Nov. 29, 1960 S. L. HARMON ET AL 2,962,060

PACKAGING APPARATUS

Filed March 19, 1958 2 Sheets-Sheet 1

Fig. 1.

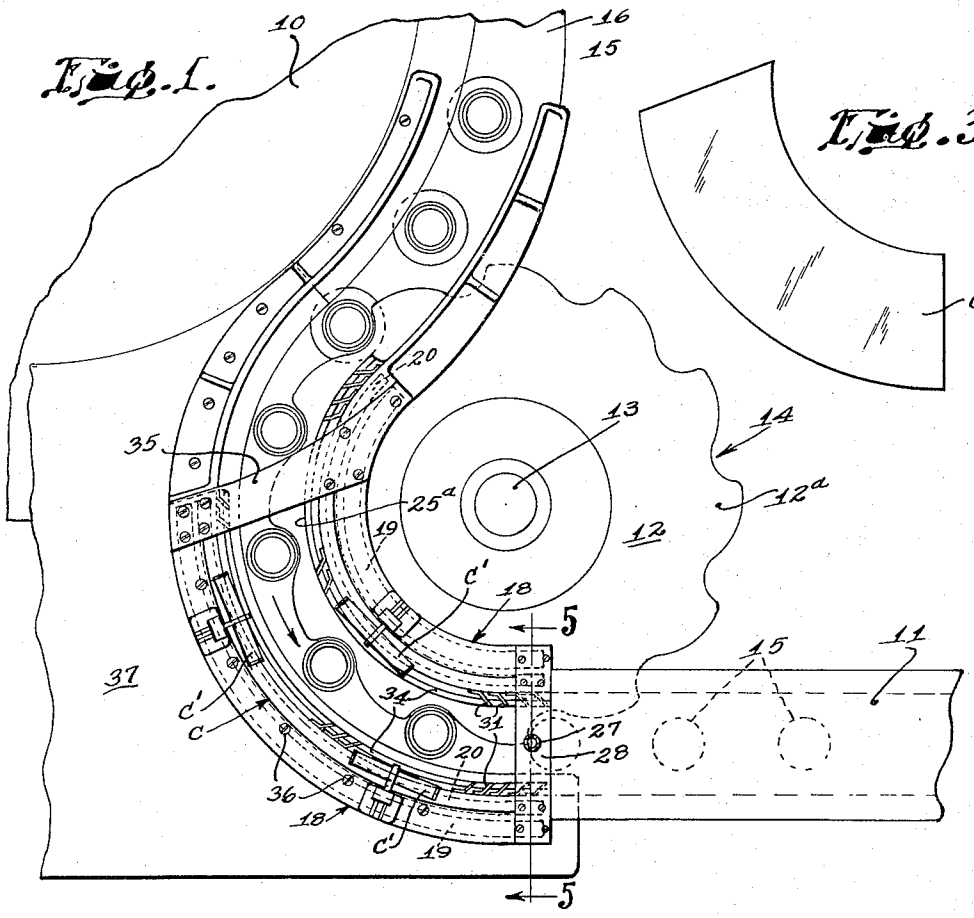
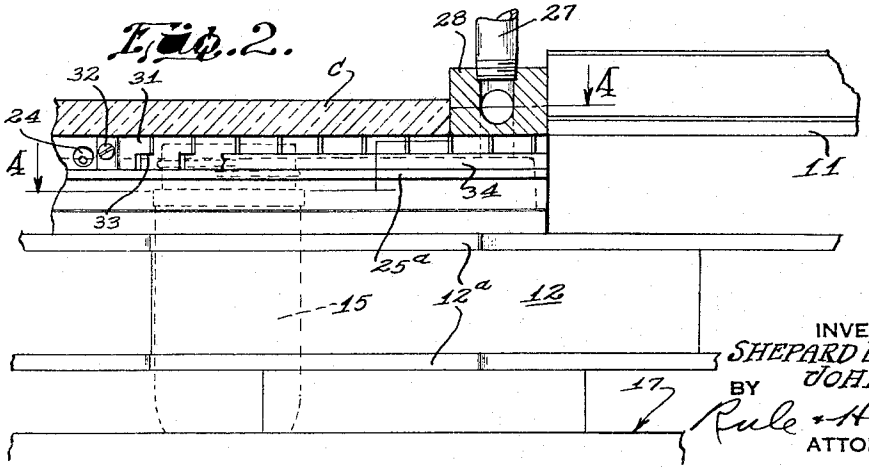


Fig. 3.

Fig. 2.



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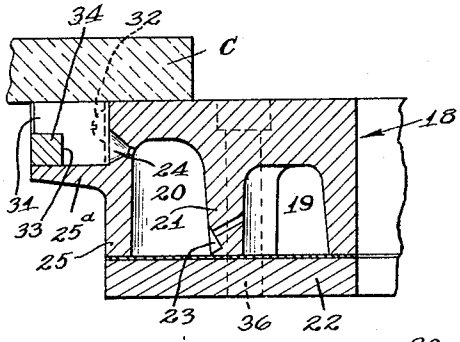


Fig. 6.

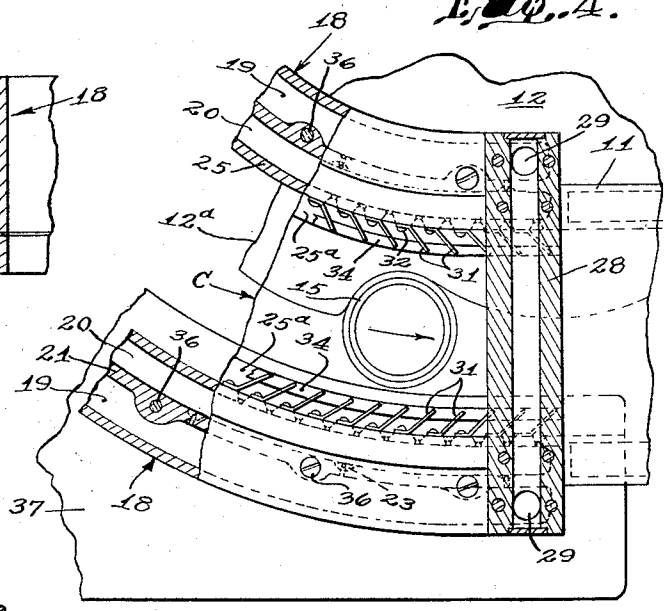


Fig. 4.

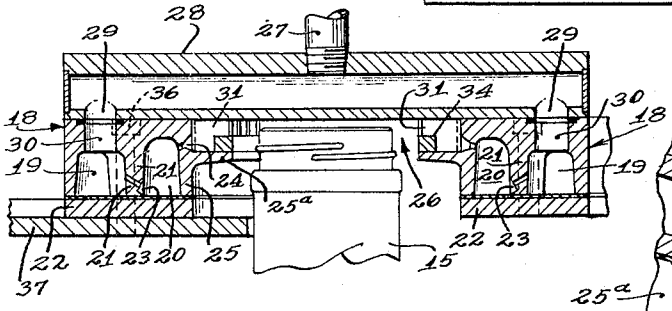


Fig. 5.

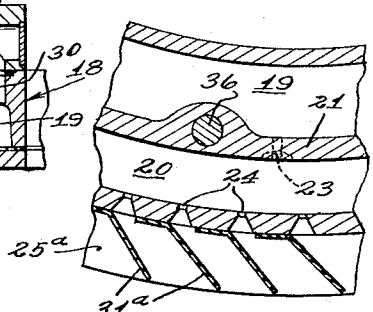


Fig. 8.

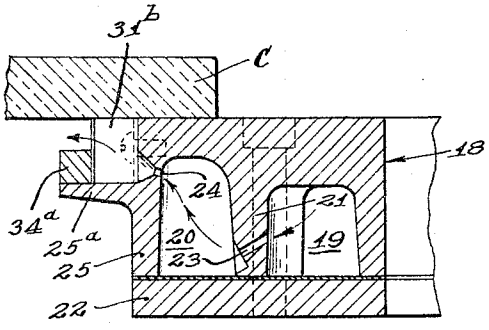


Fig. 9.

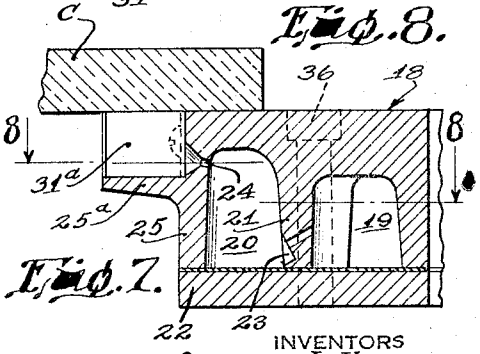


Fig. 7.

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PACKAGING APPARATUS

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12 Claims. (Cl. 141—70)

The present invention relates to packaging apparatus and more especially is concerned with the provision of novel and effective means for maintaining undisturbed and undiluted an inert gas that has been introduced into the headspace of filled containers, preparatory to their being delivered to and sealed by a closure cap applying apparatus.

In the packaging of certain commodities, it is not only highly desirable, but frequently absolutely essential that oxygen be excluded from the jars or like containers in order to insure against rapid spoilage of the product. To this end an inert gas may be introduced into and fill a jar prior to depositing therein the product to be packaged. Upon deposition of such product, a substantial part of the gas is displaced, leaving enough however to fill the usual headspace immediately above the product. Ordinarily movement of such jars to the capping machine causes turbulence of the ambient atmosphere and resultant replacement of some, if not all, of the gas in the headspace with oxygen. Such, as explained above, results in short shelf life and frequently complete spoilage of the product.

An object of our invention is the provision of effective means for overcoming the above indicated objection and insuring retention in undiluted condition, the inert gas previously introduced into the container and occupying the headspace.

A further object of our invention is the provision of an inert gas injector arrangement operable to produce a blanket of such gas over and about the neck portions of filled open jars or such containers and novel means for closely controlling the direction of movement of the introduced gas so that it flows toward the center line of the path of travel of the jars and additionally in the direction of movement of the latter at the proper velocity.

It is also an object of our invention to provide a novel form of inert gas injector which will direct gas from opposite sides of a path of travel of filled open jars in such fashion as to create a gas blanket enveloping the top and neck portions of the jars and advancing with the latter whereby to prevent dilution or displacement of gas already occupying the jar headspace.

Other objects will be in part apparent and in part pointed out hereinafter.

In the drawings:

Fig. 1 is a fragmentary top plan view of a packaging apparatus incorporating our invention.

Fig. 2 is a fragmentary vertical longitudinal sectional view thereof.

Fig. 3 is a plan view of a transparent cover plate which comprises a part of our invention.

Fig. 4 is a fragmentary sectional plan view taken substantially along the plane of line 4—4 of Fig. 2.

Fig. 5 is a transverse sectional view taken substantially along the plane of line 5—5 of Fig. 1.

Fig. 6 is an enlarged detail sectional view of the gas injector element shown at the right-hand side of Fig. 5.

Fig. 7 is a view similar to Fig. 6 showing another specific form of the gas directing vanes or louvers.

Fig. 8 is a sectional view taken substantially along the plane of line 8—8 of Fig. 7.

Fig. 9 is a view similar to Figs. 6 and 7 showing still another specific form of the vanes or louvers.

Our invention is shown positioned between a jar filling machine **10** which may be of conventional or any preferred form and a straight line gas confining tunnel **11** the discharge end of which terminates in proximity to closure cap applying mechanism (not shown). This gas confining tunnel **11** and associated elements (not shown) comprise the subject matter of our copending application for U.S. Letters Patent, Serial Number 722,532 filed March 19, 1958. The present invention is directly associated with a transfer star wheel **12** which is mounted upon and rotates about the axis of a vertical shaft **13**, such star wheel comprising a pair of superposed disks **12a**, provided with an annular series of uniformly spaced peripheral recesses **14** which remove jars **15** or the like filled containers from the turret **16** of said filling machine **10** to a conveyor **17** which is positioned beneath the aforementioned gas confining tunnel **11**. During movement of the jars **15** under the influence of said star wheel **12**, they are blanketed in the vicinity of their open neck portions with an inert gas such as CO_2 or nitrogen which preferably moves with the jars and substantially at the same velocity for the purpose of preventing any appreciable degree of relative movement of the jars and ambient atmosphere as would cause excessive turbulence and result either in dilution of inert gas in the headspace of the jars or perhaps complete removal of such gas and replacement thereof with oxygen.

In one embodiment of our invention (Figs. 1 through 6), it comprises a pair of inert gas injection units, one of each being positioned at and extending along one side of the arcuate path of travel of the jars **15**. These units are formed to introduce inert gas into the area through which the mouth and neck portions of the jars move and such gas is maintained in this zone by means of a cover. Each of the gas injection units **18** is of arcuate form being coaxial with the star wheel supporting shaft **13** and including an outer longitudinal high pressure chamber **19** and inwardly of and concentric with the latter a low pressure or expansion chamber **20** which chambers are separated one from the other by means of a vertical dividing wall **21**. These chambers are formed in a casting as channels initially opening through one side but are closed by means of a plate **22** and thus become sealed chambers excepting for the inlets to be described presently. These concentric chambers **19** and **20** are closed at their ends and communicate with each other through a longitudinal series of ports **23** formed in the aforementioned partition or dividing wall **21**. Discharge ports **24** are formed in the inner wall **25** of each of the expansion chambers **20** for the purpose of delivering inert gas under suitable pressure to the jar neck accommodating space **26**.

The supply of inert gas is delivered by way of a supply pipe **27** and a header **28** which extends transverse to the length of the gas injection units. This header has its ends connected to the outer or high pressure chambers **19** through discharge openings **29** in the header and registering inlet openings **30** in said chambers **19**. Preferably this header **28** is positioned at that end of the gas injector adjacent the straight line gas confining tunnel **11**. The casting from which each gas injecting unit is formed is provided with a horizontal longitudinal flange **25a** which projects into the jar neck accommodating space **26** from the exterior wall **25** of the expansion chamber **20**. This flange is positioned just below the plurality of discharge ports **24** and together with the cover plate C (Figs. 3 and 6) closes the open spaces between a plu-

rality of vanes or louvers **31** which are arranged along the exterior wall of said expansion chamber **20** and correspond in number to that of the discharge ports **24**. These vanes or louvers may be secured by screws **32** or the like fasteners to the expansion chamber walls and comprise flat generally rectangular plates which are disposed diagonally in relation to the path of travel of the jars **15**. In that form of our invention shown in Figs. 1 through 6, each of these vanes **31** has a corner section cut away providing a recess **33** (Fig. 6) which accommodates a portion of an elongated baffle bar **34**. This baffle bar is suitably secured to the upper outer margin of the flange **25a** and is positioned directly across from the discharge ports **24** to thereby insure initial delivery of the gas into the extreme upper areas of the jar accommodating space **26** and thereby effect envelopment of the mouth and neck portions of the jars. The aforementioned cover plate C preferably is formed of some transparent material, such, for example, as "Lucite" and extends from the header **28** to a tie-bar **35** (Fig. 1) which together interconnect the two gas injection units **18**. Clamps C' releasably secure the cover plate C in operative position. The cover plates **22** for the gas chambers **19** and **20** are secured to the chamber casting by means of screws **36**, certain of which also serve to rigidly mount the entire assembly upon a support **37**. This perhaps is best shown in Fig. 5.

With a structure as just described, jars **15** are advanced without interruption by means of the star wheel unit **12** and during their travel between the gas injection units **18** have their mouth and neck portions completely blanketed by an inert gas. This gas is introduced under suitable pressure into the jar neck accommodating space **26** and because of the diagonal positioning of the vanes or louvers **31** such injected gas will also move forwardly with and at approximately the same speed as the jar travel with the result that there is little, if any, relative movement between the jars and the surrounding atmosphere such as would produce turbulence and result in displacement or dilution of inert gas that has already been introduced into the jars. These filled, open jars after moving beyond the header **28** enter another gas chamber **11** which, as stated heretofore, has associated with it devices disclosed and claimed in a copending application.

In Figs. 7 and 8, we have disclosed a slight modification which essentially comprises omission of the baffle bars **34** shown in Fig. 6 and consequent formation of the vanes or louvers **31a** so that they are effective throughout their entire height as means for determining the zone of delivery of the discharged gas. This obviously increases the vertical dimension of the zone of initial entry of the gas into the jar neck accommodating space **26** and in certain situations is quite desirable.

In Fig. 9, we have shown a still further modification in which a baffle bar **34a** is positioned upon the flange **25a** as in the first described form of our invention but the vanes or louvers **31b** are shortened horizontally and terminate in the plane of the inner wall of said baffle bar.

Wherever oxygen is referred to in this application, it is to be understood that such is intended to also include free air which contains approximately twenty-one percent (21%) oxygen.

Other modifications may be resorted to within the spirit and scope of the appended claims.

We claim:

1. In apparatus for providing a blanket of inert gas for enveloping the open upper end portions of a plurality of filled jars while the latter are traveling along a prescribed horizontal path between jar filling and closure capping devices, a conveyor for advancing jars along an elongated path, an elongated horizontal cover plate overlying a portion of the conveyor, a gas distributing chamber extending along each side margin of the plate, said chambers defining side margins of an elongated jar neck accommodating space overlying the conveyor, means for delivering inert gas to an end of each chamber, each said chamber having a vertical wall provided with a longitudinal series of discharge ports opening into said jar neck accommodating space and a plurality of vanes or louvers disposed vertically on edge and at an angle to direct discharged gas into and generally along the path of travel of the jars and in the direction of movement of the latter, the previously mentioned cover plate in part resting upon the upper ends of the vanes or louvers and closing the upper ends of open spaces between said louvers and a continuous horizontal flange extending along each chamber and closing the lower ends of said open spaces.

2. In apparatus for providing a blanket of inert gas for enveloping the open upper end portions of a plurality of filled jars while the latter are traveling along a prescribed horizontal path between jar filling and closure capping devices, a conveyor for advancing jars along an elongated horizontal path, an elongated horizontal cover plate overlying a portion of the path of travel of the jars, a pair of contiguous inner and outer gas distributing chambers at each side margin of said plate, a vertical longitudinal dividing wall between each pair of chambers formed with ports providing communication between said chambers, means for delivering inert gas to an open end of each outer chamber at relatively high pressure, each said inner chamber having a wall provided with a longitudinal series of discharge ports opening into an elongated jar neck accommodating space overlying the path of travel of the jars and defined marginally by the pair of inner chambers, a plurality of vanes or louvers disposed vertically and on edge and extending diagonally relative to the path of travel of the jars to direct discharged gas toward the center line of said path and generally in the direction of travel of the jars and means associated with the vanes to concentrate application of the gas to the upper areas of said jar neck accommodating space.

3. The apparatus defined in claim 2, the last-named means in part comprising a flange projecting horizontally inwardly from each said chamber immediately beneath the discharge ports in the latter and a baffle supported on each said flange directly opposite the series of discharge ports.

4. Apparatus as defined in claim 3, the elongated horizontal cover plate cooperating with the aforementioned flange in closing the upper and lower ends of the open spaces between the vanes or louvers.

5. The apparatus defined in claim 2, the vanes or louvers being individual to the discharge ports and means securing the vanes to the gas chambers.

6. Apparatus as defined in claim 2, the means for delivering inert gas comprising a chamber-like header extending transversely of said path at one of the gas distributing chambers, said header and the outer chambers having ports establishing communication between them and means for supplying an inert gas under pressure to the header.

7. Apparatus as defined in claim 1, a star wheel operable to propel the jars along said horizontal path and both gas distributing chambers lying in a horizontal plane above and formed on arcs coaxial with the star wheel.

8. Apparatus as defined in claim 1, the cover plate being formed of a transparent material and clamping means for releasably securing the plate in position over the jars.

9. In apparatus for providing a blanket of inert gas for enveloping the open upper end portions of a plurality of filled jars while the latter are traveling along a prescribed horizontal path between jar filling and closure capping devices, a conveyor for advancing jars along said path, an elongated horizontal cover plate overlying a portion of the path of travel of the jars, a gas distributing chamber extending along each side margin of the plate,

means for delivering inert gas to an end of each chamber, each said chamber having a vertical wall provided with a longitudinal series of discharge ports opening into an elongated jar neck accommodating space overlying the path of travel of the jars and defined marginally by the pair of chambers and a plurality of vanes or louvers disposed vertically on edge and at an angle to direct discharged gas into and generally along the path of travel of the jars and in the direction of movement of the latter, a longitudinal horizontal flange extending inwardly from each chamber just below the discharge ports, the vanes or louvers extending vertically from the flange to the aforementioned cover plate.

10. Apparatus as defined in claim 9 and a baffle bar resting upon the flange near its free edge directly opposite the discharge ports.

11. Apparatus as defined in claim 9, each vane being a flat generally rectangular plate formed with a cut-out corner to accommodate a portion of the baffle bar.

12. Apparatus as defined in claim 9, the vanes terminating short of the free edge of the flange and a baffle bar extending along the flange between said free edge and the vanes directly opposite the discharge ports.

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