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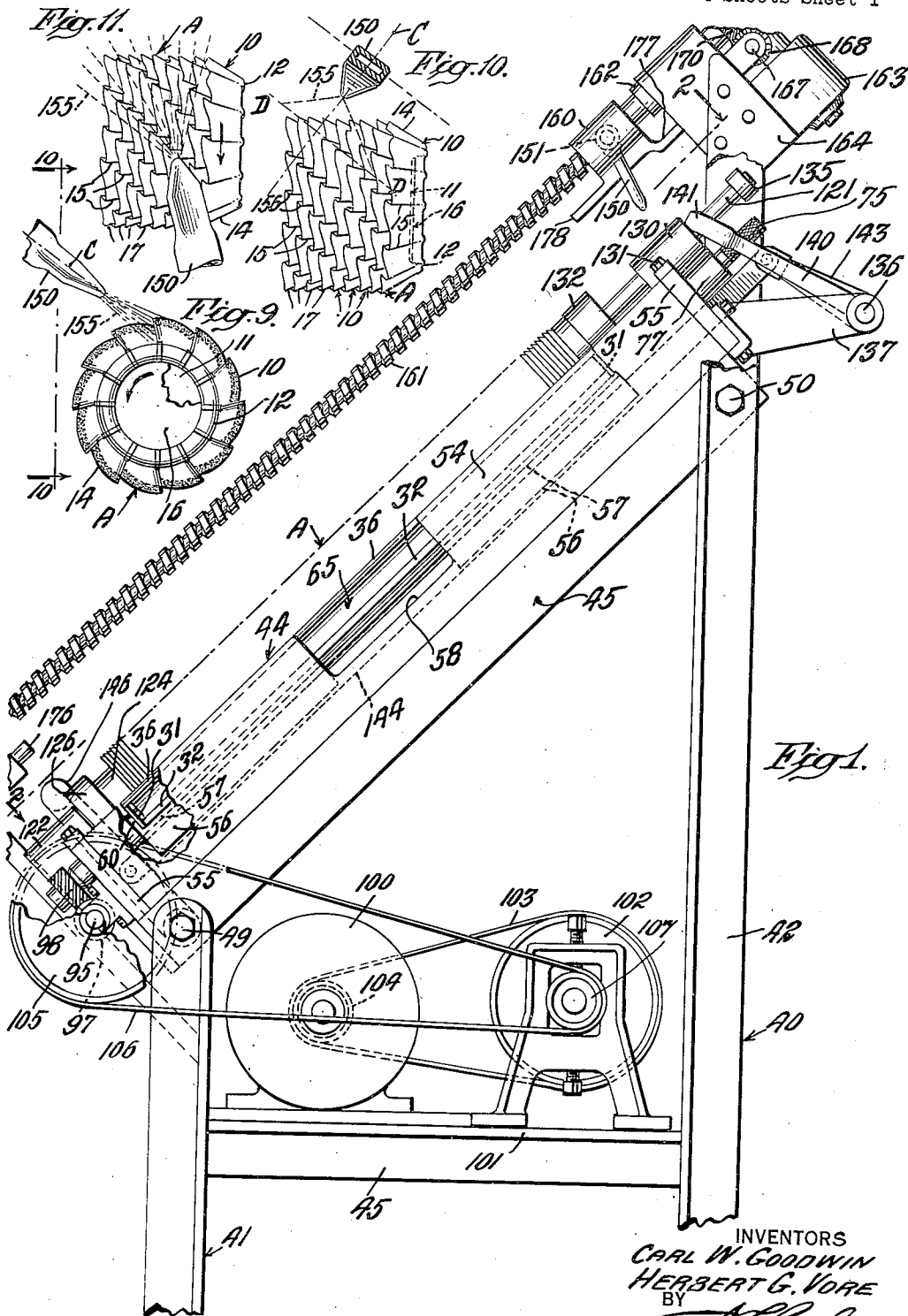
C. W. GOODWIN ET AL

2,325,162

COATING MACHINE

Filed May 19, 1941

4 Sheets-Sheet 1



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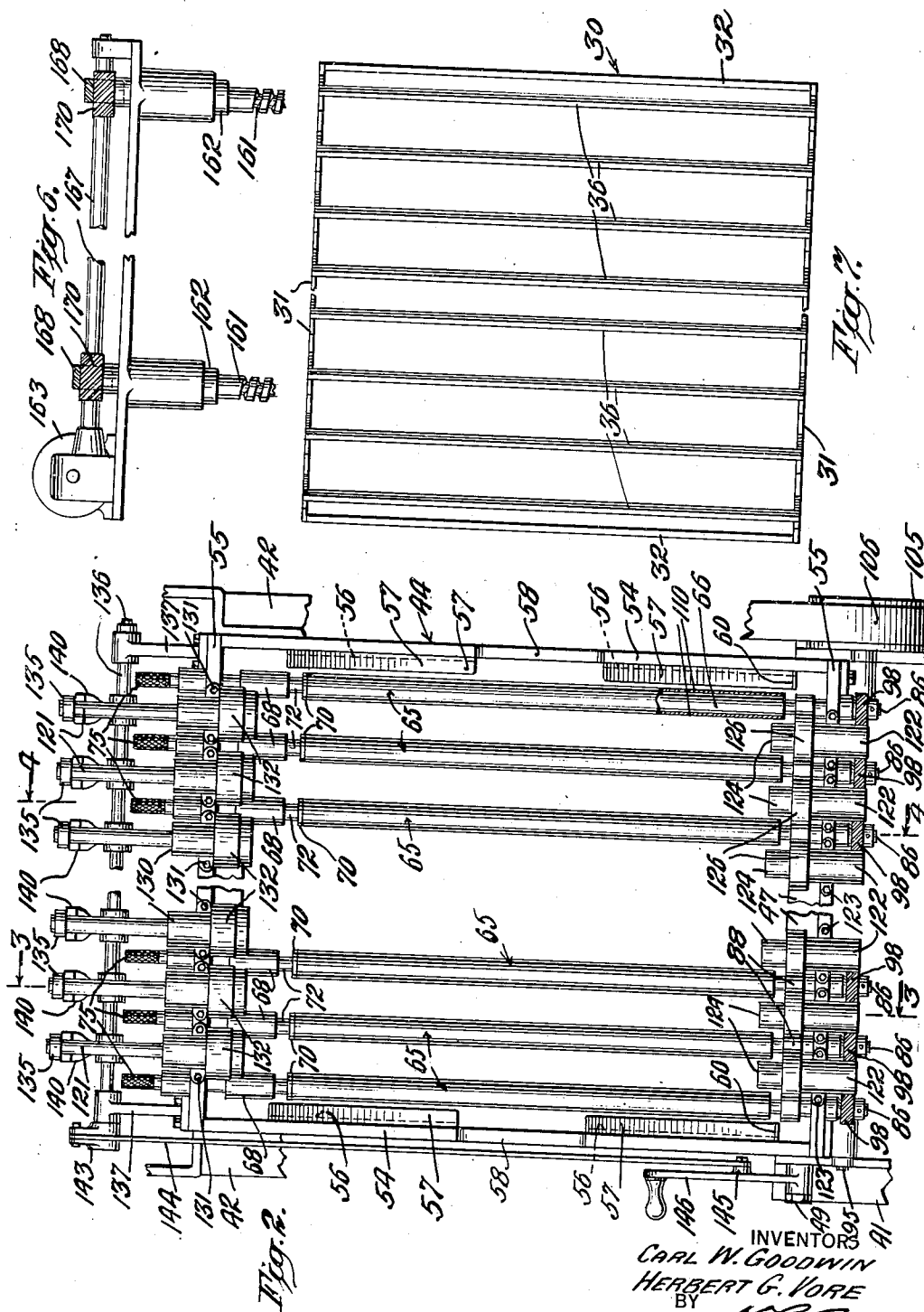
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COATING MACHINE

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4 Sheets-Sheet 2



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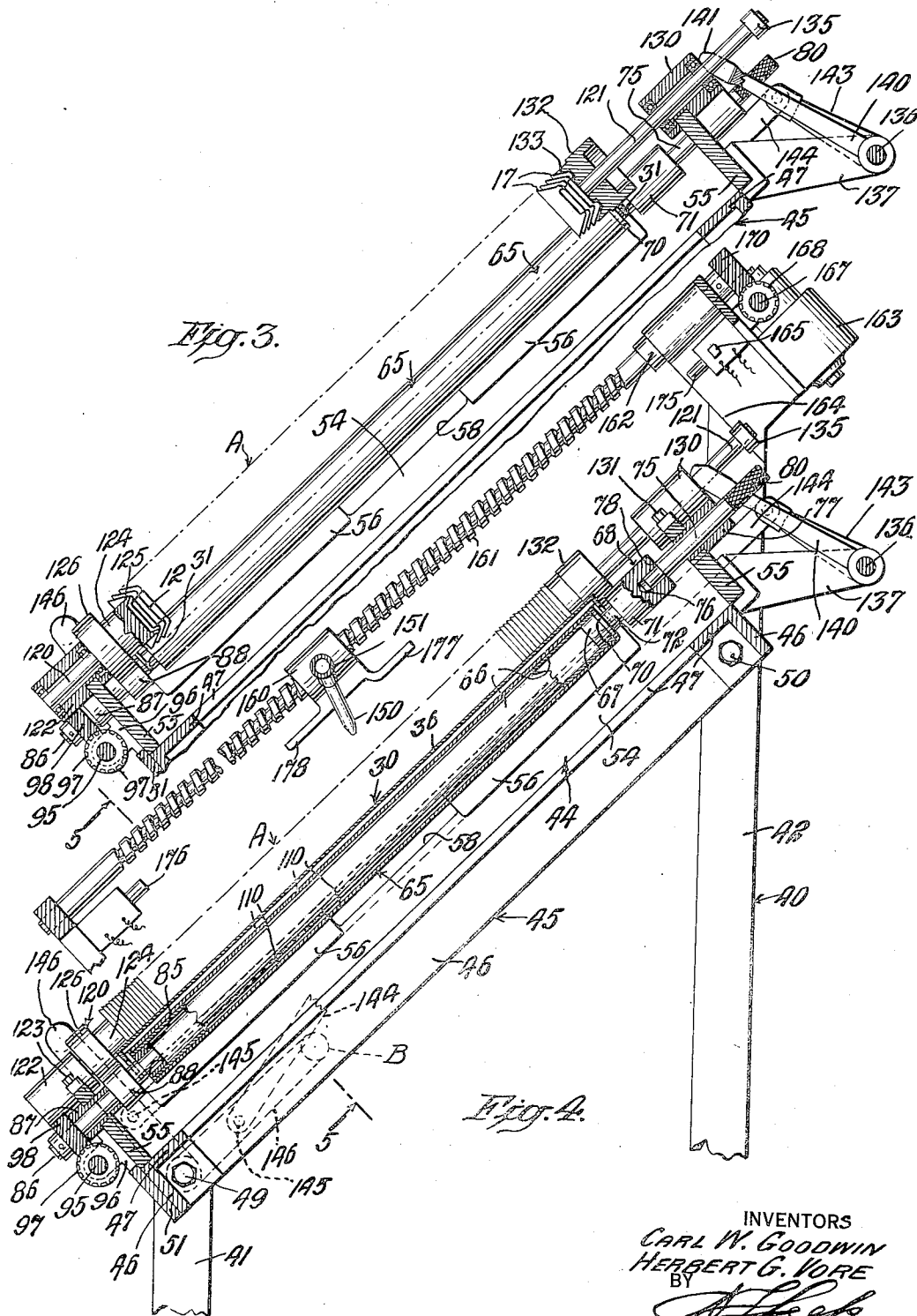
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COATING MACHINE

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4 Sheets-Sheet 3



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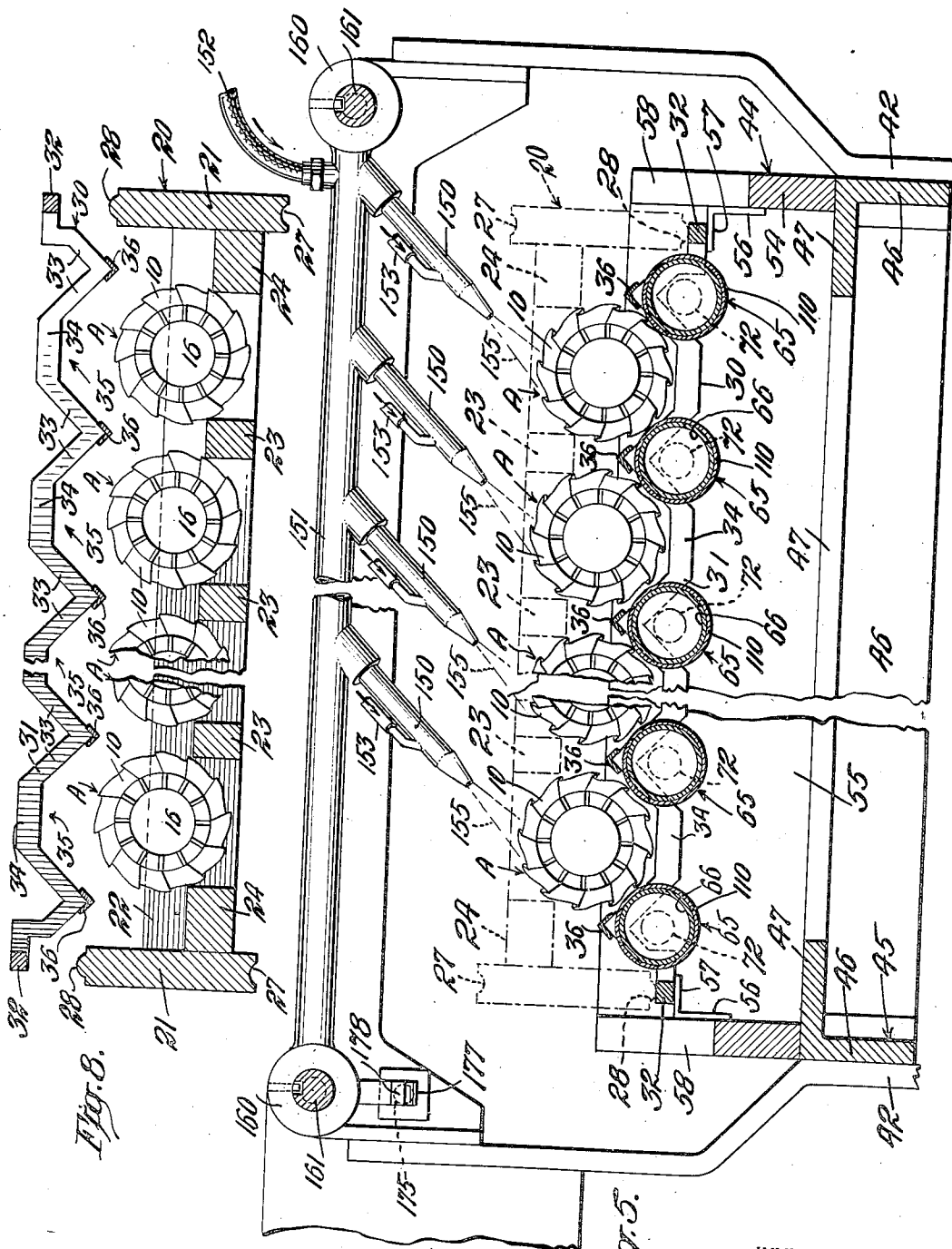
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**2,325,162**

COATING MACHINE

Filed May 19, 1941

4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

2,325,162

## COATING MACHINE

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Application May 19, 1941, Serial No. 394,150

7 Claims. (Cl. 91—45)

The present invention relates to a machine for applying adhesive to partially preformed hood caps for milk bottles or the like.

One object of the present invention is to provide a new and improved machine of the above type.

Another object is to provide a novel and improved machine for applying adhesive to the folds of the pleated skirts of partially preformed hood caps, so that these folds can be sealed together during the bottle capping operation.

Another object is to provide a novel and improved machine for applying an annular coating of adhesive on the lower portion of the pleated skirt of a partially preformed hood cap.

Another object is to provide a novel and improved machine of the above type, which lends itself to adhesive applying operations on an efficient mass production basis.

Another object is to provide a novel and improved machine of the above type, having means by which partially preformed hood caps, nested and arranged in stacks in a tray can be easily transferred as a batch from said tray to said machine for adhesive applying operations.

Another object is to provide a novel and improved machine of the above type, having means by which stacks of nested caps, after being coated with adhesive as above indicated, may be easily transferred as a batch to a tray for storage or shipment.

Various other objects and advantages of the invention will be apparent from the following particular description, and from an inspection of the accompanying drawings, in which

Fig. 1 is a fragmentary side elevation of the upper part of an adhesive applying machine embodying the present invention, said machine being shown with parts broken away, and with stacks of nested caps in operative position ready to be coated with adhesive.

Fig. 2 is a top plan view of a portion of the machine taken on line 2—2 of Fig. 1, and shown without the caps to be coated.

Fig. 3 is a section taken on line 3—3 of Fig. 2, showing stacks of nested caps in position to be adhesively coated.

Fig. 4 is a section taken on line 4—4 of Fig. 2, showing stacks of nested caps in position to be coated, and also showing the adhesive spraying device.

Fig. 5 is a section taken on line 5—5 of Fig. 4, but on a larger scale.

Fig. 6 is a top plan view of one end portion of

the feed mechanism for the adhesive spraying device.

Fig. 7 is a top plan view of a rack by which stacks of preformed nested caps can be transferred as a batch to and from the adhesive applying machine.

Fig. 8 is a transverse section of a cap supporting tray, shown in conjunction with a rack by which the stacks of nested caps can be transferred as a batch from said tray to the adhesive applying machine.

Fig. 9 is an end view of a stack of nested caps in the process of receiving adhesive through a spray nozzle.

Fig. 10 is an elevational view of a stack of nested caps, taken along line 10—10 of Fig. 9 and shown in the process of being sprayed with adhesive, and

Fig. 11 is a top plan view of the stack of nested caps in the process of being sprayed with adhesive.

The machine of the present invention is shown applied to preformed hood caps 10, made from disc blanks of suitable water resistant material, such as paper, having form sustaining rigidity to permit creasing and shaping. The blanks are partially preformed in a suitable forming press such as shown in the copending application of Goodwin and Martin, Ser. No. 390,468 for Forming press (SK-26), to provide a depressed central bore closing portion 11 (Figs. 9, 10 and 11), adapted to enter snugly into the bore of a bottle, such as the conventional milk bottle, and to seat on an internal ledge thereof, an annular pouring lip housing 12 of channel-shaped cross-section, joined to the central bore closing portion 11 and adapted to extend over the pouring lip of the bottle, and an outer flared depending skirt 14. The skirt 14 is formed with a plurality of substantially triangular folds or pleats 15, which extend outwardly beyond the pouring lip housing 12, and which are adapted to be folded downwardly around the outer surface of a bottle neck upon contraction of said skirt. A disc 16 may be seated within the bore closing portion 11 to impart additional strength and rigidity thereto, and to facilitate the seating of said portion on the internal ledge of the bottle.

After the caps 10 have been shaped and preformed as described, they are stacked and nested as shown in Figs. 9, 10 and 11, with the outer portions 17 of the skirts 14 exposed and with the line of nested pleats 15 extending helically around the stack of caps. These stacks A are stored in this condition on a divided tray 20 as

shown in Fig. 8, until such times as they are transferred to the machine of the present invention for the purpose of applying adhesive to the folds of the pleated skirts 14 of the cap, so that these folds can be sealed together during bottle capping operations.

The tray 20 is preferably of wooden construction, and comprises a pair of side bars 21, interconnected by a pair of end bars 22 to form an open rectangular frame. A series of parallel transversely spaced grid bars 23 extend between and are connected to the end frame bars 22, and a pair of bars 24 are secured to and extend along the side frame bars 21 respectively. Two of the stacks A of nested caps 10 are seated on and between adjoining bars 23 and 24 on the sides respectively of the tray 20, while the other intermediate stacks A are seated on and between adjoining grid bars 23.

Each of the side frame bars 21 is shown provided along one edge with a channel 27 of semi-circular cross-section, and along the other edge with a ridge 28 of corresponding cross-section, to permit stacking of the trays 20, and to lock the stacked trays against relative horizontal movement by the interengagement of the ridges 28 and channels 27 of adjoining trays 20.

As a feature of the present invention, the adhesive applying machine is constructed to permit expeditious transfer of the stacks of nested caps 10 as a batch to and from said machine, without substantially disturbing the relative positions of said stacks. For that purpose, there is provided a transfer rack 30, which is preferably of metal, and which comprises a pair of parallel end pieces 31, interconnected by parallel side pieces 32, to form an open rectangular frame substantially co-extensive in outline with the outer frame of the tray 20. Each of these end pieces 31 is in the shape of a zig-zag bar, having a series of upwardly offset triangular sections 33, separated by straight horizontal sections 34 to form a series of stack receiving recesses 35 dividing the rack 30 into compartments. The recesses 35 of one frame bar 31 are in registry with the corresponding recesses 35 of the other frame bar 31 to receive the end sections of each stack A in seating engagement with the base sections 34, and upward flaring side sections 33 of registering recesses, and are spaced to correspond to the spacing of the stacks A in the trays 20. Brace rods 36 in the form of angle irons extend between the two frame bars 31 in seating engagement with the apices of the triangular bar sections 33, and are secured thereto by welding or the like.

In transferring the stacks from the tray 20 to the adhesive applying machine to be described, the rack 30 is inverted over the tray 20 as shown in Fig. 8, and lowered until the side frame bars 32 of said rack 30 rest on the side frame bars 21 of said tray 20. In this position of the rack 30, the stacks A will extend into the recesses 35 of said rack 30. The tray 20 and rack 30 are then inverted together and positioned on the adhesive applying machine as shown in Fig. 5, and as will be more fully described hereinafter to deposit the stacks A on said machine. The tray 20 is then lifted and removed, while the transfer rack 30 is retained on the machine to permit easy re-transfer of the whole batch of stacks as a unit to the tray 20 or other suitable receiver after the completion of the adhesive applying operation.

The adhesive applying machine of the present invention comprises a stand 40, having a pair of front uprights 41 and a pair of rear uprights 42,

interconnected into a rigid supporting structure by suitable bracing members 45. The rear uprights 42 extend a substantial distance above the front uprights 41 to support the operating parts of the machine in inclined position as will be more fully described.

A frame 44 is supported in an upwardly and rearwardly inclined position on a frame holder 45, fixed to the stand 40. This frame holder 45 is shown as an open rectangular structure, having its border or side members 46 in the form of angle irons, with inwardly extending marginal flanges 47 along their upper edges for seating the frame 44. The frame holder 45 has its front end extending snugly between the front uprights 41 and secured to the upper ends thereof by suitable means, shown as bolts 49. The rear end of the frame holder 45 extending snugly between the rear uprights 42, is raised above the front end and is secured to said rear uprights 42 by suitable means, for instance bolts 50. The frame holder 45 will be inclined upwardly and rearwardly at a convenient angle as shown.

To the forward lower end of the frame holder 45 is secured a plate 51, extending above the upper edge of said frame holder 45 to form a stop or seat for the lower front edge of the frame 44.

The frame 44 comprises a pair of side bars 54, interconnected by a pair of end bars 55 to form a rectangular open frame structure. This frame 44 is substantially co-extensive in outline to the frame holder 45, and is seated on said frame holder 45 with its front forward edge abutting the stop plate 51 as shown in Figs. 1, 3 and 4, so that said frame 44 is inclined upwardly and rearwardly, as above mentioned. The frame 44 is fixed to the frame holder 45 in this inclined position by suitable means, such as bolts (not shown), passing through brackets (not shown) on said frame 44 and through the marginal flanges 47 of the frame holder 45.

For seating the rack 30 in proper position in the frame 44, each of the side bars 54 of said frame has secured to the inner side thereof a pair of inclined brackets 56, shown in the form of angle irons having marginal rack supporting flanges 57, extending inwardly from the upper edges thereof. These two brackets 56 are spaced by a substantially rectangular recess 58 in the side bar 54, extending from the upper edge of said bar 54, and serving as a clearance opening to receive the operator's hand, while the rack 30 is being lowered into the frame 44.

The lower ends of the rack supporting flanges 57 of the two lower brackets 56 are turned upwardly at right angles to said flanges to form stops or seats 60 for the rack 30 as shown in Fig. 1.

Rotatably supported on the frame 44 is a series of spaced parallel inclined rolls 65, which partially support the stacks of caps, and which frictionally drive said stacks at high speed. Each of these rolls 65 comprises a metal tube 66 into which is press fitted at its upper rear end, the reduced end 67 of a bearing member 68. A flange 70 on the bearing member 68 abuts the upper rear edge of the tube 66 and projects radially outwardly beyond the outer periphery of said tube 66.

The upper rear section of the bearing member 68 is in the form of a cylindrical block 71, coextensive in diameter with that of the flange 70, and axially spaced from said flange 70 by an intermediate reduced section 72 of said bearing member 68 for the purpose to be described.

A roll locking spindle 75 extends into an axial

Bore 76 in the block 71, and passes through a bushing 77, having a reduced end press fitted into the rear end wall 55 of the frame 44. The lower forward end of the spindle 75, extending into the bore 76 of the block 71, is of reduced diameter to form an axially facing annular shoulder 78, which bears against the block 71, to limit the axial position of said spindle 75 with respect to said block. The rear end 80 of the spindle 75 is knurled to afford a rough gripping surface by which said spindle 75 may be manually pulled outwardly to release the corresponding roll 65.

A collar 85 is press fitted in the lower front end of each tube 66, and serves as a bushing for a drive shaft 86 splined thereto by any suitable means, shown as a Woodruff key, to permit axial movement of said tube 66 out of drive engagement with said shaft 86. This drive shaft 86 is journaled in a bearing 87, pressed fitted in an opening in the lower front end wall 55 of the frame 44, and is formed with a cylindrical enlargement or boss 88 for the purpose to be described.

For driving the rolls 65, a main drive shaft 95 is supported on bearings 96, fixed to the lower front wall 55 of the frame 44, and carries a series of helical gears 97 meshing with helical gears 98 fixed to the shafts 86 respectively.

In order to drive the main shaft 95, there is provided a motor 100 (Fig. 1), supported on a platform 101 between the stand uprights 41 and 42, and rotating the main shaft 95 through a suitable speed reduction drive. This drive is shown comprising a comparatively large pulley 102 driven by a belt 103 from a smaller pulley 104 on the shaft of the motor 100. A comparatively large pulley 105 on the main drive shaft 95 is driven by a belt 106 from a smaller pulley 107 on the shaft of the pulley 102.

To permit easy cleaning of the rolls 65, and to increase the effectiveness of their peripheries for friction drive engagement with the stacks A of caps, an easily removable paper tube 110 is fitted tightly over each of the metal tubes 66 to rotate with said tube 66. This paper tube 110 abuts the flange 70 on the corresponding bearing member 68, and has an outside diameter equal to that of said flange 70, so that the outer peripheries of said paper tube 110 and said flange 70 are substantially flush.

When it is desired to replace a used paper tube 110 by a fresh one, the corresponding spindle 75 is pulled rearwardly out of the block 71 of the bearing member 68 to release the respective roll 65. This roll 65 is then slid axially rearwardly out of engagement with the drive shaft 86, and lifted transversely out of the frame 44. After the used paper tube 110 has been replaced by a fresh one, the roll 65 is lowered in the frame 44, slipped over the shaft 86, and locked in axial position by the spindle 75.

For holding the ends of the stacks A in proper axial position on the frame 44, there is provided a series of inclined spindles 120 at the lower front end of said frame 44 arranged above and in staggered relationship with respect to the rolls 65, and a series of inclined spindles 121 at the upper rear end of said frame 44 in axial registry with respective spindles 120.

Each of the lower spindles 120 is journaled in suitable anti-friction bearings mounted in a bearing block 122, which is shown fixed to the front lower wall 55 of the frame 44 by bolts 123. The upper rear end of each spindle 120 is formed with a cylindrical stack holder or

chuck 124, provided with an annular rim 125 adapted to engage the inner surface of the top wall of the pouring lip housing 12 of the lower end cap of the stack A, as shown in Fig. 3. To meet sanitary requirements, the diameter and depth of this rim 125 is such, that no part of the stack holder or chuck 124 comes in contact with any part of the lower end cap of the stack A, which might extend into the interior of a bottle when sealed thereon.

A collar or cylindrical enlargement 126 on the spindle 120 has a peripheral engagement with the cylindrical enlargements 88 on the two drive shafts 86 adjoining said spindle 120 on opposite sides thereof, so that said spindle 120 is frictionally driven from said shafts 86.

Each of the upper rear spindles 121 is journaled in anti-friction bearings mounted in a bearing block 130, shown fixed to the rear upper wall 55 of the frame 44 by bolts 131. Press fitted or otherwise fixed to the lower end of each spindle 121 is a stack holder or chuck 132, formed with a recess 133 to receive the upper end cap of the stack A. This end cap extends only partially into the recess 133, so that the outer skirt portion 17 of this cap is exposed to receive the adhesive as will be described.

The upper stack holders or chucks 132 are axially movable to permit the deposit of each stack A between a pair of aligned holders on chucks 124 and 132 for adhesive applying operation, and to permit the removal of said stack from between said holders or chucks 124 and 132 at the completion of said operation. For that purpose each of the upper spindles 121 is axially slidable in its bearing block 130, and has affixed to its upper rear end a collar 135, by which said spindle 121 can be axially pulled outwardly.

Means for outwardly shifting the upper spindles 121 in unison includes a rock shaft 136, journaled in brackets 137 fixed to the upper end of the frame 44. A series of shifter levers 140 are fixed at one end to the rock shaft 136, and are forked at their other ends 141 to receive the respective spindles 121. When the rock shaft 136 is rotated clockwise (Figs. 3 and 4), the forked ends 141 of the shifter levers 140 engaging respective collars 135 shift the spindles 121 axially outwardly in unison to move the stack holders 132 also axially upwardly and rearwardly in the position shown in Fig. 2.

In order to rotate the rock shaft 136 for the operation described, there is provided an arm 143, fixed at one end to said rock shaft 136, and pivotally connected at its other end to one end of a link 144. This link 144 extends obliquely downwardly and forwardly along one side of the frame 44 on the outer side of the stand 40, and is pivotally connected at its lower front end at 145 to an intermediate section of a crank handle 146, which is pivotally supported at one end on one of the front bolts 49 connecting the frame holder 45 to the stand 40.

In normal inactive position shown in full lines in Figs. 3 and 4, the crank handle 146 extends obliquely upwardly substantially at right angles to the plane of inclination of the frame 44. To shift the upper stack holder or chuck 132 obliquely upwardly, the crank handle 146 is swung forwardly to the position shown in full lines in Fig. 2 and in dot and dash lines B in Fig. 4. In this position, the crank handle 146 will be past the center line of the link 144, so that the upper stack holders or chucks 132 will be locked in their upper slidable position until such times

as the crank handle 146 is returned to the position indicated in full lines in Figs. 3 and 4.

For depositing stacks A in the frame 44, after the rack 30 has been inverted over the tray 20 as previously described and shown in Fig. 8, and the assembly reinverted so that the stacks A rest in the recesses 35 of said rack 30, the assembly is lowered in inclined position into the frame 44, while the upper rear spindles 121 are in their uppermost position as a result of the forward operation of the crank handle 136. After the assembly of the rack 30 and tray 20 has been lowered to proper position in the frame 44, this assembly is shifted obliquely downwardly and forwardly to slide the straight base sections 34 of the front end bar 31 of the rack 30 underneath the lower spindles 120, until this front bar 31 rests against the end stops 60 on the brackets 56. The rack 30 is then rested on the flanges 57 of the brackets 56. In this position of the rack 30, the stacks A will be in axial alignment with respective pairs of axially aligned spindles 120 and 121, the front end bar 31 of the rack 30 will be seated against the stop 60 and will extend in the recesses formed between the front lower ends of the tubes 65 and the enlargements 88 on the drive shafts 86, and the rear end bar 31 of said rack 30 will extend in the recesses formed around the reduced sections 72 of the bearing members 68.

After the rack 30 has been seated in the proper position described, the inverted tray 20 is lifted and removed, and the crank handle 146 is returned to the position indicated in full lines to release the upper spindles 121. The stack holders or chucks 132 on these spindles 121 are heavy, and their axial inclination such, that when the spindles 121 are released, they will gravitate obliquely forwardly and downwardly in position to engage the upper ends of respective stacks A as shown in Figs. 1, 3 and 4. The weighted character of the upper spindles 121 also serves to maintain the stacks A under axial compression during rotation of said stacks, so that the caps in each stack are retained in proper nested position during adhesive applying operation.

The stacks A resting on the rolls 65 will be frictionally driven thereby at high speed. The peripheral surface interengagement between the cylindrical enlargements 125 on the spindles 120 and the cylindrical enlargements 88 on the drive shafts 85 will assist in frictionally driving these stacks. If desired, these enlargements 88 and 126 may be eliminated, and the rolls 65 depended on entirely to frictionally drive the stacks.

For applying the adhesive onto the stacks A as these stacks are rotated in the frame 44, there is provided a spray device comprising a series of spray nozzles 150, each adapted to operate on a respective stack of caps. These spray nozzles 150 are connected to a manifold 151, which in turn is connected to a suitable supply of adhesive by a flexible conduit 152. Suitable air pipes 153 deliver the necessary air pressure to the adhesive to force said adhesive in spray form onto the rotating surfaces of the stacks A.

Each of the nozzles 150 is preferably designed to eject a spray 155, fanned out in the shape of a thin extended layer as shown in Figs. 9, 10 and 11. The nozzle 150 preferably extends obliquely downwardly with the axis C of said nozzle 150 disposed above the axis of the stack as shown in Fig. 9, and the spray 155 should preferably be positioned and shaped to enter into the inner folds 156 of the rotating skirt pleats 15. To reach

these inner folds 156, the plane of the spray desirably extends substantially parallel to the helical line of nested pleats 15 indicated approximately by the line D—D. In this way the spray is driven into the inner folds 156 of the caps as the stack of caps is rotated, and is caused to adhere particularly to the portions of the caps which are to be folded over for securing the same on the bottle. The spray 155 also forms a complete band of adhesive on the outer exposed portions 17 of the skirts 14 of the nested caps.

The nozzles 150 may be of any well known type, such as that of the DeVilbiss type, in which the shape, size and angle of the spray 155 is adjusted.

Although the desirable position and shape of the spray 155 has been described, it is to be considered that these may vary in accordance with the particular adhesive used and with the particular requirements of any specific case.

Any suitable adhesive may be used, such as an isomerized rubber composition known as Pliolite, or other thermoplastic adhesives having a low sealing temperature, as set forth in the copending application of Herbert G. Vore, Ser. No. 391,125 for Bottle cap and method of making the same (SK-28).

In order to move the series of nozzles 150 along their respective stacks, the ends of the manifold 151 have secured thereto collars 160, threaded on a pair of parallel lead screws 161, which are journaled in bearings 162 supported on the upper ends of the stand uprights 42. These lead screws 161 extend obliquely parallel to the frame 44, and are positioned outwardly beyond the sides thereof to permit free movement of the rack 30 towards and away from the frame 44. A motor 163 for driving these lead screws 161 is supported on a bracket 164 fixed to the stand uprights 42.

A speed reduction transmission between the motor 163 and the lead screws 161 includes a shaft 167, driven from the motor 163, and gears 168, fixed to said shaft 167 and meshing with helical gears 170 fixed to the ends of the feed screws 161.

The motor 163 may be controlled from a manually operable switch 165, and may be of the reversible type to effect reversal of the feed screws 161, and return movement of the nozzles 150 into elevated position after they have reached the end of their oblique downward stroke. During this return movement of the nozzles 150, the spraying of adhesive on the caps may be continued, or if desired, the supply of adhesive may be discontinued at the end of their downward forward stroke to shut off the spraying operation.

In the specific form shown, the return movement of the nozzles 150 is effected automatically, and the motor 163 shut off automatically at the end of a complete spraying cycle. For that purpose there is provided a motor cut-off switch 175 of the push-button spring-pressed type at the rear upper end of the machine, and a reversing switch 176 of the push-button snap type at the front lower end of the machine. Dogs 177 and 178 rigid with one of the lead screw collars 160 are adapted to operate the switches 175 and 176 respectively at the end of each stroke. The upper switch 175 opens when engaged by the dog 177 to shut off the motor 163 and closes when released to rotate the motor 163 in one direction.

The manual switch 165 when closed short circuits the upper switch 175. When this manual switch 165 is closed the motor 163 is started and the nozzles 150 moved obliquely downwardly and forwardly from their rearward

elevated position. The switch 165 may be of the spring-pressed type, so that when it is released it will open. The initial downward movement of the nozzles 150 under control of the switch 165 releases the switch 175, so that this switch is closed and the downward and forward movement of the nozzles 150 continued. When the nozzles 150 reach the end of their downward forward stroke, the dog 178 operates the switch 176 and thereby reverses the motor 163, so that the nozzles 150 return towards their rearward elevated position. When the nozzles 150 reach this elevated position, the dog 177 engaging the switch 175 opens the switch and thereby shuts off the motor 163. Suitable means may be provided if desired to automatically shut off the spray when the nozzles 150 have reached their elevated position.

Before starting another spraying cycle, the reversing switch 176 can be manually pushed to restore it to its former position for the next downward forward movement of the nozzles 150, or automatic means, such as relay or solenoid means, may be provided to effect this restoration when the nozzles have reached their elevated position at the end of the spraying cycle.

After the completion of the adhesive spraying operation, the crank handle 146 is moved forwardly from the position shown in full lines in Fig. 4 to the dot and dash position B shown to shift the upper spindles 121 rearwardly, so that the stacks A are released from engagement with the upper stack holders 132. An empty tray 20 is then inverted over the stacks in the frame and in position to receive the stacks between adjoining grid bars 23 and 24. The rack 30 with the inverted tray 20 is then lifted from the frame 44 and the assembly inverted, so that the trays 20 will be in the position shown in Fig. 8 with stacks A resting on the grid bars 23 and 24. These trays 20 can then be stacked and stored.

As many changes could be made in the above apparatus, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A machine for applying adhesive to the skirt folds of hood caps, comprising means for supporting a stack of nested caps in inclined position with the outer marginal portions of their skirts exposed, and including a pair of axially aligned freely rotatable chucks having heads constructed to fit and engage the ends of said stack respectively, the upper chuck being weighted and freely slidable axially to apply gravitational force on said stack and maintain it under compression, means for rotating said stack, a nozzle and means feeding said nozzle along said stack for spraying adhesive onto the surface of said stack.

2. A machine for applying adhesive to the skirt folds of hood caps, comprising a pair of parallel spaced rolls, means for rotating said rolls in unison, means for holding a stack of nested caps between said rolls in peripheral frictional drive engagement therewith, and including a pair of axially aligned, freely rotatable chucks disposed above said rolls with their axes parallel to the axes of said rolls and dis-

posed in a vertical plane between said rolls, said chucks having heads constructed to fit and engage the ends of said stack respectively, a nozzle for spraying adhesive on the exposed surface of said stack, and means feeding said nozzle along said stack.

3. A machine for applying adhesive to the skirt folds of hood caps, comprising a pair of parallel spaced inclined rolls, means for rotating said rolls in unison, means for holding a stack of nested caps between said rolls in peripheral frictional drive engagement therewith, and including a pair of axially aligned chucks having heads constructed to fit and engage the ends of said stacks respectively and disposed above said rolls with their axes inclined parallel to the axes of said rolls and in a vertical plane midway between said rolls, the upper chuck being weighted and freely slidable to apply a gravitational force on said stack and maintain it under compression, a nozzle for spraying adhesive on the surface of said stack, and means feeding said nozzle along said stack.

4. A machine for applying adhesive to the skirt folds of hood caps, comprising a frame, a pair of parallel spaced rolls, means for supporting said rolls on said frame, and including a spindle mounted on one end of each of said rolls in axial alignment with said roll, and a slide bearing for said spindle supported on said frame, said spindle being slidable in said bearing out of supporting engagement with said roll to permit removal of said roll from said frame, means for holding a stack of nested caps between said rolls in peripheral engagement therewith, means for rotating said stack, and means for spraying adhesive on the surface of said stack while said stack is rotated.

5. A machine for applying adhesive to the skirt folds of hood caps, comprising a frame, a pair of parallel spaced rolls, means for supporting said rolls on said frame, and including a shaft coaxial with each of said rolls, and having a drive spline connection with one end of said roll permitting axial movement of said roll out of engagement with said shaft, a bearing on said frame for said shaft, a spindle mounted on the other end of said roll in axial alignment with said roll, and a slide bearing for said spindle mounted on said frame, said spindle being slidable in said slide bearing out of supporting engagement with said roll to permit removal of said roll from said frame, means for driving said shaft, means for holding a stack of nested caps between said rolls in peripheral engagement therewith, and means for spraying adhesive on the surface of the rotating stack.

6. A machine for applying adhesive to the skirt folds of hood caps, comprising means for supporting a stack of nested caps with the outer marginal portions of their skirts exposed, and including a pair of axially aligned freely rotatable chucks having heads constructed to fit and engage the ends of said stack respectively, a rotatable member, means responsive to the rotation of said member for moving one of said chucks axially with respect to the other chuck to permit insertion of a stack of nested caps between said chucks or to permit removal of a stack of nested caps from between said chucks, an adhesive spray nozzle, and means feeding said nozzle along said stack to spray the exposed portions of said skirt with adhesive.

7. A machine for applying adhesive to the skirt folds of hood caps, comprising an open rec-

tangular frame, means for supporting a stack of nested caps on said frame with the outer marginal portions of their skirts exposed, and including a pair of axially aligned freely rotatable chucks having heads constructed to fit and engage the ends of said stack respectively and supported near the ends respectively of said frame, a crank handle near one end of said frame, means responsive to the rotation of said crank handle for moving one of said chucks axially with re-

spect to the other chuck to permit insertion of a stack of nested caps between said chucks or to permit removal of a stack of nested caps from between said chucks, an adhesive spray nozzle, and 5 means feeding said nozzle along said stack to spray the exposed portions of said skirts with adhesive.

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