

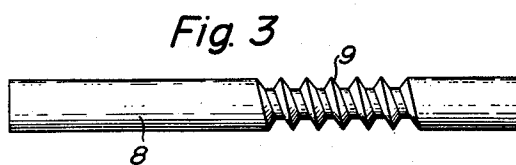
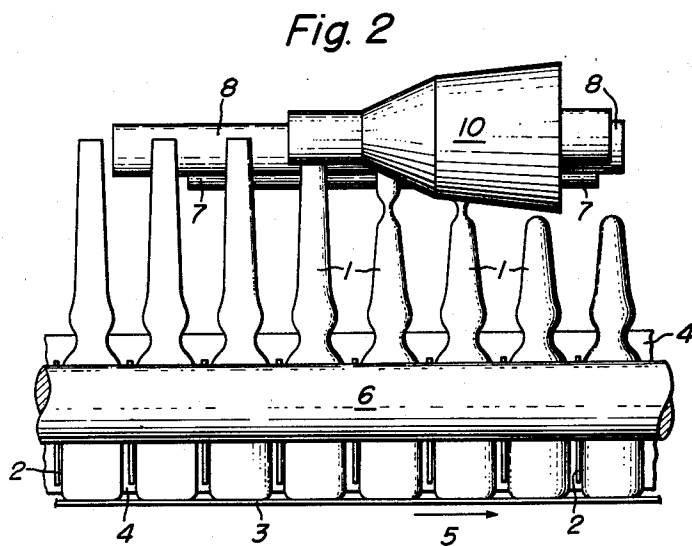
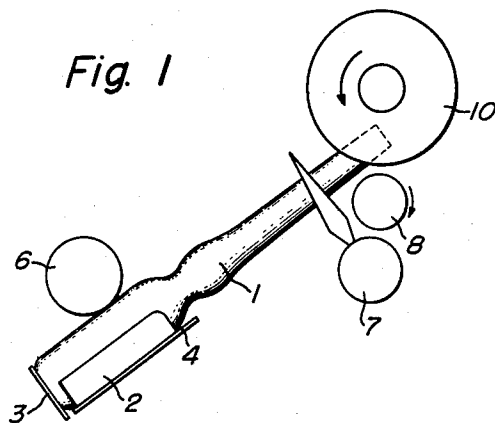
March 10, 1964

HIDEO TATIBANA

3,124,445

APPARATUS FOR AUTOMATICALLY SEALING AMPULES

Filed Nov. 21, 1961



1

3,124,445

APPARATUS FOR AUTOMATICALLY SEALING AMPULES

Hideo Tatibana, 23 Showadori-2-chome, Nakano-ku, Tokyo, Japan

Filed Nov. 21, 1961, Ser. No. 153,934

5 Claims. (Cl. 65—270)

The present invention relates to apparatus for automatically fusion sealing glass ampules.

The present invention has for its object to provide an improved apparatus for automatically fusion sealing the open-end neck portions of glass ampules while the ampules are advanced in succession rotating about their own axes by a conveyor means on which the ampules are placed in a row.

Another object of the present invention is to provide an improved apparatus of the kind described which is adapted to fusion seal the neck portions of glass ampules adjacent to the open end thereof at high speed and with accuracy and thus is particularly suitable for large scale production of finished glass ampules.

According to the present invention, there is provided an apparatus for automatically fusion sealing the neck portions of glass ampules adjacent to the open end thereof comprising a conveyor means adapted to move at a uniform speed and having an inclined conveyor surface adapted to carry a succession of the ampules with the open end portions thereof directed rearwardly upward. A presser belt is arranged to frictionally engage the body portions of the ampules being carried by said conveyor means in succession so as to rotate said ampules about their own axes. A gas burner means is arranged to heat the neck portions of the ampules in succession at a predetermined point adjacent to the open end portions thereof as the ampules are carried while rotating about their own axes. A rotatable propelling rod having a helical groove formed thereon is provided to supportingly receive and advance the open end portions of the ampules in succession along with the body portions thereof after the open end portions have sagged under their own weight as the neck portions of the ampules are heat-softened by the gas burner means. A rotatable cone member is arranged to press the open end portions of the ampules being advanced by the rotatable propelling rod against the latter and to rotate so as to pull said open end portions away from the respective body portions of the ampules as required.

Other objects, features and advantages of the present invention will be apparent from the following description when read with reference to the accompanying drawing which schematically illustrates one embodiment of the invention.

In the drawing:

FIG. 1 is a schematic side elevation of the apparatus embodying the invention;

FIG. 2 is an oblique view of the same as seen from above; and

FIG. 3 is a front elevational view of the rotatable propelling rod having a helical groove thereon.

Referring to FIGS. 1 and 2, reference numeral 4 generally indicates a conveyor means adapted to carry a succession of glass ampules 1 with the open end portions directed rearwardly upwardly in the direction indicated by the arrow 5. The conveyor means 4 has an inclined conveyor surface arranged to proceed at a uniform speed and carrying partitions 2 regularly spaced so as to accommodate therebetween the body portions of the ampules 1 with the open end portions thereof directed rearwardly upwardly. The conveyor means 4 also includes an abutment plate 3 extending along the conveyor surface and

2

substantially at right angles thereto to prevent the ampules 1 being carried from slipping off the conveyor 4.

A presser belt 6 is provided extending parallel to the conveyor surface to frictionally engage the body portions of the ampules 1 being carried by the conveyor 4 so that the ampules each rotate about their own axis while being carried forward.

A gas burner means 7 is arranged relative to the ampules 1 being carried as shown for the purpose of heating the neck portions thereof at a predetermined point adjacent to the open end portions where the neck portions of the ampules are to be fusion sealed.

A rotatable propelling rod 8 is arranged to extend in the direction of travel of the conveyor 4 adjacent to the open end of the ampules being carried. The propelling rod 8 has a helical groove 9 (FIG. 3) formed thereon to supportingly receive and advance the open end portions of the ampules 1 in succession along with the body portions thereof after the open end portions have sagged under their own weight as the neck portions of the ampules 1 are heat-softened by the gas burner means 7.

Disposed above the propelling rod 8 is a cone member 10 which acts to press the open end portions of the ampules being advanced by said rotatable propelling rod 8 against the latter and is adapted to rotate so as to pull said open end portions away from the respective body portions of the ampules as required. The propelling rod 8 and the conically shaped member 10 are rotatably driven from a suitable prime mover by way of a gear mechanism or other suitable transmission (not shown) at coordinated speeds.

In operation of the above apparatus, a succession of glass ampules 1 are positioned on the inclined conveyor surface so that the body portions thereof are accommodated in the spacings between the partitions 2 with the bottoms abutting against the abutment plate 3, each of the spacings between adjacent partitions substantially corresponding to the outer diameter of the ampules 1. The ampules 1 positioned are thus held in place against accidental displacement relative to the conveyor surface with the open end portions of the ampules 1 directed rearwardly upwardly. The ampules 1 are advanced forward together with the conveyor 4 as the latter operates while rotating about their own axes due to frictional engagement of the ampule bodies with the presser belt 6.

As each of the ampules 1, now rotating about its own axis, is carried past the gas burner means 7, a predetermined region of the neck portion of the ampule comes into contact with the flame of the gas burner means 7 and is heated thereby to be fused or softened so that the free end portion of the ampule 1 sags under its own weight to be supported by and received in the helical groove 9 in the rotating propelling rod 8 and thus is advanced forward along with the associated ampule body by the lead of the helical groove 9 while being gradually pressed between the propelling rod 8 and the rotating cone member 10 to be pulled away from the associated body portion of the ampule 1.

The neck portion of the ampule is thus reduced in diameter under the pull of the cone member 10 and the heat of the burner flame until the open end portion of the ampule is separated from the body thereof. The open end portion thus falling off is immediately carried away in a manner usually employed in this sort of automatic unit.

Meanwhile, that part of the neck portion of the ampule remaining integral with the body portion thereof is further heated by the gas burner means 7 while rotating about its own axis so that the open free end of the remaining neck portion is fused to close by the cohesion characteristic of the fused ampule glass due to the sur-

face tension thereof, forming a tidy perfectly sealed free end of a definite hemispherical configuration.

It will be understood that the specific arrangement shown and described above is for the purposes of illustration and that changes and modifications may be made without departing from the invention as defined by the appended claims.

What is claimed is:

1. Apparatus for automatically fusion sealing the open-end neck portions of glass ampules comprising a conveyor means having an inclined conveyor surface adapted to carry a succession of the ampules with the open end portions thereof directed rearwardly upwardly, an abutment plate extending along said conveyor surface and substantially at right angle thereto for supporting said ampules, a presser belt extending parallel to said conveyor surface for frictionally engaging the body portions of said ampules to cause said ampules to rotate, a gas burner means arranged adjacent to the open end portions of said ampules and adapted to heat the neck portions thereof, a rotatable propelling rod extending parallel to said presser belt and having a helical groove formed thereon to supportingly receive and advance said open end portions of said ampules in succession along with the body portions thereof after said open end portions have sagged under their own weight as the neck portions of the ampules are heat-softened by said gas burner means, and a rotatable cone arranged with the axis thereof parallel to said rotatable propelling rod, and with the apex portion thereof directed toward the upstream end of said conveyor means, the surface of said cone member contacting the neck portions of said ampules in succession.

2. Apparatus for fusion sealing the open neck portion of a glass ampule, said apparatus comprising means for advancing said ampule in an inclined supported position along a path of advancement with the neck portion of the ampule extending upwardly, means supported proximate the first said means for engaging said ampule to rotate the same as the ampule is being advanced, means located along the path of advancement of the ampule

for heating the neck portion thereof to heat soften the same whereby the neck portion of the ampule will sag, means extending in the direction of advancement of the ampule at a location beneath the neck portion for receiving the latter to support and convey the same in the direction of advancement after the neck portion has sagged due to the heating thereof, and a rotatable cone element supported adjacent the means for receiving the sagging neck portion of the ampule and extending in the direction of advancement of the ampule, said cone element having increasing diameters in the direction of advancement of the ampule, said cone element being operatively spaced from the means for receiving the neck portion of the ampule to contact the sagged neck portion and urge the same away from the remainder of the ampule to thereby sever the neck portion from the ampule, said means for heating the neck portion extending beyond the rotatable cone element for fusion sealing the ampule after the neck has been severed.

3. Apparatus as claimed in claim 2 wherein said means for receiving the sagging neck portion includes a threaded rod extending parallel to the rotatable cone element and supported for rotation in a direction opposite to that of the cone element.

4. Apparatus as claimed in claim 3 wherein said rod and cone element are supported in vertical alignment.

5. Apparatus as claimed in claim 2 wherein said cone element includes first and second frusto-conical portions defining different cone angles.

References Cited in the file of this patent

UNITED STATES PATENTS

1,664,154	Broche	Mar. 27, 1928
2,058,812	Meyer	Oct. 27, 1936
2,633,672	Ralston	Apr. 7, 1953

FOREIGN PATENTS

767,040	Great Britain	Jan. 30, 1957
---------	---------------	---------------