applicator plates may readily be adjusted toward and from each other to apply glue to various sizes and forms of cartons and that different sizes of applicator plates and heater plates may readily be substituted for different sizes of cartons to universally adapt the gluing station to various types, arrangements and sizes of cartons.

It may also be seen that the metering pump, operated by the single stroke of a solenoid armature, with the check valve in the flow circuit from the pump to the glue nozzles may be adjusted to positively meter a selected quantity of glue, and that the check valve maintaining a vacuum downstream of the pump, when the pump is not in operation, prevents dripping of glue through the glue applicator nozzles.

It may still further be seen that a new form of glue pot has been provided in which the raw glue in the form of flakes, pellets, sticks or like conventional forms may be placed in a pre-melt section and melted and strained as the melted glue passes to a glue reservoir for metering through the bottom of the reservoir by the cyclic glue pump therein.

While I have herein shown and described one form in which the invention may be embodied, it may readily be understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts thereof.

I claim as my invention:

1. In a device for applying hot melt glue to carton blanks and the like, a glue pot, a heater plate beneath said glue pot, a glue applicator plate beneath said heater plate and having a series of glue applicator nozzles opening through the bottom thereof, and a communicating connection between said glue pot and said glue applicator nozzles through said heater plate comprising a gear pump in the bottom of said glue pot, a single stroke motor for driving said gear pump a portion of a cycle of rotation thereto, to meter spots of glue through said nozzles, a check valve in said communicating connection on the downstream side of said gear pump, and means closing said check valve as the gear pump completes its metering operation and thereby creating suction in said nozzles when said gear pump is out of operation, to hold glue from dripping through said nozzles.

2. In a device for applying hot melt glue to carton blanks and the like, a glue pot, a table, vertically movable support means for said glue pot, supporting said glue pot for movement toward and from said table, a heater plate on the bottom of said glue pot for heating the glue therein and maintaining the glue in a liquid form, a glue applicator plate beneath said heater plate and having a series of glue applicator nozzles opening through the bottom of said plate, a communicating connection between said glue pot and said nozzles through said heater plate comprising a gear pump in the bottom of said glue pot, a solenoid having an armature, a one way drive connection between said armature and said gear pump, means energizing said solenoid to effect one way movement of said armature and the driving of said gear pump for a portion of a cycle of rotation thereof to meter spots of glue through said nozzles, a check valve in said communicating connection on the downstream side of said pump and accommodating the flow of glue from said pump to said nozzles and spring means closing said check valve upon the termination of each metering cycle of said pump and thereby maintaining said nozzles under suction when said pump is inoperative, to prevent the dripping of glue from said nozzles.

3. In a device for applying hot melt glue to carton blanks and the like, a glue pot, a table, vertically movable support means for said glue pot, supporting said glue pot for movement toward and from said table, a heater plate on the bottom of said glue pot for heating the glue therein and maintaining the glue in a liquid form, a glue applicator plate beneath said heater plate and having a series of glue applicator nozzles opening through the bottom of said plate, a communicating connection between said glue pot and said nozzles through said heater plate comprising a gear pump in the bottom of said glue pot, a solenoid having an armature, a one way drive connection between said armature and said gear pump, means energizing said solenoid to effect one way movement of said armature and the driving of said gear pump

for a portion of a cycle of rotation thereof to meter spots of glue through said nozzles, a check valve in said communicating connection on the downstream side of said pump and accommodating the flow of glue from said pump to said nozzles and spring means closing said check valve and thereby creating suction in said nozzles when said pump is inoperative, to thereby prevent the dripping of glue from said nozzles, and said table having a series of openings leading therethrough in registry with said nozzles to prevent the accumulation of glue on said table in case of accidental operation of said pump.

4. In a device for applying hot melt glue to carton blanks and the like, a table top, a vertically movable support movable toward and from said table top, a pair of glue pots mounted on said support on opposite sides of the longitudinal center of said table, carton feeding means feeding a carton blank along said table top into position beneath said glue pot, each glue pot having a heater plate extending across the bottom thereof for heating the glue therein and maintaining the glue liquid, and an applicator plate extending along the bottom of said heater plate having a series of glue applicator nozzles opening through the bottom of said plate, metering connections between said glue pots and said applicator plates through said heater plates comprising a gear pump in the bottom of each glue pot, an individual solenoid for each gear pump having an armature, a one way drive connection from said armature to the associated gear pump for driving said gear pump a portion of a cycle of rotation, upon energization of said armature, to meter spots of glue through said nozzles, a carton sensing switch sensing the positioning of a carton beneath said nozzles and an energizing connection between said carton sensing switch and said solenoids for energizing said solenoids to effect operation of said pumps for a portion of a cycle of rotation thereof.

5. In a device for applying hot melt glue to carton blanks and the like, a table top, a vertically movable support movable toward and from said table top, a pair of glue pots mounted on said support on opposite sides of the longitudinal center of said table, carton feeding means feeding a carton blank along said table top into position beneath said glue pot, each glue pot having a heater plate extending across the bottom thereof for heating the glue therein and maintaining the glue liquid, and an applicator plate extending along the bottom of said heater plate having a series of glue applicator nozzles opening through the bottom of said plate, metering connections between said glue pots and said applicator plates through said heater plates comprising a gear pump in the bottom of each glue pot, an individual solenoid for each gear pump having an armature, a one way drive connection from said armature to the associated gear pump for driving said gear pump a portion of a cycle of rotation, upon energization of said armature, to meter spots of glue through said nozzles, a carton sensing switch sensing the positioning of a carton beneath said nozzles and an energizing connection between said carton sensing switch and said solenoids for energizing said solenoids to effect operation of said pumps for a portion of a cycle of rotation thereof, a check valve in each communicating connection on the downstream side of each pump and spring means closing said check valve as said pumps complete their metering cycles and thereby creating suction in said nozzles when said pumps are not in operation and preventing dripping of glue from said nozzles.

6. In a device for applying hot melt glue to carton blanks and the like, a table top, a vertically movable support movable toward and from said table top, a pair of glue pots mounted on said support on opposite sides of the longitudinal center of said table top and moved downwardly by said support into gluing engagement with a carton blank, said glue pots being adjustably movable towards and from each other to conform to the carton blank to be glued, a heater plate mounted beneath each glue pot, a glue applicator plate extending across the bottom of each heater plate and having a series of glue applicator nozzles opening through the bottom of said glue applicator plate, means metering a measured volume of glue from each glue pot to the associated glue nozzles, and releasable supporting connections between said heater plates and said glue pots accommodating the interchanging of heater plates and glue applicator plates for various sizes and arrangements of carton blanks.

7. A hot melt carton gluing device in accordance with claim 6 wherein the releasable supporting connections are tongue and groove connections and each comprise a beveled ledge extending along opposite sides of the bottom of each glue pot, a gib having an inwardly facing beveled surface extending along one side of each heater plate for engagement with one of said beveled ledges, and clamping means mounted on said heater plates at the opposite sides thereof from said gibs and extending at the angles of said beveled ledges and having engagement therewith to draw said gibs into engagement with said beveled ledges and maintain said heater plates in engagement with the bottoms of said glue pots.

8. A glue pot for applying hot melt glue to carton blanks and the like comprising an upwardly opening receptacle having parallel spaced side walls, opposite end walls, one of which is inclined and a bottom wall connecting said side walls together, a partition extending between said side walls upwardly from the bottom of said inclined wall and dividing said receptacle into a pre-melt section and a main reservoir section, a passageway extending across said partition at the bottom thereof, a heater plate extending across the bottom of said main reservoir section and having electrically energizable heating elements therein for melting the glue in said pre-melt section and maintaining the glue liquid in said main reservoir section, a metering pump in the bottom of said main reservoir section for metering the glue for application to carton blanks and the like, and an impervious strainer plate extending downwardly along said partition in said pre-melt section across said pasageway and having a downwardly opening serrated bottom portion straining the glue passing from said pre-melt section to said main reservoir section.

9. In a device for applying glue to carton blanks and the like, a glue pot having a pre-melt section and a main reservoir section having a relatively flat bottom, a heater plate extending along the bottom of said flat bottom, a glue applicator plate extending along the bottom of said heater plate and having a series of glue applicator nozzles opening through the botom of said plate in a pre-selected pattern, a gear pump in the bottom of said reservoir including two meshing gears, a port leading through the bottom of said reservoir at one side of the region of mesh of said gears, a second port leading from the region of mesh of said gears at the opposite sides thereof from said first port, passageway means affording communication between said second port and said nozzles, a solenoid having a rectilinearly movable armature, a shaft for rotating one of said gears, a rocking member rockable about said shaft, a link connecting said armature to said rocking member, a one way clutch connecting said rocking member to said shaft for driving said shaft and pump for a pre-selected portion of a cycle of rotation upon energization of said solenoid, and spring means returning said armature, upon deenergization of said soleoid.

10. In a device for applying glue to carton blanks and the like, a glue pot having a pre-melt section and a main reservoir section having a relatively flat bottom, a heater plate extending along the bottom of said reservoir section for melting the glue in said pre-melt section and maintaining the glue liquid in said main reservoir section, a glue applicator plate extending along the bottom of said heater plate, a series of glue nozzles opening through the bottom of said plate and arranged in a pre-selected pattern, a gear pump in the bottom of said main reservoir

section and including two meshing gears, a port leading through the bottom of said reservoir section into the region of mesh of said gears at one side thereof, a second port leading from the region of mesh of said gears at the opposite side thereof, passageway means leading from said second port to said nozzles, check valve means in said passageway means, means closing said check valve upon the completion of metering rotation of said pump, to create suction in said passageways and nozzles and thereby prevent the flow of glue through said nozzles when said pump is inoperative, a shaft on one of said gears for operating said gears and pump, a solenoid having rectilinearly movable armature, a rocking member rockable about said shaft, a link connecting said armature to said rocking member, a one way clutch connecting said rocking member to said shaft for driving said shaft and pump for pre-selected cycle of rotation upon energization of said solenoid, and spring means for returning said armature upon deenergization of said solenoid.

11. In a device for applying hot melt glue to carton blanks and the like, a table top, a support supported on said table top, a glue pot supported on said support and moved thereby into a glue applying direction, a heater plate mounted beneath said glue pot, a glue applicator plate extending across the bottom of said heater plate and having a series of glue applicator nozzles opening through the bottom thereof, a gear pump operable for a cycle of rotation thereof, mounted in said glue pot above said heater plate for metering a measured volume of glue from said glue pot to said glue nozzles, and releasable slidable supporting connections between said heater plate

and said glue pot accommodating the interchange of heater plates and glue applicator plates for various sizes and arrangements of carton blanks.

12. The structure of claim **11** wherein the slidable supporting releasable connections comprise a bevelled ledge extending along each side of the bottom of said glue pot, a gib having an inwardly facing bevelled surface extending along one side of said heater plate for engagement with one of said bevelled ledges, and clamping means mounted on said heater plate at the opposite side thereof from said gib and extending at the angle of the associated bevelled ledge and being engageable therewith to draw said gib into engagement with said bevelled ledge and maintain said heater plate in engagement with bottom of said glue pot.

References Cited

UNITED STATES PATENTS

2,396,578	3/1946	Kittel et al.	118—429 X
2,605,036	7/1952	Cozzoli	141—116 X
2,614,731	10/1952	White	222—333
2,914,108	11/1959	Coakley	118—411
3,002,599	10/1961	Lopata	222—185 X
3,030,915	4/1962	Shannon	
3,040,935	6/1962	Lopata	222—333 X
3,056,337	10/1962	Bahr et al.	118—2 X
3,146,126	8/1964	Baker	118—2
3,224,411	12/1965	Blaha et al.	118—411 X

CHARLES A. WILLMUTH, *Primary Examiner.*

J. P. McINTOSH, *Assistant Examiner.*