

Nov. 18, 1958

L. E. ARNESON

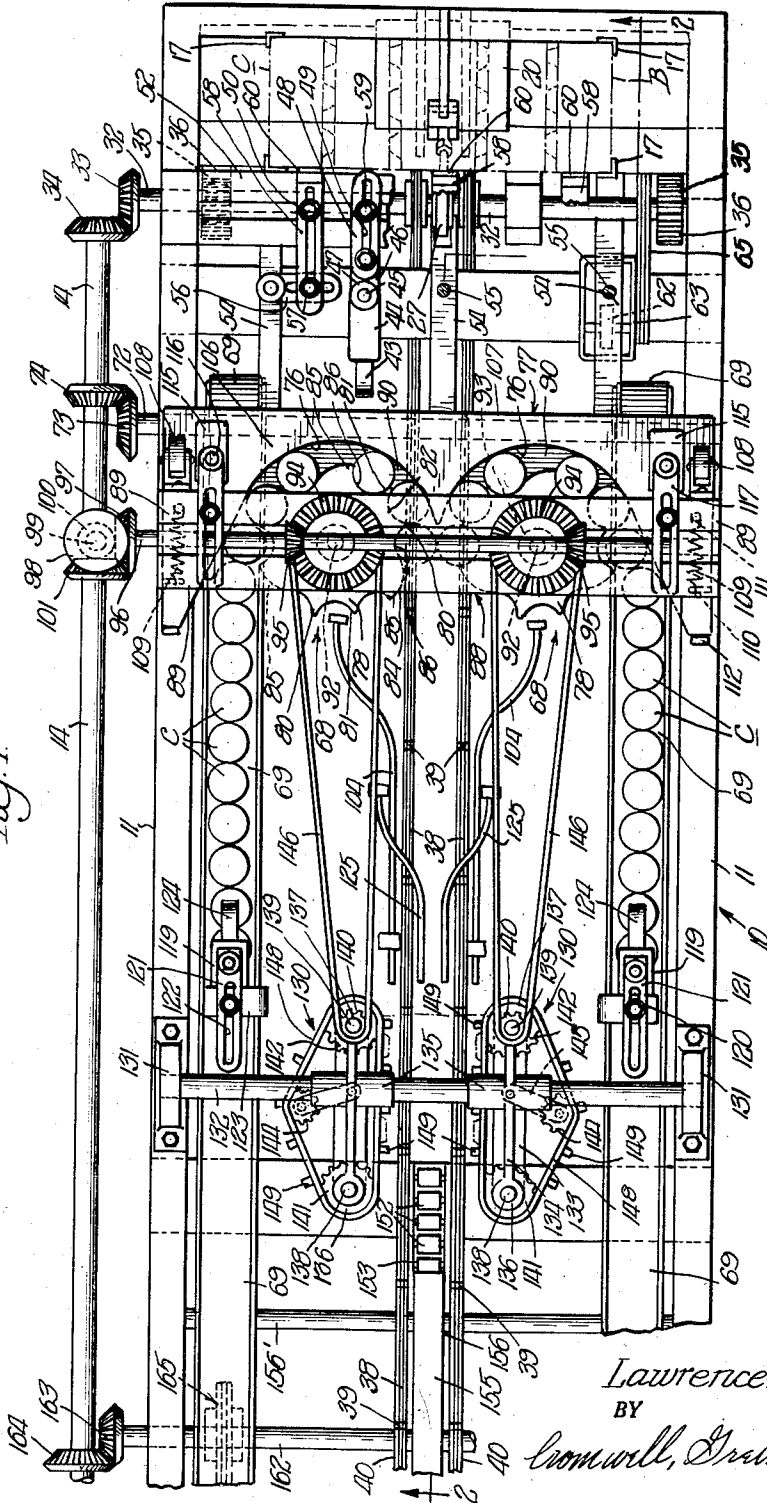
2,860,461

CAN PACKAGING APPARATUS

Filed Jan. 21, 1955

2 Sheets-Sheet 1

Fig. 1



INVENTOR.
Lawrence E. Arneson,
BY

Commwell, Smith & Warden
Attys

Nov. 18, 1958

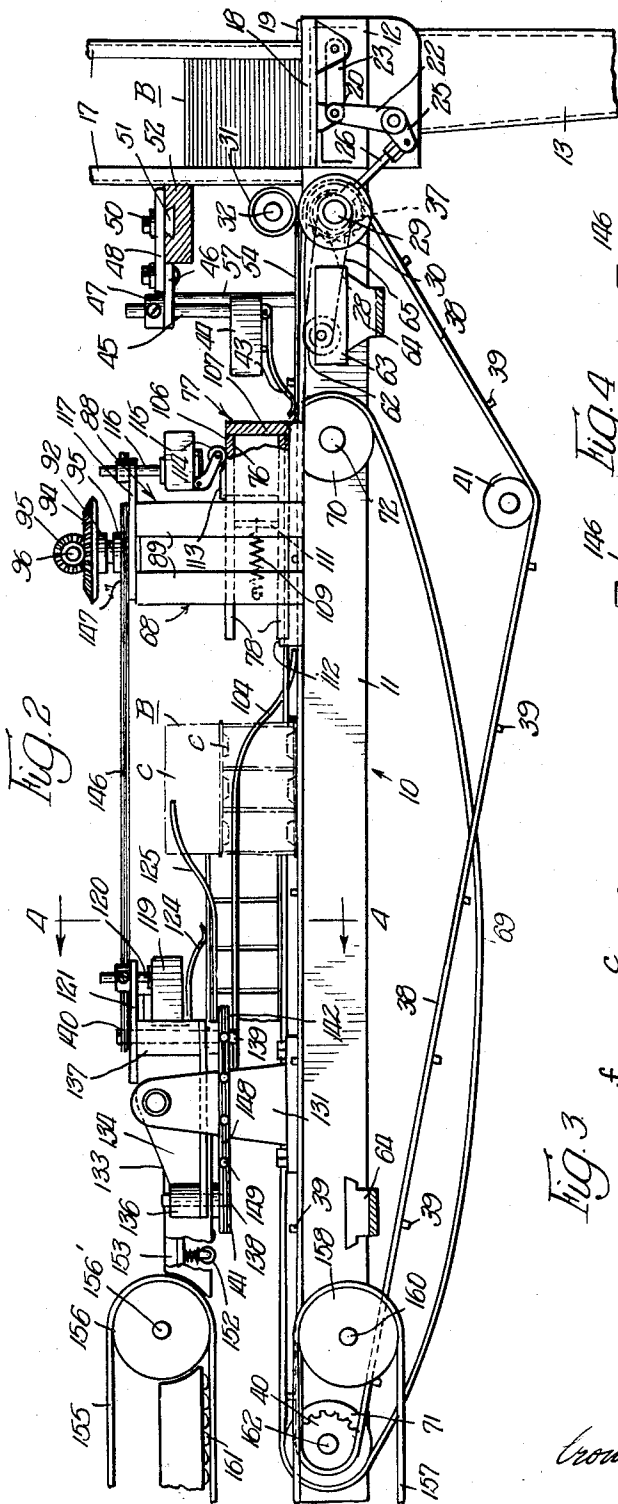
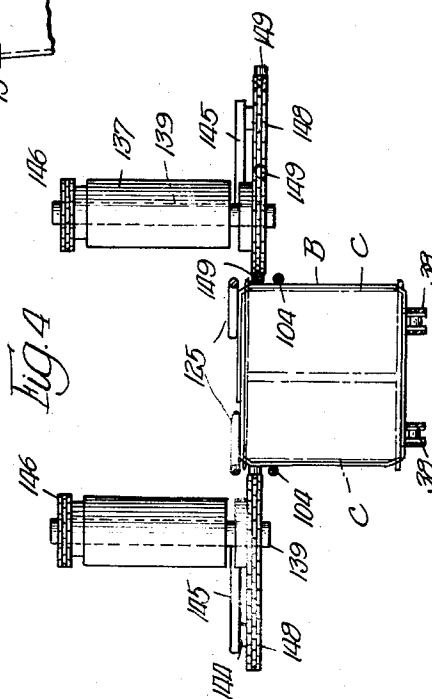
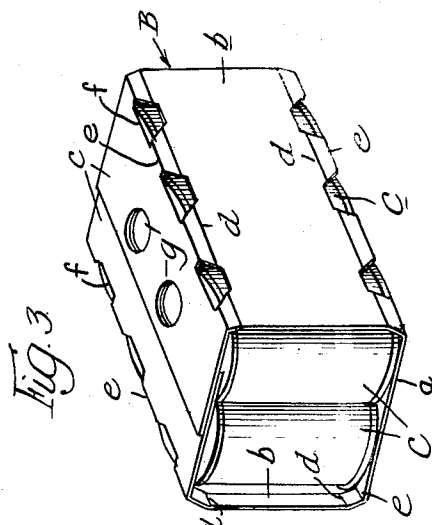
L. E. ARNESON

2,860,461

CAN PACKAGING APPARATUS

Filed Jan. 21, 1955

2 Sheets-Sheet 2



INVENTOR.
Lawrence E. Arneson,
BY
Cromwell, Ernst & Winters
Attys.

1

2,860,461

CAN PACKAGING APPARATUS

Lawrence E. Arneson, Morris, Ill., assignor, by mesne assignments, to Federal Paper Board Company, Inc., Bogota, N. J., a corporation of New York

Application January 21, 1955, Serial No. 483,349

27 Claims. (Cl. 53—56)

The present invention relates to improvements in a continuously operating machine for packaging cans of food, beverage or other objects of cylindrical outline in an open-ended paperboard packaging unit. This application is a continuation-in-part of my copending application, Serial No. 445,360 of July 23, 1954, now abandoned, and concerns practical improvements in the previously disclosed apparatus to insure a steady continuing infeed of the objects to be packaged, as well as the packaging units, to a station at which they are initially assembled in relation to one another.

In the completed condition of the package as turned out by the machine, the paperboard unit is disposed in a wrap-around or banded, snugly encircling, but open-ended relation to a generally rectangular group of the objects, arranged on end and in side by side relation to one another, provision having been made to resist endwise displacement of the objects from the packaging band. This is done by engaging the upper and lower, rounded bead edges of end or corner cans of the group in a nested relation in side apertures which are longitudinally spaced along the top and bottom side edges of the paperboard banding unit.

It is one of the purposes of the present invention to provide apparatus which intensifies this end restraining action by insuring that the side wall panels of the packaging sleeve are tightly engaged with an assembled group of objects in the apertured top and bottom zones in question. To this end local pressure is applied to the sides of the partially formed sleeve, using a group of objects therein as an anvil, as a paperboard sleeve blank progresses continuously through the machine and is wrapped and formed about the group. The pressure is exerted inwardly at points spaced along the top margins of up-turned side wall panels of the blank, and between the apertures which receive the upper beads or edges of the cans, tensioning and snugging the wall margins tightly between the beads, and the final securement of the package along overlapped top panels is performed while it is in this tensioned condition.

It should be noted particularly that the apparatus is a packaging apparatus in the fullest sense, in that it assembles articles in an intended group or cluster arrangement and wraps and secures a banding sleeve blank therearound to fully complete a package. It thus performs all of the packaging operations, including the complete formation of the paperboard packaging sleeve unit itself; and it is thus to be sharply distinguished from a loading machine which simply acts to deposit an object or group of objects, as by gravity, by ram action or otherwise, into a preformed, partially or wholly set-up carton or like container.

All of these operations, and others related thereto in a manner to be described, are performed without interruption, in the normal operation of the machine, from the time a paperboard sleeve blank is withdrawn from a suitable gravity hopper; has adhesive applied thereto; is forwarded past star wheel type can assembly stations, at

2

which sets of cans are disposed in a cluster on a center panel of the advancing blank; is subjected to preliminary side wall folding arrangements; has its side wall panels compressed, and held compressed, between the can accommodating apertures; and is sealed at its top, while under side compression in the desired, tightly encircling and nested relationship of the packaging sleeve or band and can group which thereafter prevents endwise shift of the cans.

Machines presently used to perform this general sort of work, commencing with the outfeed of a flat, unfolded blank, usually perform the ensuing operations in an intermittent fashion, generally by reason of their relying on the use of a reciprocatory plunger feed device for the grouped articles, which feed advances the same intermittently from a side or from beneath the path of travel of a blank. Other stoppages may be involved in other manipulations, necessarily to further slow down the output of each machine. The consequence is that in the usual carton loading or packaging department of a canning establishment, for example, which has as its supply a rapidly and continuously issuing output of cans to be packaged, it is necessary to employ more than one packaging machine, for a necessary package output rate to accommodate the rate of can supply.

As stated, the invention affords packaging apparatus which is continuous in its operation and can handle the output of any can discharge line. Its capacity at its continuously acting, star wheel article grouping means is well able to receive and arrange articles in properly grouped relationship on an advancing blank, without diminishing the desired speed of advance of either the cans or the blanks.

However, within the limitations of a practical, mass output machine handling rapidly traveling objects by non-precision means, it is impossible to design can feed-in conveyor units which will service the star wheel grouping stations of a packaging apparatus such as the present without any possibility of jamming of the cans as they enter or traverse the star wheel stations. By the same token it is impossible to insure that a continuous supply of cans will issue from a source of supply, such as a preceding bottling apparatus, or that paperboard blanks will continuously issue from their hopper, as they do in the normal operation of the apparatus. Should any of these contingencies arise they are met in the improved apparatus by an immediate stoppage of its operation, in toto.

With the object of cutting off operation in the event a can or cans tip and/or jam in entering a star wheel grouper, the latter is equipped with a special type of switch actuator, which also acts as the normal guide rail defining the outer limit of the can path through the grouper. A microswitch controlled by this actuator immediately terminates machine operation in the event of jamming of this source, enabling its cause to be corrected.

Another object is to de-actuate the apparatus when a failure of can feed-in occurs, for continued machine operation would mean continued infeed of blanks, only to have the blanks destroyed and jammed when fed past empty star wheels and folded. Accordingly, suitable microswitch controls are incorporated in the can feed-in lines, in advance of the star wheels, to stop all operations if a cessation of can feed occurs.

Similar microswitch provisions are embodied in advance of the blank feed hopper, so that the apparatus will cease functioning in the event the hopper is allowed to become empty, or if a blank is jammed in being fed therefrom.

Considered somewhat more specifically the apparatus embodies a gravity supply hopper from which transversely

3

elongated, flat paperboard blanks are successively forwarded by a reciprocating discharge unit of more or less conventional character, entering into the bight of driven blank speed up rollers. Should a blank fail to be forwarded, its absence is detected by a feeler normally riding the top thereof, and the feeler actuates a microswitch wired in a conventional way in the machine energizing circuit to halt operation of the machine.

The speed up rollers separate the advanced blank from succeeding blanks and arrange the same for engagement by the feed lugs of a continuously operating, endless feed device. The blanks are advanced by this device, in a direction at a right angle to the length of their elongated outline, past a glue pot, where a stripe of adhesive is applied across one outer side edge thereof, after which the blank travels underneath and past a pair of laterally spaced star wheel article grouping units. These are located on either side of the center line of advance of the blanks, and on either side of its center, bottom forming panel.

Cans or other cylindrical objects are normally continuously fed in immediate side by side succession to these star wheels by endless, continuously traveling feed belts located on opposite, outer sides of the star wheels. Micro-switch feelers brush the tops of the continuous, substantially contacting succession of cans normally fed, and if an excessive gap arises between successive cans this feeler descends, causing an associated microswitch to shut off the machine operation in the same way as the hopper microswitch. Insurance is thus had that cans will approach the star wheel units in proper close succession.

Should one or more of the cans tilt, tumble or otherwise be presented to a star wheel unit in a manner to cause interference with its tooth or to jam, the machine is also stopped immediately. To this end an arcuate rail surface disposed outwardly of each star wheel, and normally confining the cans in a radial sense as they traverse the star wheel unit, is mounted for horizontal floating action. A member on which this rail surface is formed is spring urged to bring it into a proper radial, path defining relation to the star wheel, in which position it is restrained against further inward movement. Should jamming occur it takes place against this rail member, which causes the same to move outwardly. A microswitch is tripped by the outward movement causing the machine to be stopped so that the can jam at the star wheel can be eliminated.

Each of the star wheels shift sub-groups of three cans inwardly toward the center line of blank feed, which sub-groups are dropped onto the bottom forming panel of the blank, in appropriately timed relation to the advance of the latter as determined by the conveyor feed lugs. The cans are deposited in a side by side, longitudinally and transversely aligned engagement with one another, thereby shaping up a rectangular cluster which thereafter advances with the blank, riding on the center panel of the latter.

The blank now passes successive plow-type folding units, by which its side wall and top defining panels are respectively folded upwardly and inwardly toward an overlapped, but as yet unsealed, relation of the latter with the top of the can cluster. When the side walls are in upright condition engaging the sides of the cans, the partially completed package passes between a pair of presser units. These act on opposite sides of the package to apply local force to the latter at spaced points along each of its upper side wall margins, thereby forcing the up-folded blank sides into the spaces between can accommodating apertures along those side margins and tightly binding the same about the can group or cluster.

The presser unit is in the form of a pair of endless, horizontally traveling chains, each equipped with sets of presser lugs which are so spaced, in relation to one another and lengthwise of the chain, as to engage the wall margins of the package at the intermediate points mentioned and also adjacent the outer ends thereof.

4

With the packaging band or sleeve locally compressed at its upper side margins, the package now passes under spring urged sealer rollers and an endless, continuously traveling discharge and sealer belt whose lower reach is biased downward by a series of presser rolls. These means apply downward force on the overlapped area of the top forming panels of the packaging units, sealing the panels to one another at a previously glued zone. Pressure is maintained until the glue has set and outward spring will not result in a loosening of the tightly banded package of cans. The completed package now passes forwardly to a suitable discharge station or other receiver.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the apparatus.

A single embodiment of the invention is presented herein for the purpose of illustration. It will be appreciated that the invention may be incorporated in other modified forms coming equally within the scope of the appended claims.

In the drawings:

Fig. 1 is a top plan view, of more or less conventional and somewhat schematic character, showing the general layout of the various operating instrumentalities of the improved apparatus, and the provisions to drive the same in a continuous fashion;

Fig. 2 is a fragmentary view in vertical longitudinal section along line 2—2 of Fig. 1, this view being partially broken away;

Fig. 3 is a perspective view of a can package formed by the apparatus; and

Fig. 4 is a fragmentary view in transverse vertical section along line 4—4 of Fig. 2.

The operating instrumentalities of the improved apparatus and the driving provisions therefor are mounted upon a rigid supporting framework 10 constituted by appropriately braced side members 11 of channel or angle iron construction, by similar transverse frame members 12 at the ends and at intermediate points along the length of the framework, and by upright legs 13. The frame parts have not been illustrated fully and in detail, since any adequately strong framework will serve the purpose.

A main drive shaft 14 extends longitudinally of frame 10, outwardly of one side thereof, and this shaft is appropriately journaled in suitable bearings (not shown) on the framework. Shaft 14 is driven by a motor or other source of power, and in turn serves as the driver for the various operating units of the apparatus. In doing this shaft 14 acts through the agency of various horizontal and vertical shafts which are also suitably journaled on the framework 10 by conventional means not deemed necessary to illustrate with especial particularity.

Commencing with the right hand or blank supply hopper end of the apparatus, as viewed in Figs. 1 and 2, framework 10 supports a pair of parallel depending bracket plates 15 located adjacent and on either side of the longitudinal center line of the apparatus, these being secured in depending relation to a transversely extending angle iron 16 having its support on frame side members 11. The brackets are appropriately braced transversely and are further supported at their rear on transverse frame member 12. An upright supply hopper 17 at this zone gravitationally feeds paperboard blanks B, of the character depicted in dot-dash line in Fig. 1, to a feed out shuttle or shoe 18. This shuttle is guided on a longitudinal way 20 between brackets 15 to slide across a transverse strap which may be considered as a part of angle iron 16. The shuttle 18 has a rear feed abutment or abutments 19 projecting thereabove which successively engage bottom blanks B in the hopper and, upon forward movement of the shuttle, advance blanks from the hopper in a conventional fashion.

It is in order at this point, for a better understanding

5

of the various manipulations performed on blanks supplied from the hopper, to refer briefly, in connection with Figs. 1 and 3, to structural features of the blank B itself. The outline thereof is indicated in dot-dash line in Fig. 1 and the completed package is shown in Fig. 3.

Blank B is of elongated, generally rectangular outline, being disposed in hopper 17 with its length extending transversely of the frame. It is symmetric in this position about a center line at a right angle to its length, which center line coincides with the longitudinal center line of the apparatus. The blank is subdivided by creases paralleling that center line into a center-most bottom forming panel *a* of rectangular outline, side wall forming panels *b* adjoining the same, and top forming panels *c*.

The creating of the blank consists of pairs of longitudinally extending parallel creases *d*, *e*, at the zone of junction of the respective top, bottom and wall forming panels with one another. Can accommodating apertures *f* of truncated triangular outline are died out in the zones between the respective sets of creases, the parallel margins of the apertures coinciding with creases *d*, *e*. Finger holes *g* may be provided in the top forming panels *c*, and similar apertures may also be provided in the bottom forming panel *a*. The bottom blank B in hopper 17 is engaged by dog 19 of shuttle 18 at the rear edge of its centermost panel *a*.

A bell crank lever 22 is journaled between brackets 15 by a pivot pin, and an upwardly extending arm of the bell crank is pivotally connected through a rearwardly extending link 23 to a depending lug 24 on shuttle 18. A relatively short forward arm 25 of the bell crank has an actuating rod 26 pivotally connected thereto, which rod is operatively connected by means of a strap 27 at the other end thereof to an eccentric 28. Eccentric 28 is fixed to a transverse power take-off shaft 29 appropriately journaled in framework 10. A pair of steel blank feed-out rollers 30 are secured on shaft 29 on either side of the longitudinal center line of the apparatus, and a further pair of blank feed-out pull rollers 31, located immediately thereabove, coact with rollers 30 in spacing out the blanks as fed by shuttle 18. Rollers 31 are of smaller diameter than rollers 30 and are each provided with a resilient peripheral facing for a frictional grip on cartons forwarded to the rollers. Rollers 31 are secured to a horizontal, transversely extending power take-off shaft 32 which is appropriately journaled on frame 10, and the lower shaft 29 has a bevel gear 33 fixed thereon outwardly of the frame 10 which is driven by a like bevel gear 34 on main drive shaft 14.

Shafts 32 and 29 are drivingly coupled by meshing spur gears 35, 36 secured respectively thereto, and these gears have the same size ratio as rollers 31, 30, respectively, so that rotation of shaft 32 at a predetermined speed results in rotation of the smaller feed-out pull rollers 31 at a greater rotative speed than that of shaft 29.

A pair of chain sprockets 37 are secured on shaft 29 in transversely spaced relation to one another, and blank forwarding conveyor chains 38 are trained about these sprockets. Each chain is provided with longitudinally spaced carton advancing lugs 39, the lugs of the respective chains being in transverse alignment with one another, and the chains are trained about further driven sprockets 40 adjacent the opposite or forward end of the apparatus. The driving provisions for sprockets 40 will be hereinafter described. Appropriate provisions are made to guide and support chains 38 intermediate their sprockets, as well as to take up slack therein, this in the form of a conventionally illustrated tension roller 41. It is desired to drive chains 38 at both the rear and forward sprockets 37 and 40 in order to maintain accurate spacing of lugs 39 by maintaining uniform tension on the upper reaches of the chains.

Since the feed rollers 31 have a greater speed than the chain sprockets on shaft 29, a blank B advanced by shuttle 18 into the nip of rollers 30, 31 is speeded up to

6

deposit the same on chains 38 forwardly of an approaching pair of chain lugs 39. These lugs then catch up with the rear edge of the blank and continue its forward movement at a uniform rate.

Rotation of shaft 29 operates eccentric 28, connecting rod 26, bell crank 21 and link 23 to impart reciprocatory motion to blank feed-out shuttle 18, the blank thus fed out being separated from a blank forwarded in the ensuing stroke of the shuttle by the overspeeded feed rolls.

Inasmuch as the proper timing and reliable delivery of bottom-most blank B from the hopper onto chains 38 is essential in the operation of the apparatus, provision is made to best control the outfeed of the blank and to halt the machine in the event proper blank feed fails.

Means to this end comprise a switch feeler or control arm 43 which, as shown in Fig. 1, is mounted only slightly to one side of the longitudinal machine center line to ride across the surface of a blank forwarded from the hopper. Switch arm 43 controls a microswitch 44 appropriately wired in the motor circuit of the apparatus, so that in the event a blank B is not fed downwardly from the hopper, the arm will drop down and switch 44 will, through appropriate electrical connecting or relay provisions not involved in the invention, interrupt the energizing circuit of the apparatus as a whole.

Switch 43 is carried by an upwardly extending rod 45 which is mounted for vertical adjustment on a bracket member 46, there being an associated collar 47 which adjustably supports the rod 45 upon manipulation of a set screw. Bracket member 46 is fixedly, but adjustably associated with a further bracket member 48 which has a longitudinally extending slot 49 (Fig. 1), enabling a bolt 50 extending through the slot to clamp the bracket 46 in a desired, longitudinally adjusted position of microswitch 44. Bolt 50 is threaded into a gib element 51 slidably received in a dovetail groove of a rigid, transversely extending mounting bar 52 which receives element 51. The microswitch and mounting provisions thus enable the switch to be fixedly clamped in any desired vertical or longitudinal adjustment, in accordance with dimensions of the blank being employed. Bar 52 is supported on framework 10 by uprights at either end thereof.

Bar 52 also serves as a mounting means for certain blank hold-down devices, of which there are three on the present machine. One thereof is located at the longitudinal midpoint of the apparatus and the remaining two are located to overly the opposed end edges of the blank, controlling the same as the blank is fed out of the hopper. The hold-down devices are similar in their general nature. Each comprises an elongated, longitudinally extending hold-down strap 54 secured to the lower end of an upstanding rod 55, and a slotted bracket 56 to which the upper end of the rod is adjustably secured by a set screw.

A bolt 57 adjustably clamps bracket 56 in fixed but adjustable relation to a further slotted bracket member 58, which further bracket member is secured by a bolt 59 and associated gib in the dovetail recess of rigid cross bar 52. The bracket members 58 may also be equipped with upright rear strap members 60 which restrain the forward edges of the blanks B in the hopper 17.

The above described provisions insure an adequately controlled and vertically restrained outfeed of the lowermost hopper blank forwarded by shuttle dog 19, but if no blank is forwarded, due to the hopper becoming empty or by failure of the feeding mechanism, the apparatus as a whole is instantly halted through the microswitch 44. The bracket mounting provisions permit universal adjustment of hold-down straps 54 and microswitch 44 to accommodate blanks of widely differing character.

Receiving a blank B from shuttle 18, chain lugs 39 forward the same above an adhesive applicator roll 62 adjacent one side of frame 10, which deposits a stripe of adhesive along one end of the blank, in a zone to be subsequently overlapped by and sealed to the other end

of the blank. Roll 62 is appropriately journaled in a glue pot 63 adjustably carried on one of a number of rail supports 64 extending transversely between and supported by frame side members 11; and applicator roll 62 is driven by a chain 65 trained about a sprocket fixed on shaft 29 and a further sprocket on the roll shaft.

The conveyor chains advance blank B beneath and past a can loading station, at which a pair of star wheel units 68, located in transverse alignment with one another and on either side of the path of travel of the chains, deposit a group of cans C on the center, top forming panel *a* of the blank. Each unit 68 positions half of the cans of the group, for example three, in particular relation to panel *a*, and to the can accommodating apertures *f* adjoining it, in a manner which will be more fully described when the operation of the apparatus is explained.

Star wheel units 68 are each supplied by an endless, continuously operating conveyor belt 69 trained about a rear drive drum or pulley 70 adjacent unit 68 and a further idler pulley 71 adjacent the forward, delivery end of the apparatus. Pulleys 70 are secured on a transverse power take-off shaft 72 journaled in the framework 10, which shaft is provided at its outer end with a bevel gear 73 in mesh with a like bevel gear 74 on main drive shaft 14. Rotation of shaft 72 drives the conveyor belts in a rearward direction, as indicated by arrows, thus to advance cans continuously inwardly into the respective star wheel units 68.

In so advancing the cans are guided by inwardly inclined sets of vertically spaced guide surfaces 76 intercepting the path of belt movement. These surfaces confine the cans to the star wheel outline as they are advanced by each unit 68, but they do so in a yieldable fashion, due to a floating mount for a guide member 77 on which the surfaces are formed, as will be later described.

Star wheels 68 are composed of like, vertically registered and spaced plates 78 of a contour adapting each wheel to separate out a sub-group of three cans advanced on a belt 69. The plates 78 of each wheel are subdivided into a plurality of assembling sections, which in turn are subdivided by projecting teeth 80, 81, to afford concave can receiving seats. There is a central seat 82 between teeth 80, 81, a forward seat 83 ahead of tooth 80, which seat merges forwardly into the outer convex curvature 84 of an enlarged, section-separating tooth 85, and a rearward seat 86 between the teeth 81 and 85. It is to be seen upon reference to Fig. 1 that each series of seats 83, 82, 86 will pick up a set of three cans advancing to the rear on a belt 69, and will properly space and align the set while bringing the same to the machine centerline, guided by arcuate surfaces 76 of floating guide member 77.

A superstructure 88 on framework 10 serves as a journaled support for the star wheels and associated driving instrumentalities therefor. This superstructure bridges the framework from side to side, being sustained by side members 11, and it may be fabricated of appropriately braced and welded angle irons 89. It also affords a support for a fixed horizontal table 90 beneath each star wheel, on which the cans are slidingly supported as they are advanced toward the center of the apparatus. These tables, beneath which blanks B are advanced by chains 38, are supported just sufficiently above the plane of the blank feed to be cleared by the lugs 39 of chains 38. Thus cans C positioned by star wheel units 68 drop off their tables 90 a distance of, say, $\frac{3}{4}$ inch, onto the center panel *a* of the blank, under the control of the star wheel seats 82, 83, 86 and curved guide rail surfaces 76.

Each set of star wheel plates 78 is secured to a vertical shaft 92 having a journal in a depending tubular bearing sleeve 93 carried by superstructure 88, and the upper extremity of each shaft 92 has fixedly secured

thereon a bevel gear 94 meshing with a bevel driving pinion 95 secured to a transverse power take-off jack shaft 96. Shaft 96 is equipped at its outer end with a bevel gear 97 in mesh with a similar bevel gear 98 on an upright stub shaft 99, which in turn has a bevel pinion 100 at its lower end in mesh with a bevel gear 101 secured on main drive shaft 14. As in the case of other shafts, these power members are mounted in suitable bearings on superstructure 88 and on machine frame 10, with which provisions the invention does not deal.

Star wheels 68 are thus continuously driven in the directions as indicated by arrows. They pick up, forward and drop a group of three cans on each side of center panels *a* of the advancing blank, the can and blank unit then being advanced by chain feed lugs 39 past conventional primary plow rods or bars 104.

Because it is impossible, in a rapidly operating packaging apparatus whose can input is ordinarily derived from a bottling machine through a combined gravitational and belt feed system, to closely confine the cans in a lateral sense, it sometimes happens that cans will arrive at one or the other of the star wheel units 68 in a tilted or overturned condition. This will of course result in a jamming at the star wheel teeth, hence the present invention apparatus includes provisions to meet this possibility.

It has been stated above that the arcuate guide surfaces 76 which define the path of travel of the cans through the star wheel units are formed on a single yieldable or floating member 77. As illustrated in Fig. 2, this member is of a generally channel-shaped outline in vertical cross section, presenting inwardly extending flange elements 106 at the elevation of the respective plates 78 of the star wheel. The guide surfaces 76 constitute the inner edges of these flange elements, which are rigidly connected to one another by an outer upright box-like wall 107 to constitute member 77.

The member 77 is mounted to slide horizontally in a front to rear direction, as on an appropriate slide support on frame side bars 11, and is restrained vertically in its sliding movement by hold-down rollers 108 supported by superstructure 88. Coil springs 109 at either end of floating member 77 are anchored to fixed pins 110 on the superstructure and are secured at their other ends to upright pins 111 connected between the plates 78 of member 77, thus urging that member forwardly, i. e. in a direction toward the star wheel units 68. The resiliently biased movement in this direction is limited to afford an arcuate can path of minimum desired width by fixed stops 112 on frame side bars 11.

It is therefore evident that if a tilted or toppled can enters the star wheel unit, the instant it is engaged by one of the teeth of the latter it will be thrust against a guide surface 76, thus biasing the floating member 77 to the rear and avoiding a destructive jam, with possible damage to the machine. The upper flange element 106 of the floating member 77 is provided at each end thereof with a fixed cam element 113, which, upon the rearward movement referred to, will engage a roller actuator 114 of a microswitch 115, thereby elevating the actuator and operating the microswitch. The latter is wired in the electrical circuit of the apparatus in parallel with blank feed microswitch 44, so that the apparatus is halted under the circumstance described.

Each microswitch 115 is provided with an upwardly extending rod 116 which is adjustably clamped by a set screw collar on a bracket 117 secured to superstructure 88. This enables vertical adjustments of the microswitch 115 to accommodate cans of various axial dimensions.

A further throw-out provision, approximately equivalent in its significance to the blank feedout switch 44, is made for the purpose of halting operation of the machine in the event a gap occurs in the line of cans being forwarded to the star wheel units 68 on belts 69.

This takes the form of a microswitch 119 disposed directly above each of the belts 69, in a considerably forwardly spaced relation to the respective star wheel units. Each switch 119 has an upright rod 120 secured thereto, the rod being mounted for vertical adjustment on a rearwardly extending bracket arm 121. Each bracket arm is slotted at 122 for fore and aft adjustment on and fixed support by an upright bracket 123 which is appropriately supported on the machine frame, the adjustments in the respects noted being similar to those provided at the switches 115.

A switch control or feeler finger 124 depends from the switch to wipe across the tops of cans advanced rearwardly by belts 69, normally in immediate side by side contacting relation. Should a gap exist between cans, finger 124 descends, actuating switch 119, which is in parallel circuit relation with the switches 44, 115, and thereby interrupt operation of the machine until further cans are brought up to restore the direct succession thereof. This lifts feeler finger 124 and restores an operational circuit at the can feed-in station of switch 115.

As stated above, upon the reception of a grouped charge of six cans C on the center, bottom forming panel *a* of blank B the blank is advanced by chains 38 past plow rods 104. These curve inwardly and upwardly from either outer side of the margins of the panel *a*, folding side wall panels *b* of the blank in a continuous fashion to an upright position, in which they have side by side engagement with the outer surfaces of cans C positioned on the blank. Next the continuously advancing, partially completed package is fed by conveyor 38 past curved secondary plow rods or bars 125, which act on top forming panels *c* of the blank, folding the same progressively inwardly and downwardly until they are in loosely overlapped or superposed relation to one another along end sealing zones thereof, to one of which zones a stripe of adhesive was previously applied by applicator roll 62.

The partially completed package now enters between the presser units of the apparatus, generally designated 130, which units are supported on frame side members 11 by means of upright brackets 131 thereon and a transverse rod 132 extending between and supported by the brackets. Each unit 130 includes a carriage 133 having a longitudinally extending upright flange 134 through which a tubular adjusting and locking sleeve 135 extends, the sleeve being in fixed relation to flange 134. Rod 132 is received in the sleeves of the two carriages 133 and the latter are secured in desired, transversely adjusted position by means of set screws tapped in sleeve 135.

The operating means of the presser unit 130 are supported on carriage 133 and to this end the flange 134 is provided with enlarged vertical bosses 136, 137 at the respective forward and rearward ends thereof, the bosses being bored and reamed to provide bearings for rotatable spindles 138, 139, respectively. Appropriate provisions are made to hold the spindles in predetermined vertical relation to the bearings. Spindle 139 is provided at its upper end with a small drive pulley 140, fixedly secured thereto, and the lower ends of the spindles 138, 139 have sprockets 141, 142 fixed thereon. A horizontal flange on carriage 135 furnishes a mount for an idling, tension-adjusting pulley 144 which is carried on a laterally projecting arm 145.

Each presser unit 130 is operated continuously by a drive chain 146 trained about upper sprocket 140 and about a larger diameter sprocket 147 secured on the upright drive shaft 92 of the star wheel unit to the rear thereof. This in turn drives sprocket 142 and a presser chain 148 trained about the respective presser unit sprockets 141, 142, 144. The tooth ratio of the sprockets is such that each chain 148 advances at a linear speed equal to the speed of advance of the main drive chains 38.

The chains 148 are equipped with sets of outwardly projecting presser lugs 149 which are adapted to engage the upright side wall panels *b* of the partially completed package and to press those panels firmly against the group of cans adjacent the upper side margins of the panels. The spacing of lugs 149 along the respective chains 148 corresponds to the longitudinal spacing of the material of side wall panels *b* as separated by can-accommodating apertures *f*, and in so engaging these points the walls and aperture edges assume a snug, frictional binding engagement with the cans, holding the cans securely against endwise displacement.

Presser lugs 149 maintain this shaping and holding engagement with the packaging unit as the overlapped top forming panels *c* of the latter pass from beneath plow bars 125 and, in traversing presser units 130, enter beneath a series of small, longitudinally spaced, spring urged pressure rolls 152. These are appropriately supported to float between transversely spaced auxiliary frames 153, which may derive their own support in any conventional manner from the machine frame, as from cross rod 132. Rollers 152 iron the overlapped bottom forming panels together at their adhesive sealing zone, causing the same to adhere firmly to one another while side wall panels *b* continue to be pressed inwardly as described.

Departing from presser units 130, the now completed carton next passes beneath the lower reach of a pressure belt 155 which is trained at its rear about a suitable idler 156 on a transverse shaft 156'. Belt 115 coacts with a similar lower feed belt 157, both appropriately driven from a separate source, in discharging the package. Belt 157 is trained about a pulley 158 idling on a transverse shaft 160 and its upper reach receives the packages advanced by chains 38. Spring loaded pressure rollers 161 act downwardly on the lower reach of belt 155.

The drive for chains 38 at the forward end of the apparatus is derived from a transverse power take-off shaft 162, to which chain sprocket 40 is secured, and over which sprocket the chain is trained. Shaft 162 is equipped with a bevel gear 163 at its outer end which meshes with a like bevel gear on main drive shaft 14. Shaft 162 also serves as a journal for forward, can-feed belt drums or pulleys 71. Since belts 69 are driven from drums 70 at the opposite end of the machine, drums 71 are provided with roller-type anti-friction bearings, generally designated 165, to idle on shaft 162.

It will be understood that in the advancement of blanks by chain lugs 39 and cans by belts 69 through the various operating provisions described above the blanks B and chain and belt means described above will have sliding support of a suitable sort, preferably composed of guide and slide rails supported on rail supports 64. Provisions of this character have not been illustrated, with the object of simplifying the disclosure and because they are old and well known in the arts of article handling and packaging.

It is believed that the operation of the apparatus is clear from the foregoing detailed description. However, to recapitulate briefly, elongated rectangular blanks B, positioned in hopper 17 in the arrangement illustrated in dot-dash lines in Fig. 1, are fed forwardly, one by one, from the bottom of the stack by the feed dog 19 of shuttle 18 as the latter partakes of a forward drive stroke. The forward edge of the blank is thus introduced into the nip of speed-up rollers 30, 31 by which it is separated from a succeeding blank and thrust sufficiently forwardly to be positively engaged by the drive lugs 39 of chains 38, as those lugs travel upwardly and forwardly around positively driven chain sprockets 37. As the shuttle advances a blank the latter is held down at its critical end zones and at its midpoint, where the thrust of the shuttle is exerted, by the hold-down straps 54. Should the hopper be empty or a blank not be fed for any other reason, microswitch 44 shuts off the machine.

Glue is applied by applicator roll 62 to the lower surface of one end of the blank, after which the transversely extending blank is forwarded longitudinally beneath the tables 90 of star wheel units 68. These units pick up sub-groups of three cans each, as advanced by belt 69 and guided by arcuate surfaces 76 of member 77. In the event of a can jam at either star wheel the guide member 77 is forced backwardly against the force of a spring 109 and a cam 113 on the guide member causes a microswitch 115 to halt the apparatus until the obstruction is cleared. If a continuous feed line does not exist to each star wheel unit 68 a microswitch 119 will correspondingly suspend operations.

Cans C are slid forwardly over tables 90 and deposited in a group of six on the center panel *a* of the blank B, being in approximate vertical register at their outer peripheries with the side and end margins of the blank. The bottoms of cans C overlap panel *a* into the can accommodating apertures *f* adjoining its side margins. The thus prepared unit now passes fixed plow bars 104, 125, by which its side walls *b* and upper panels *c* are progressively folded upwardly and into an overlapped horizontal relation of the latter to one another, with the side walls engaging the sides of the can group.

In this condition, the side walls *b* are subjected adjacent their upper margins to inward local compression by the predeterminedly spaced lugs 149 on chains 148 of both presser units 130. This indents the material of the blank between the can accommodating apertures *f* into the spaces between successive cans of the group, the lugs traveling with the shaped packaging unit the while. The overlapped upper panels *c* are then subjected to ironing action by the rolls 152 as they complete their traverse of the presser unit 130, and the completed package issues and enters the discharge section of the machine, including pressure and feed-out belts 155, 157 driven from an independent external source. The completed packages are deposited by these belts at any appropriate delivery station.

The apparatus is distinguished by the fact that it is operated continuously and rapidly in all of the phases of the various operations which it performs on blank B and group of articles to be packaged therein. Furthermore, all of the operating instrumentalities thereof are positively driven, including the positive drive of the feed chains 38 at both front and rear ends thereof, the positive drive of feed-out rollers 30, the positive drive of star wheel units 68 and the positive drive of presser units 130. This insures perfectly timed functioning of the parts, which is important in insuring that the cans C are grouped properly on the center of the blank and that local pressure is properly applied by pressure units 130 at the exact upper zones of the side walls which are to be indented between cans.

Notwithstanding this, the apparatus is relatively simple in its parts, and considering the high speed output thereof and its reliability of operation, is relatively inexpensive in construction. It occupies a very small floor space area, and the various operating units thereof are of such a nature as to be readily adjustable in the transverse sense, for the purpose of adapting the machine to operate on packages of different widths.

I claim:

1. Apparatus for packaging a group of like objects in a paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a conveyor feeding flat container blanks in the direction of the end to end dimension of said panels, means feeding a group of objects onto an inner panel of said blank, former elements acting to form said blank into a container in which said group is housed, said elements folding side wall panels and panels of said blank on either side thereof respectively upright and inwardly toward one another into generally parallel and overlapped relation to the sides of said group and to adjoining surfaces

thereof, presser means, and means supporting said presser means adjacent the conveyor for travel in the direction of advancing movement of said container and for engaging said container adjacent the juncture of said side panels and said overlapped panels to press the container snugly against the group as said presser means travels with the container, the action of said presser means also inwardly depressing said side wall panels adjacent said overlapped panels at longitudinally spaced points intermediate the objects in the group.

2. Apparatus for packing a group of like objects in a paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a conveyor feeding flat container blanks in the direction of the end to end dimension of said panels, means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said feeding means and the latter positioning said group of objects on an inner panel of said blank, former elements adjacent said conveyor acting to form said blank into a container in which said group is housed, said elements folding side wall panels and panels of said blank on either side thereof respectively upright and inwardly toward one another into generally parallel and overlapped relation to the sides of said group and to adjoining surfaces thereof, presser means, and means to support said presser means adjacent said conveyor for travel in the direction of advancing movement of said container and in position for engaging said container adjacent the juncture of said side panels and said overlapped panels to press the container snugly against the group as said presser means travels with the container, said presser means having spaced members for inwardly depressing said side wall panels adjacent said overlapped panels at longitudinally spaced points intermediate the objects in the group.

3. Apparatus for packaging a group of like objects in a paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements adjacent said conveyor acting to form said blank into a container in which said group is housed, said elements folding side wall panels and panels of said blank on either side thereof respectively upright and inwardly toward one another into generally parallel and overlapped relation to the sides of said group and to adjoining surfaces thereof, and continuously traveling presser means engaging said container adjacent the juncture of said side panels and said overlapped panels to press the container snugly against the group as said presser means travels with the container, said presser means having projecting members for engaging and inwardly depressing said side wall panels at longitudinally spaced points adjacent said overlapped panels and between the objects in the group.

4. Apparatus for packing a group of like objects in a paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements positioned along said conveyor and acting to form said blank into a container in which said group is housed, said elements folding side wall panels and panels of said blank on either side there-

13

of respectively upright and inwardly toward one another into generally parallel and overlapped relation to the sides of said group and to adjoining surfaces thereof, presser means mounted adjacent said conveyor for travel with the container and engaging said container adjacent the juncture of said side panels and said overlapped panels to press the container snugly against the group as said presser means travels with the container, the action of said presser means inwardly depressing said side wall panels at longitudinally spaced points intermediate the objects in said group and adjacent said overlapped panels, and means to drive said conveyor, star wheel means and presser means in timed relation.

5. Apparatus for banding a group of cylindrical objects in an open-ended paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements positioned along said conveyor to fold side wall and bottom wall panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, presser means mounted in oppositely disposed relation adjacent said conveyor for travel with the container and engaging said side wall panels to press the same snugly against the group as said presser means travels with the container, said presser means engaging and inwardly depressing said side wall panels adjacent the top thereof and at spaced points therealong, and means to drive said conveyor, star wheel means and presser means in timed relation.

6. Apparatus for banding a group of cylindrical objects in an open-ended paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, duplicate, continuously rotating star wheel means on either side of said conveyor feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements positioned along said conveyor to fold side wall and bottom wall panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, presser means mounted in oppositely disposed relation adjacent said conveyor for travel with the container and engaging said side wall panels to press the same snugly against the group as said presser means travels with the container, said presser means engaging and inwardly depressing said side wall panels adjacent the top thereof and at spaced points therealong, and means to drive said conveyor, star wheel means and presser means in timed relation.

7. Apparatus for banding a group of cylindrical objects in an open-ended paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements acting to fold side wall and bottom wall panels of said blank on either side of said inner panel upwardly and inwardly

14

toward one another into generally parallel relation, respectively, to the sides and top of said group, presser means mounted in oppositely disposed relation adjacent said conveyor for travel with the container and engaging said side wall panels to press the same snugly against the group as said presser means travels with the container, said presser means comprising a continuously moving member having portions thereof engaging and inwardly depressing said side wall panels adjacent the top thereof and at longitudinally spaced points therealong, and means to drive said conveyor, star wheel means and presser means in timed relation.

8. Apparatus for banding a group of cylindrical objects in an open-ended paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements acting to fold side wall and bottom wall panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, presser means engaging said side wall panels to press the same snugly against the group as it travels with the blank, said presser means comprising a continuously traveling chain having longitudinally spaced, laterally projecting presser lugs engaging and inwardly depressing said side wall panels adjacent the top thereof and at longitudinally spaced points therealong, and means to drive said conveyor, star wheel means and presser means in timed relation.

9. Apparatus for banding a group of cylindrical objects in an open-ended paperboard container having side, top and bottom wall panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously rotating star wheel means feeding a group of objects transversely of the direction of conveyor travel, said conveyor being positioned to advance said blank under said star wheel means and the latter positioning said group of objects on an inner panel of said blank, former elements acting to fold side wall and bottom wall panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, presser means engaging said side wall panels to press the same snugly against the group as it travels with the blank, said presser means comprising a continuously traveling chain having longitudinally spaced, laterally projecting presser lugs engaging and inwardly depressing said side wall panels adjacent the top thereof and at longitudinally spaced points therealong, a continuously acting sealing unit engaging said bottom wall panels to secure the same to one another over the top of said group, and means to drive said conveyor, star wheel means and presser means in timed relation.

10. In an apparatus for banding a group of successive cylindrical objects in a packaging unit having longitudinally spaced apertures at the junction of horizontal and vertical panels thereof, through which apertures portions of said objects are exposed, the combination of means to longitudinally advance said packaging unit with panels adjoining either side of a center thereof in vertical position, and with portions of said objects exposed through said apertures, and a presser unit mounted to travel in a path along the path of travel of said packaging unit and acting, while it advances, from a side of the thus partially completed package to inwardly depress portions of a

vertical panel between a pair of said apertures and at said junction of horizontal and vertical panels thereof.

11. In an apparatus for banding a group of successive cylindrical objects in a packaging unit having longitudinally spaced apertures at the junction of horizontal and vertical panels thereof, through which apertures portions of said objects are exposed, the combination of means to longitudinally advance said packaging unit with panels adjoining either side of a center thereof in vertical position, and with portions of said objects exposed through said apertures, and a presser unit acting, while it advances, along a side of the thus partially completed package to inwardly depress portions of a vertical panel adjacent said apertures and at said junction of horizontal and vertical panels thereof, said presser unit comprising an endless member traveling in a horizontal plane and parallel to the path of advance of the package, said member being provided with lugs projecting outwardly therefrom and spaced longitudinally from one another in accordance with the spacing of said apertures.

12. In an apparatus for banding a group of successive cylindrical objects in a packaging unit having longitudinally spaced apertures at the junction of horizontal and vertical panels thereof, through which apertures portions of said objects are exposed, the combination of means to longitudinally advance said packaging unit with said group resting on an inner horizontal panel thereof, means to fold panels adjoining either side of said inner panel thereof into vertical and horizontal position, respectively, with portions of said objects exposed through said apertures, and a presser unit mounted along the path of advance of said packaging unit and acting, while it advances, along a side of the thus partially completed package to inwardly depress longitudinally spaced portions of a vertical panel between a pair of said apertures and at said junction of horizontal and vertical panels thereof, said presser unit comprising an endless member traveling in a horizontal plane and parallel to the path of advance of the package, said member being provided with lugs projecting outwardly therefrom and spaced longitudinally from one another in accordance with the spacing of said apertures.

13. Apparatus for packaging a group of cylindrical objects in a flexible paperboard container having side, top and bottom wall forming panels snugly encircling said group, comprising a conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, means feeding and positioning a group of objects on an inner panel of said blank, means acting to fold side wall and bottom wall forming panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, traveling presser means engaging said side wall panels to press the same snugly against the group as said presser means travels with the container and means to apply pressure to said top wall forming panels and to secure the same together.

14. Apparatus for packaging a group of cylindrical objects in a flexible paperboard container having side, top and bottom wall forming panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container blanks in the direction of the end to end dimension of said panels, continuously acting means feeding and positioning a group of objects on an inner panel of said blank, means acting to fold side wall and bottom wall forming panels of said blank on either side of said inner panel upwardly and inwardly toward one another into generally parallel relation, respectively, to the sides and top of said group, continuously acting presser means moving with said traveling conveyor and engaging said side wall panels to press the same snugly against the group as said presser means travels with the container, means to engage said top wall forming panels and secure the same together, and means

to drive said conveyor, object positioning means and presser means in timed relation.

15. Apparatus for packaging a group of cylindrical objects in a flexible paperboard container having side wall and horizontal wall forming panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container units in the direction of the end to end dimension of said panels, means to group objects on an inner panel of a container unit, former elements acting to fold side wall and horizontal wall panels of said blank on either side of said inner panel into generally parallel relation, respectively, to the upright sides and horizontal surfaces of said group, presser means positioned along said conveyor and engaging at least one of said side wall panels to press the same snugly against the group as said presser means travels with the container, said presser means comprising a continuously traveling chain having longitudinally spaced, laterally projecting presser lugs engaging and inwardly depressing said side wall panel at longitudinally spaced points therealong, and means to drive said conveyor, grouping and presser means in timed relation.

16. Apparatus for packaging a group of cylindrical objects in a flexible paperboard container having side wall and horizontal wall forming panels snugly encircling said group, comprising a continuously traveling conveyor positively feeding flat container units in the direction of the end to end dimension of said panels, means to group objects on an inner panel of a container unit, former elements acting to fold side wall and horizontal wall panels of said blank on either side of said inner panel into generally parallel relation, respectively, to the upright sides and horizontal surfaces of said group, presser means mounted to travel along said conveyor and having means for engaging at least one of said side wall panels to press the same snugly against the group as said presser means travels with the container unit, and having longitudinally spaced, laterally projecting presser lugs engaging and inwardly depressing said side wall panel at longitudinally spaced points therealong, a continuously acting sealing unit engaging said horizontal panels to secure the same to one another across said group, and means to drive said conveyor, grouping and presser means in timed relation.

17. In an apparatus for packaging cans and like objects in a packaging member, feed means for packaging members comprising a conveyor forwarding said members in longitudinal succession, a rotary object assembling device to which said members are so forwarded, and further conveyor means to supply objects to said assembling device in succession, said device comprising a rotary object assembling member acting to group a predetermined number of objects supplied by said further conveyor means and to dispose the same in position to be packaged in a packaging member at said assembling device, a guide member at least in part defining a path through which objects are advanced in the rotation of said assembling device, and means mounting said guide member for movement in the event of engagement thereof under predetermined force by objects supplied to said assembling device, and control means responsive to such movement of said guide member to halt further supply of said objects to said device.

18. In an apparatus for packaging cans and like objects in a packaging member, feed means for packaging members comprising a conveyor forwarding said members in longitudinal succession, a rotary object assembling device to which said members are so forwarded, and further conveyor means to supply objects to said assembling device in succession, said device comprising a rotary object assembling member acting to group a predetermined number of objects supplied by said further conveyor means and to dispose the same in position to be packaged in a packaging member at said assembling device, a member past which objects are advanced in

17

the rotation of said assembling device, and means mounting said last named member for movement in the event of engagement thereof under predetermined force by objects supplied to said assembling device, control means responsive to such movement of said last named member to halt further supply of said objects to said device, and means operatively connected to said control means to halt further forwarding of said packaging members by said first named feed means.

19. In an apparatus for packaging cans and like objects in a packaging member, feed means for packaging members comprising a conveyor forwarding said members in longitudinal succession, a rotary object assembling device to which said members are so forwarded, and further conveyor means to supply objects to said assembling device in succession, said device comprising a rotary object assembling member acting to group a predetermined number of objects supplied by said further conveyor means and to dispose the same in position to be packaged in a packaging member at said assembling device, a guide member at least in part defining a path through which objects are advanced in the rotation of said assembling device, and means mounting said guide member for movement in the event of engagement thereof under predetermined force by objects supplied to said assembling device, control means responsive to such movement of said guide member to halt further supply of said objects to said device, and means operatively connected to said control means to halt further forwarding of said packaging members by said first named feed means.

20. Apparatus for packaging cans or like objects in an open-ended container, comprising a gravity supply hopper for paperboard blanks to package said objects, conveyor means engaging the lowermost blank to advance the same longitudinally, a control device normally engageable with a blank so advanced and actuable by non-engagement therewith, a rotary object assembling mechanism to which said conveyor successively advances blanks, said mechanism operating in the rotation thereof to assemble and deliver a group of objects in operative position to be packaged by a blank at said mechanism, means to feed objects in succession to said assembling mechanism, a further control device associated with said assembling mechanism, said further device being actuable by an object and comprising a guide member mounted for floating movement and in part defining a path of travel of objects assembled by said mechanism, said guide member being engageable by an object under certain circumstances to cause actuated floating movement thereof, and means responsive to actuation of either of said control devices to halt operation of said apparatus, and means to fold and secure said blank about a group of objects positioned by said assembling mechanism, as said group is advanced longitudinally with the blank by said conveyor means whereby to encase the bottom, top and sides of the group.

21. Apparatus for packaging cans or like objects in an open-ended container, comprising a gravity supply hopper for paperboard blanks to package said objects, conveyor means engaging the lowermost blank to advance the same longitudinally, a rotary object assembling mechanism to which said conveyor successively advances blanks, said mechanism operating in the rotation thereof to assemble and deliver a group of objects in operative position to be packaged by a blank at said mechanism, means to feed objects in succession to said assembling mechanism, a control device normally engageable with objects so fed and actuable by non-engagement therewith, a further control device associated with said assembling mechanism, said further device being actuable by an object and comprising a guide member mounted for floating movement and in part defining a path of travel of objects assembled by said mechanism, said guide member being engageable by an

18

object under certain circumstances to cause actuated floating movement thereof, and means responsive to actuation of either of said control devices to halt operation of said apparatus, and means to fold and secure said blank about a group of objects positioned by said assembling mechanism, as said group is advanced longitudinally with the blank by said conveyor means whereby to encase the bottom, top and sides of the group.

22. Apparatus for packaging cans or like objects in an open-ended container, comprising a gravity supply hopper for paperboard blanks to package said objects, conveyor means engaging the lowermost blank to advance the same longitudinally, a control device normally engageable with a blank so advanced and actuable by non-engagement therewith, a rotary object assembling mechanism to which said conveyor successively advances blanks, said mechanism operating in the rotation thereof to assemble and deliver a group of objects in operative position to be packaged by a blank at said mechanism, means to feed objects in succession to said assembling mechanism, a control device normally engageable with objects so fed and actuable by non-engagement therewith, a further control device associated with said assembling mechanism, said further device being actuable by an object and comprising a guide member mounted for floating movement and in part defining a path of travel of objects assembled by said mechanism, said guide member being engageable by an object under certain circumstances to cause actuated floating movement thereof, and means responsive to actuation of any of said control devices to halt operation of said apparatus, and means to fold and secure said blank about a group of objects positioned by said assembling mechanism, as group is advanced longitudinally with the blank by said conveyor means whereby to encase the bottom, top and sides of the group.

23. Apparatus for packaging cans or like objects in an open-ended container, comprising a gravity supply hopper for paperboard blanks to package said objects, conveyor means engaging the lowermost blank to advance the same longitudinally, a control device normally engageable with a blank so advanced and actuable by non-engagement therewith, a rotary object assembling mechanism to which said conveyor successively advances blanks, said mechanism operating in the rotation thereof to assemble and deliver a group of objects in operative position to be packaged by a blank at said mechanism, means to feed objects in succession to said assembling mechanism, a control device normally engageable with objects so fed and actuable by non-engagement therewith, a further control device associated with said assembling mechanism, said further device being actuable by an object and comprising a guide member mounted for floating movement and in part defining a path of travel of objects assembled by said mechanism, said guide member being engageable by an object under certain circumstances to cause actuated floating movement thereof, and means responsive to actuation of any of said control devices to halt operation of said apparatus, means to fold and secure said blank about a group of objects positioned by said assembling mechanism, as said group is advanced longitudinally with the blank by said conveyor means whereby to encase the bottom, top and sides of the group, and means exerting local pressure on said side walls at longitudinally spaced points therealong during but prior to the termination of said folding and securing.

24. In an apparatus for banding a group of successive cylindrical objects in a packaging unit having longitudinally spaced apertures at the junction of horizontal and vertical panels thereof, through which apertures portions of said objects are exposed, the combination of means to longitudinally advance said packaging unit with said group resting on an inner horizontal panel thereof, means to fold panels adjoining either side of said inner panel

thereof into vertical and horizontal position, respectively, with portions of said objects exposed through said apertures, and a presser unit mounted for movement along the path of advance of said packaging unit and having means acting, while it advances, along a side of the thus partially completed package to inwardly depress longitudinally spaced portions of a vertical panel at opposite sides of said apertures and at said junction of horizontal and vertical panels thereof.

25. In an apparatus for packaging cans and like objects in a packaging member, a conveyor having means thereon for forwarding packaging members in longitudinal succession, a rotary object assembling device adjacent said conveyor to which said packaging members are so forwarded, means including a second conveyor for supplying objects to said object assembling device in succession, said object assembling device comprising a rotary object assembling member acting to group a predetermined number of objects supplied by said second conveyor and to advance the same to a position to be packaged in a packaging member at said object assembling device, a control member spaced from the periphery of said object assembling member and along the path traversed by objects which are advanced to a packaging position by said rotary object assembling member, means mounting said control member for movement outwardly of the path of the objects advanced by said object assembling member in the event of engagement thereof under predetermined force by jamming of objects supplied to said object assembling device, and means responsive to such movement of said control member to halt further supply of said objects to said device.

26. Apparatus for packaging cans in paperboard blanks comprising a conveyor having means for advancing successive blanks in flat opened out condition to a can assembling mechanism, said can assembling mechanism comprising a pair of star wheels arranged on parallel spaced axes on opposite sides of said blank conveyor, supply conveyors arranged to deliver cans in single line array to the star wheels, means to operate the star wheels to assemble groups of cans and move the same through a curved path to packaging position on successive blanks advanced to said can assembling mechanism, and a control mechanism associated with said can assembling mechanism which comprises a guide member extending across the path of the blank conveyor and having portions on either side thereof forming curved guideways along which the groups of cans are moved by said star wheels to the packaging position, said guideway portions each being normally spaced a distance from the associated star wheel to permit passage of the cans in single line arrangement

with their axes in parallel relation, means mounting said member for sliding movement toward and from said star wheels, means for resiliently urging said member toward the star wheels whereby said member is adapted to be moved away from said star wheels upon engagement of a guide portion by an improperly positioned can, and means responsive to movement of said member beyond a predetermined distance from either of said star wheels to halt operation of said apparatus.

27. An apparatus for packaging cans in paperboard blanks comprising a conveyor having a horizontal run on which successive blanks are advanced in flat opened out condition, a can assembling mechanism to which said blanks are advanced by said conveyor, said can assembling mechanism comprising a pair of star wheels arranged to rotate on vertical axes on opposite sides of said blank conveyor, supply conveyors delivering cans in single line array to each of the star wheels, means to operate the star wheels to deliver assembled groups of cans around the periphery thereof and through a curved path to packaging position on successive blanks advanced by said blank conveyor to said can assembling mechanism, and a control mechanism associated with said can assembling mechanism comprising a horizontally disposed guide member extending across the blank carrying run of said blank conveyor and having curved guide portions at opposite ends thereof in spaced relation to the periphery of the star wheels, said curved guide portions being engaged by the cans which are moved by said star wheels around the periphery thereof, said curved guide portions being normally spaced a distance from the associated star wheel to permit passage of the cans when they are in single line arrangement with their axes in vertically extending parallel relation, means mounting said guide member for floating movement toward and from the periphery of said star wheels, means for resiliently resisting movement of said guide member away from the star wheels, and means responsive to the movement of said guide member beyond a predetermined distance from either of said star wheels to halt operation of said apparatus whereby when a guide portion of said member is engaged by an improperly positioned can, operation of said apparatus will be stopped.

References Cited in the file of this patent

UNITED STATES PATENTS

2,018,432	Ackley	Oct. 22, 1935
2,351,596	Brogden	June 20, 1944
2,374,326	Bourland	Apr. 24, 1945
2,599,220	Bergmann	June 3, 1952
2,603,923	Chidsey	July 22, 1952

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,860,461

November 18, 1958

Lawrence E. Arneson

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 15, for "creating" read -- creasing --; column 12, lines 11 and 62, for "packing", in each occurrence, read -- packaging --; column 18, line 33, before "group" insert -- said --.

Signed and sealed this 14th day of April 1959.

(SEAL)

Atte

K H. AXLINE
Acting Officer

ROBERT C. WATSON
Commissioner of Patents