

May 26, 1936.

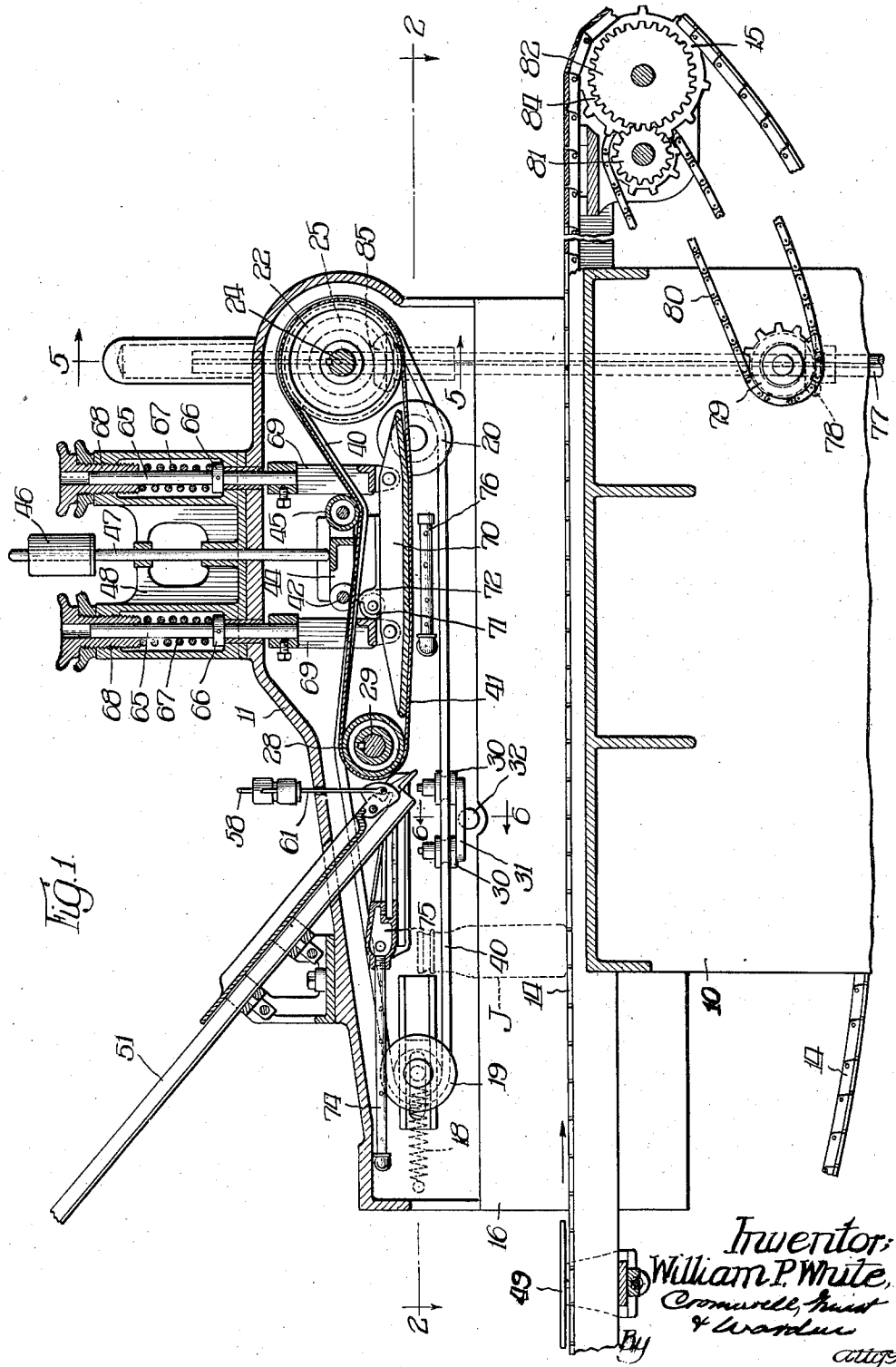
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PACKAGE SEALING APPARATUS

Filed Feb. 2, 1933

2 Sheets-Sheet 1



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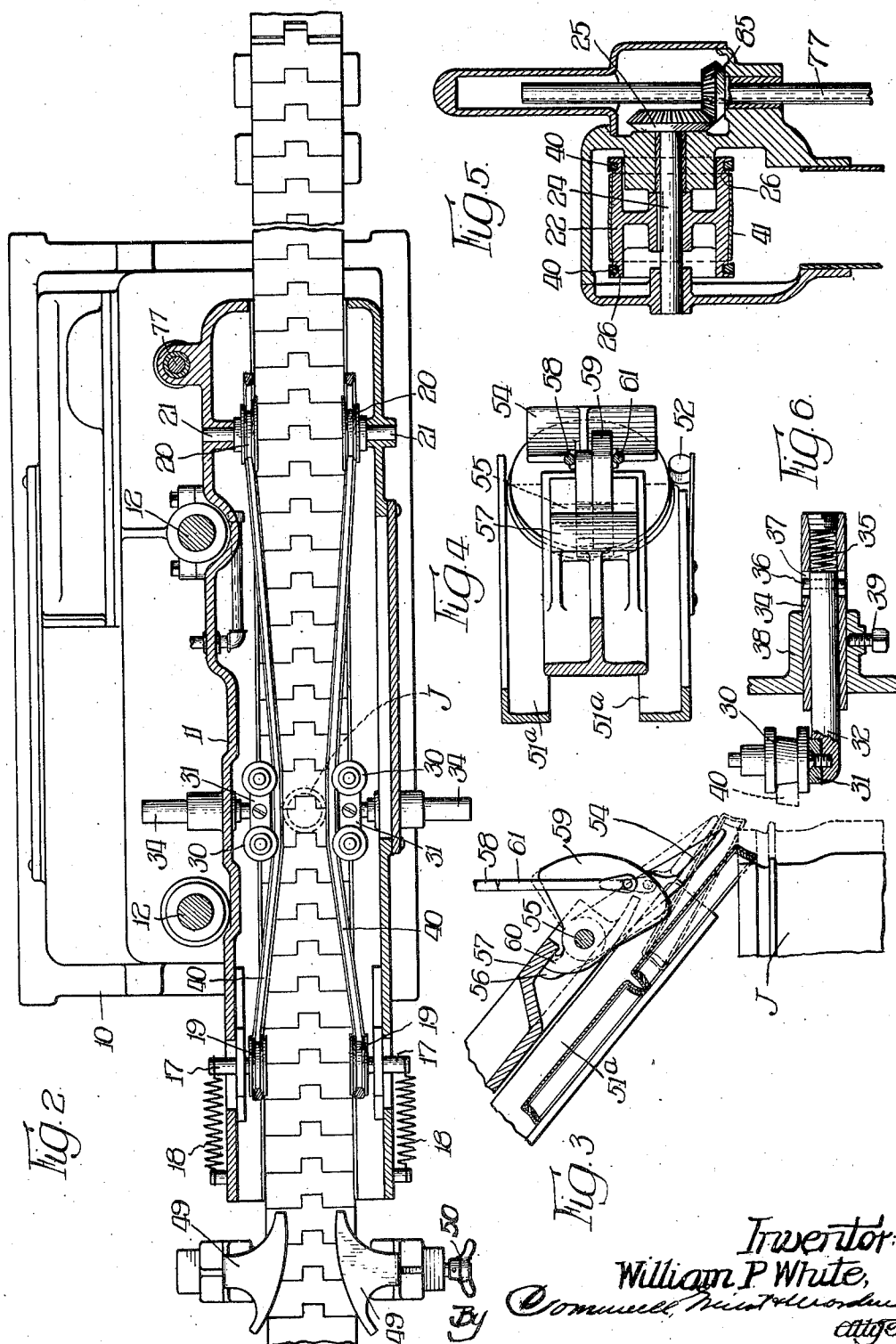
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UNITED STATES PATENT OFFICE

2,041,891

PACKAGE SEALING APPARATUS

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Application February 2, 1933, Serial No. 654,847

20 Claims. (Cl. 226—80)

This invention relates to packaging and pertains particularly to apparatus for the sealing of closure caps on packing vessels, such as cans, bottles, jars, and the like.

A general object of the invention is the provision of an improved apparatus for the sealing of containers with closure caps, whereby the sealing may be accomplished incident to the continuous progressive movement of the container and a high rate of output of properly sealed packages maintained.

Another object is the provision of such apparatus particularly qualified to admit of the containers being moved progressively at a high rate of speed during the application and sealing of closure caps on them, without subjecting them to the likelihood of being overturned or tilted in such fashion as to spill any of their contents.

Yet another object of the invention is the provision of such apparatus which is particularly qualified to effect the sealing of containers which are presented to the sealing operation in very close succession one after another.

Another object is the provision of such apparatus which is particularly qualified for the sealing of tall containers of relatively small base area.

Yet another object is the provision of apparatus effective to obtain the above specified results and advantages, and in conjunction therewith to effect the sterilization of the closures and the mouth portions of the containers, and to effect the displacement or removal of air from the unoccupied portions of the container and closure in such fashion that a subatmospheric pressure is obtained in the sealed package.

Another object is the provision of improved mechanism for applying closure caps to progressively moving containers.

Yet another object is the provision of an improved apparatus for sealing or affixing closure caps upon progressively moving containers.

Other and further objects will be pointed out or indicated hereinafter or will become apparent to one skilled in the art upon an understanding of the invention or its employment in use.

For the purpose of aiding in an explanation of the invention I hereinafter describe, and illustrate in the drawings forming a part of this specification, certain forms of apparatus embodying same. It is to be understood, however, that these are presented merely by way of example, as the invention may be embodied in apparatus of other forms, and consequently the disclosures herein contained of particular apparatus are not to be construed in any fashion cal-

culated to limit the appended claims short of the true and most comprehensive scope of the invention in the art.

In said drawings,

Fig. 1 is a part side sectional elevation of package sealing apparatus, the section being taken on the longitudinal median line of the machine;

Fig. 2 is a horizontal section on approximately line 2—2 of Fig. 1;

Fig. 3 is a detail in the nature of a side elevation, partly in section, of a portion of the cap-applying mechanism;

Fig. 4 is a top or plan view of the same;

Fig. 5 is a sectional detail on approximately line 5—5 of Fig. 1; and

Fig. 6 is a sectional detail on approximately line 6—6 of Fig. 1.

As stated above, the invention relates to the sealing of packing containers, such as bottles, tumblers, jars, cans, or the like, in which various foodstuffs or various other commodities are packed, with closures or closure caps. Sometimes it may be desirable to provide an hermetically sealed package, whereas in other instances it may not be necessary or desirable to have an air-tight seal. Likewise, in the case of hermetically sealed packages, it may be desirable to have them evacuated of air, whereas in other instances this may not be necessary or desirable. The present invention is applicable to the sealing of packages under any and all of these various circumstances. The speed at which the sealed packages may be turned out is, of course, of substantial importance as affecting costs, and also with respect to the character of the product, it being in many instances quite desirable to seal the packages promptly after the contents are deposited in them. The present invention contributes particular advantage in respect to speed or volume of output per unit of time. In this respect the invention possesses an additional advantage in the fact that it enables a given installation to handle a very substantial overload, and likewise qualifies it to handle a normal or sub-normal load very economically.

Described generally, the invention contemplates apparatus and operations whereby the filled containers are transmitted progressively, in a series, at a continuous and uniform rate of speed, the closures are applied to the successive containers while they are thus moving progressively, so that the closures may be sealed on the containers without cessation of their constant progressive movement. The arrangement is such that the serially arranged containers do not have to be spaced uniformly from one another, nor does their

progressive movement have to be timed with respect to the closure-applying and sealing operations. Thus the invention is adapted to handle with equal effectiveness either a light load or a heavy load, and may be utilized equally effectively to take the output of a single filling machine or a plurality of filling machines, without any intermediate delay or accumulation of filled containers awaiting sealing. These results are obtained by the apparatus, in part, by the provision of a continuously moving conveyor on which the containers are transmitted to the cap-applying and sealing operations, in conjunction with a cap-applying means of such character that the passage of the container past it effects the application of the cap to the container, and a sealing means which operates the cap to seal or seat it on the vessel while it is passing the sealing means; together with means for appropriately positioning and sustaining the container while it is passing the cap-applying means, in such fashion as to insure its positive cooperation with the latter and its proper action upon the cap without the possibility of its being overturned or tilted and without regard as to how closely it follows a preceding container or how closely it is followed by a succeeding container.

The character of the invention will be understood more fully and in more detail by consideration of the specific examples of apparatus and practice which are illustrated in the drawings and which will now be described.

The reference numeral 10 designates a stationary frame which forms the support for the apparatus, and the reference numeral 11 designates a housing which is adjustable vertically with respect to the frame 10, said housing being supported on the frame through the medium of vertically adjustable posts 12. The frame 10 supports a conveyor comprising the endless belt 14, the upper stage or traverse of which runs horizontally, and suitable sprockets for transmitting the belt, one of which is shown at 15. The housing 11 has side walls from which plates 16 extend downwardly on opposite sides of the belt 14, which form, in conjunction with the top of the housing 11, a tunnel-like casing, open at its opposite ends, through which the upper traverse of the belt 14 runs. For convenience in designation, the end of the casing shown at the left in Figs. 1 and 2 will be referred to as the rear or entrance end of the machine, and the opposite end of the casing will be referred to as the front or discharge end. The conveyor belt 14 is moved in the direction indicated by the arrow in Fig. 1, viz., through the casing from rear to front.

Toward the rear end of the machine, journals 17 are slidably mounted on the side walls of the housing in such fashion that they may move longitudinally of the latter, said journals being constrained in the rearward direction by springs 18. Grooved sheaves 19 are rotatably mounted on the journals 17, so that they rotate on horizontal axes. Toward the front end of the casing, the corresponding grooved sheaves 20 are rotatably mounted on fixed journals 21. At the front end of the housing 11 is arranged a pulley 22 affixed to an axle 24 which is journaled in the opposite sides of the housing and which has keyed to it a beveled pinion 25. The pulley 22, adjacent its opposite ends, has peripheral grooves 26. Midway of the housing is a second pulley 28 carried on an axle 29 which is journaled in the opposite sides of the housing.

Between the sheaves 19 and 20 are grooved guide sheaves 30 mounted to rotate on vertical journals arranged in pairs on heads 31 which are fixedly secured to bars 32 (see Fig. 6). The bars 32 are mounted to slide longitudinally in sleeves 34, wherein they are pressed inwardly, toward the median line of the casing, by springs 35, the limits of movement of the bars 32 being determined by pins 36 projecting from the bars and the ends of slots 37 in the sleeves 34, in which slots the pins ride. The sleeves 34 are mounted in bearings 38 on the side walls of the housing 11 in such fashion that they may be adjusted inwardly and outwardly with respect to the housing, suitable clamping or set screws 39 being provided for holding the sleeves in fixed position at the selected adjustment. Suitable endless belts 40, disposed in opposite relationship to each other, one at each side of the casing, are entrained on the sheaves 19, 30, and 20 and pulley 22, seating in the grooves 26 of the latter, the upper traverses of said belts running also on the pulley 28, as seen in Fig. 1. The construction of these belts is such that they present thin or shallow margins toward the median line of the casing, and they are elastically compressible transversely but substantially non-extensible or stretchable longitudinally. The relationship of the grooved sheaves 19, 30, and 20 is such that the lower traverses of the belts 40 are transmitted in an approximately horizontal position, i. e., parallel with the upper traverse of the conveyor belt 14, and, depending on the adjustment of the heads 31, may travel more or less nearly parallel with each other.

The belts 40 will be referred to as the holding belts.

Entrained around the pulleys 22 and 28 is a relatively broad, substantially non-stretchable sealing belt 41 positioned to travel over the conveyor belt 14. Pivoted on a journal rod 42, which is supported on the opposite walls of the housing 11, is a yoke 44 which carries at its free or swinging end a roller 45 that rides upon the upper traverses of the belts 40 and 41. This yoke is pressed downwardly by a weight 46, positioned on a rod 47 which is vertically slidable in a bracket 48 mounted on top of the housing 11, the lower end of which rod rests upon the yoke 44. The arrangement provides a belt tightener for the belts 40 and 41, the weight 46 being removable so as to permit the belts being relieved of the tension when the machine is not in operation. Belts 40 and 41 are driven by rotation of pulley 22, the direction of travel of their lower traverses being from rear to front of the machine and their linear speed being the same as that of the conveyor belt 14.

The open containers are placed on the conveyor belt in single file, at a point or points outside of the casing, and by movement of the conveyor belt they are carried into and through the casing. Adjustable centering guides 49 are arranged to project over the conveyor belt in front of the entrance end of the casing, for cooperation with the containers so that as the latter are moved forwardly, they will also be gradually shifted laterally to a position on the median line of the conveyor belt. The adjusting means for the centering guides 49 is such that by the turning of the hand wheel 50 they will be uniformly and symmetrically adjusted toward or from the median line of the belt. As the containers are moved forwardly in the casing, they reach a position where they are grasped ad-

jacent their upper ends between the inwardly presented margins of the belts 40 where the latter ride across the guide sheaves 30, and upon their further advance they are carried out of engagement with the belts 40 and under the sealing belt 41 and finally out of the discharge end of the casing.

For applying the closure caps to the successive containers while they are thus moved progressively through the casing, there is provided a cap chute 51 down which the caps slide in single file through an opening in the top of the housing 11. This chute is formed of a pair of flanged rails 51a which are symmetrically adjustable toward and from the median plane of the machine, in order to accommodate the chute to caps of different diameters. The chute terminates within the casing at a point between the opposite pairs of guide sheaves 30 and at an elevation somewhat above the lower traverses of the belts 40. At the lower end of the chute is provided a spring-pressed detent 52 which, in the normal position of its spring, lies partly in the path of the caps in the chute, so that it cooperates with the opposite rail to hold the lowermost cap against sliding out of the chute, retaining it therein in a sloping position with a portion of the cap projecting beyond and below the lower end of the chute. Various forms of flanged or skirted caps may be used, one form of cap being illustrated in section in Fig. 3, wherein it will be observed that the cap C has an annular skirt or flange F. With the proper vertical adjustment of the housing 11 for the particular height of containers which are being sealed, the lowermost cap in the chute will thus be held in a position in which its skirt lies in the path of the upper end of the approaching container, so that, with the advancing movement of the container, it will engage the skirt of the cap and withdraw the cap from the chute, forcing the detent 52 outwardly to permit the cap to pass. Above the lower end of the chute a leveling member 54 is hinged at 55 to oscillate upwardly and downwardly, its downward movement being limited by abutment of its heel 56 against a stop 57, so that its lower end will not obstruct the free movement of the cap, by gravity, to the position illustrated in Fig. 3. The lower arm of the leveling member is pressed downwardly by a weight supported on a rod 58 which extends through the top of the housing 11, the weight being interchangeable so that the weight loading of the leveling member may be varied in accordance with the sizes or weights of different caps. As the lowermost cap is withdrawn from the chute by the progressively moving container, it gradually assumes a more nearly horizontal position and comes into contact with the lower end of the depressor 54, so that the weight of the leveling member is imposed on the cap, to prevent its slipping off of the container and to cause it to assume an approximately level position thereon.

Due to the relationship of the lower end of the cap chute and the guide sheaves 30, the container will be firmly held and supported adjacent its upper end by the cooperating belts 40 during the time that the removal of the cap from the chute is being accomplished, so that the drag or resistance imposed on the container by the cap and the detent 52 and depressor 54 cannot overturn or tilt the container. This is a feature of very substantial importance, particularly in the handling of containers which are tall or

which have a relatively small base area, and it provides a positive progressive feed for the containers, effective to carry them past the cap-applying means with a uniform speed and prevent their slipping on the conveyor belt or being detained by the resistance offered to the withdrawal of the caps from the chute. It will be observed that the guide sheaves support the holding belts definitely at the desired elevation in this portion of the course where they grip the containers, thus avoiding any sagging of the belts or any displacement of them upwardly or downwardly as a result of the gripping pressure. This is particularly of advantage when the containers handled have tapering upper portions or necks which are engaged by the belts. The inward and outward adjustability of the guide sheaves also makes it possible to guide the containers accurately in alignment with the cap-supporting means so that they will properly engage and withdraw the caps. As the lowermost cap is being withdrawn, the successive caps in the chute slide downwardly, so that the next following cap immediately reaches the position where it is stopped by the detent 52, as soon as the preceding cap has been withdrawn.

In association with the leveling member 54, there is hinged at 55 a depressor 59, which depends over the lower end of the chute, its downward swinging movement being limited by abutment of its heel 60 against the stop 57. This depressor is also weighted by interchangeable weights supported on a rod 61 which passes through an appropriate opening in the top of the housing 11. When the cap is elevated, incident to withdrawal, it engages the member 59, and the weight of said member aids in leveling the cap on the jar mouth by holding down the rearward portion of the cap as it is withdrawn. Thus, the member 59 levels the cap in the direction of the jar's movement, while the member 54 levels it in the direction transverse thereto (see Figs. 3 and 4).

Vertically slidable in the bracket 48 are rods 65, their lower ends extending into the housing 11 through appropriate openings in its top. Downward movement of these rods 65 is limited by collars 66 which are pinned to the rods, and the rods are constrained to their downward limit position by springs 67 which bear at their lower ends against the collar 66 and at their upper ends against adjustable sleeve nuts 68, which by virtue of their screw-thread mounting may be shifted upwardly or downwardly in the bracket 48 to vary the compression under which the springs 67 are held. Attached to the lower ends of the rods 65 are yokes 69 which span the upper traverses of the belts 40 and 41 and carry at their lower ends a shoe 70. This shoe has a smooth lower surface along and below which the lower traverse of the belt 41 rides. This lower surface of the shoe 70 first slopes downwardly from its rearward end adjacent the pulley 28, then extends for a distance horizontally toward the front of the machine, and then slopes for a distance upwardly to its forward termination.

It has been explained above how a container which is being advanced progressively through the casing withdraws a closure cap from the chute 51 in such fashion that the cap rests loosely upon the rim of the container in proper position to be forced down to seated position thereon. As the container advances, with the cap thus in place on it, it passes immediately under the inclined

rearward end portion of the belt 41, which contacts it first lightly, with sufficient pressure to hold it in position; and with the continued advance of the container, the downward pressure on the cap increases gradually under the squeezing pressure exerted on the cap and the container between the conveyor belt 14 and the downwardly sloping rearward portion of the shoe 70, until the container reaches a position under the lowest or horizontal portion of the shoe, at which position the closure is fully seated on the container. From this position the container moves on under the holding pressure exerted upon it and the closure by the conveyor belt 14 and the shoe 70, until it finally passes out from under the shoe and belt 41, and is moved out of the forward or discharge end of the casing by the conveyor belt. In order that the squeezing pressure thus exerted on the container and closure, for the purpose of seating the latter on the former, shall not be such as to fracture a frangible container which may be of slightly excess height, the squeezing pressure is rendered yieldable by the yielding pressure maintained by the springs 67 upon the shoe, it being observed that the springs will permit the rods 65, and hence the yokes 69 and shoe 70, to rise slightly, upon application of upward pressure to the shoe sufficient to overcome the tension of the springs 67. In order to permit the shoe to take this upward movement properly, its connection with the yokes 69 is hinged. In order to hold the yokes in proper parallelism with the rods 65, and prevent cramping of the latter in their bearings by the force exerted frictionally on the shoe by belt 41 incident to its travel in contact with the shoe, guide rollers 71 are rotatably mounted in brackets 72 on the opposite side walls of the housing 11, and bear rearwardly against the lower portion of the rearward yoke 69 to prevent their being swung forwardly out of vertical position. These rollers permit the yoke to move freely in the vertical directions. The tightener roller 45 is effective constantly on the upper traverse of the belt 41 to hold the lower traverse of that belt in contact with the shoe 70 and prevent any wrinkling or slackening of the belt when the shoe is raised. The tightener is also effective on the holding belts.

For the purpose of sterilizing the closure caps and the mouth portions and head space of the containers before the closures are applied, and more particularly for the purpose of evacuating air from the closure caps and the head space of the containers, so that a sub-atmospheric pressure will be obtained in the containers when they are hermetically sealed, means is provided for keeping the casing filled with hot vapor, said means comprising a distributor pipe 74 which extends longitudinally in the rearward end of the casing and is provided with lateral distributing outlets, and a header 75, of bifurcated form, which straddles the lower end of the chute 51 and is provided with distributed outlets. Hot steam is supplied to the distributor pipe 74 from a suitable source outside the casing and is discharged within the casing through the distributed outlets of said pipe and the header in quantity adequate to maintain an atmosphere of hot vapor throughout that portion of the casing in which the mouth portions of the containers travel. This steam distributor and header arrangement are more fully described, and claimed, in my co-pending application Serial No. 503,715, filed December 20, 1930. With the passage of the open mouth

portions of the containers through this atmosphere of hot vapor, the air is displaced from the head space in the containers and supplanted by the hot vapor. Likewise, the closure caps on the chute 51 within the housing 11 are filled and enveloped with the hot vapor, so that they are effectively sterilized and the air displaced from them. Consequently, when a closure cap is applied to a container, the confined space is filled with a hot condensible vapor, and when the closure cap is forced down to seated position in the sealing operation and the volume of the head space thereby reduced, the resultant compression of the trapped vapor may result in a partial condensation of it; and as the sealed container is moved forwardly under the holding-down pressure of the shoe 70, the closure has opportunity to cool and relieve any compression of the vapor in the head space. To expedite this cooling, water may be sprayed upon the skirt of the closure cap and upper portion of the container from a pipe 76 extending alongside the path traveled by the container while it is passing beneath the lowest portion of the shoe 70. Consequently, by the time the sealed container passes out from under the shoe, pressure in the head space will have been reduced to a point ineffective to pop off the closure when it is relieved of the holding-down pressure, and upon cooling of the head space to room temperature, a sub-atmospheric pressure will result therein, due to the condensation of the trapped vapor.

As indicated above, the conveyor belt 14, the holding belts 40 and the sealing belt 41 are all transmitted at the same linear speed. The driving arrangement is illustrative in Figs. 1 and 5. The vertical shaft 77 is journaled on the frame 10 and is driven from a suitable source, which may be variable in speed. Through a spur pinion 78 on shaft 77, a sprocket pinion 79 is driven, and this, through the medium of a chain 80, drives a spur gear 81, which in turn drives a gear 82 conjoined to sprocket 84 which drives the conveyor belt 14. A beveled pinion 85 is fixed for rotation with shaft 77, but is slidable longitudinally thereon, and this beveled pinion 85 drives the beveled pinion 25 which is conjoined with pulley shaft 24. Thus, pulley 22 is rotated to drive sealing belt 41 and holding belts 40. The gearing being of the proper ratio to give conveyor belt 14, holding belts 40 and sealing belt 41 the same linear speed, it will be observed that all the belts are maintained in proper timing irrespective of the speed of shaft 77.

It will be understood that the upper traverse of the conveyor belt 14 is rigidly supported against downward flexion during its course of travel through the casing, that sealing belt 41 is kept taut at all times by the belt tightener 45, and that holding belts 40 are likewise kept under tension at all times by the action of the tightener and springs 18.

In operation of the apparatus, the necessary adjustments are made preliminarily to adapt it to the particular size of containers and caps which are to be handled in the contemplated run. These adjustments comprise the proper positioning of the centering guides 49, which is determined by the diameter of the container at the level where it will contact these guides, to effect the positioning of the containers on the median line of the conveyor belt; the horizontal adjustment of the rails 51^a to the proper relative position to accommodate and accurately guide the caps which are

to be used, said adjustment being in reference to the diameter of the caps; the adjustment of the housing 11 vertically to the position at which the lowermost cap in the chute will be held at the proper elevation to be engaged by the lip of a container of the contemplated height standing on the conveyor belt, said adjustment being with reference to the height of the container; such vertical adjustment of the housing 11 likewise positions the lower traverse of the sealing belt 41 at the proper elevation with respect to the conveyor belt 14 to accomplish, in conjunction with the latter, the desired seating movement of the caps on the containers; the guide sheaves 30 are adjusted symmetrically relative to the median line of the conveyor belt to positions such that the belts 40 in passing said sheaves will be at a distance from each other such as to grip between them the upper portion of the contemplated container standing on the conveyor belt, said adjustment being with reference to the diameter of the containers at the level at which they will be engaged by the holding belts 40. If it is desired to effect evacuation of air from the containers incident to the sealing operation, the steam is turned on from the supply to the distributor 74 and allowed to run until the interior temperature in the vicinity of the lower end of the cap chute is brought up to the desired point, and the supply valve then set so as to maintain a continuous supply of steam at a rate such as to maintain that temperature. This fills the casing with hot vapor, displacing the air from the portions thereof which are traversed by the mouth portions of the containers, the hot atmosphere thus maintained in the casing being of greatest temperature in the vicinity of the lower end of the chute, where the caps are applied to the containers. The machine then being started, the containers, with their contents in them, are placed on the conveyor belt 14, and with the movement of the same are carried into the casing, traveling on the longitudinal median line of the cap chute and sealing belt and midway between the holding belts 40. As the open containers pass through the hot vapor atmosphere which is maintained in the rearward portion of the casing, the air contained in their head spaces is displaced and supplanted by hot vapor. The caps being fed into the chute 51 from a suitable hopper or other source of supply, they slide in single file down the chute by gravity, the lowest cap being retained in a position projecting from the lower end of the chute in the path of the upper rim of the approaching container and each of the succeeding caps being detained by abutment with its preceding cap. As the containers are advanced in single file by the movement of the conveyor belt, they are grasped, one after the other, between the holding belts 40 at a point in their travel somewhat before they contact the respective caps presented successively at the lower end of the chute, and are thus held firmly adjacent their upper ends while they are advanced in contact with the caps and effect the withdrawal of the successive caps from the detent means. Each container, on receiving its cap, passes immediately under the rearward end of the sealing belt and with its continued advance below shoe 70, its cap is pressed down to sealed or seated position on it. The sealed packages are discharged from the front or discharge end of the casing in the same order and at the same relative spacing at which they entered the casing, and are removed from

the extended portion of the conveyor belt by hand or by any suitable take-off means.

It will thus be apparent that the containers do not have to be spaced uniformly with respect to one another longitudinally of the conveyor belt, and that the air-evacuating, cap-applying and cap-sealing operations will be performed similarly on each irrespective of their relative spacing. Hence this sealing apparatus may take the output of a single filling machine or a plurality of filling machines without necessitating any delay in the movement of the filled containers from the filling machine to the conveyor belt 14. The relative spacing of the filled containers on the conveyor belt will be dependent on the rapidity with which they are supplied to it.

Features herein disclosed but not claimed are claimed in my copending application Serial No. 35,453, filed August 9, 1935.

What I claim is:

1. In apparatus for applying closures to packing containers, in combination, conveyor means for moving packing containers progressively in a series, cap-supporting means arranged to present and support closure caps for engagement by the moving containers, holding belts arranged to travel along opposite sides of the path of the containers and adapted to grasp and support the successive containers between them, guide means cooperating with the holding belts adjacent the cap-supporting means to hold the belts firmly in engagement with the containers in order to support the containers against tilting incident to the transfer of caps to them from the cap-supporting means, and means for driving the holding belts.
2. Apparatus as specified in claim 1 and including means for varying selectively the distance between the holding belts.
3. Apparatus as specified in claim 1 and in which the guide means is selectively adjustable to vary the course of the holding belts.
4. Apparatus as specified in claim 1 and wherein the guide means is adapted to apply resilient pressure against the outer sides of the holding belts.
5. Apparatus as specified in claim 1 and wherein the guide means is arranged to direct the travel of the holding belts in converging courses to a location adjacent the cap-supporting means.
6. Apparatus as specified in claim 1 and wherein the guide means is arranged to direct the travel of the holding belts in converging courses to a location adjacent the cap-supporting means and in diverging courses from said location.
7. Apparatus as specified in claim 1 and wherein the holding belts are entrained on sheaves which rotate on horizontal axes so that the traverses of the respective holding belts are one above the other.
8. Apparatus as specified in claim 1 and wherein the holding belts are entrained on sheaves which rotate on horizontal axes and the guide means include guide sheaves which rotate on vertical axes and engage the lower traverses of the holding belts intermediate said first mentioned sheaves.
9. Apparatus as specified in claim 1 and wherein said guide means retain the holding belts against upward and downward displacement in locations adjacent the cap-supporting means.
10. Apparatus as specified in claim 1 and

including also a sealing belt arranged to travel over the path of the containers for pressing cooperation with containers moving from the cap-supporting means, and a driving sheave on which
5 said sealing belt and the holding belts are entrained.

11. Apparatus as specified in claim 1 and wherein the holding belts are entrained on sheaves which rotate on horizontal axes so that
10 the traverses of the respective holding belts are one above the other, and the guide means has guiding cooperation with the lower traverses of the holding belts.

12. Apparatus as specified in claim 1 and including a leveling device effective upon the caps
15 incident to their transfer from the cap-supporting means to the containers.

13. Apparatus as specified in claim 1 and including a leveling device for guiding a cap against
20 tilting laterally incident to its transfer from the cap-supporting means to a container.

14. Apparatus as specified in claim 1 and wherein the holding belts present thin or shallow
25 inner margins for engagement with the packing containers.

15. Apparatus as specified in claim 1 and including means maintaining the holding belts under tension longitudinally.

16. Apparatus as specified in claim 1 and including also a sealing belt arranged to travel over

the path of the containers in position to press closure caps onto containers moving from the cap-supporting means, and means for driving
said sealing belt at the same rate as the conveyor means.

17. In apparatus for applying closures to packing containers, in combination, cap-supporting means, a conveyor operable to move packing containers successively past the same, holding belts
movable along opposite sides of the path of the
10 containers, said holding belts presenting thin inner margins for engagement with upper portions of containers therebetween, guide means cooperating with the holding belts adjacent the
15 cap-supporting means to resist outward movement of the holding belts, and means for driving the conveyor and holding belts at the same linear speed.

18. Apparatus as specified in claim 17 and including means for selectively varying the zones
20 of operation of the guide means.

19. Apparatus as specified in claim 17 and wherein said guide means are spring-pressed against the holding belts.

20. Apparatus as specified in claim 17 and
25 wherein the holding belts are elastically compressible transversely but substantially non-extensible longitudinally.

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