June 6, 1961 W. A. SHIELDS 2,987,180

DEVICE FOR SELECTIVELY DISCHARGING VIALS HAVING CLOSURE CAPS SEALED THERETO AND VIALS WITHOUT CLOSURE CAPS FROM A VIAL FILLING AND SEALING APPARATUS

Filed Sept. 8, 1959 2 Sheets-Sheet 1

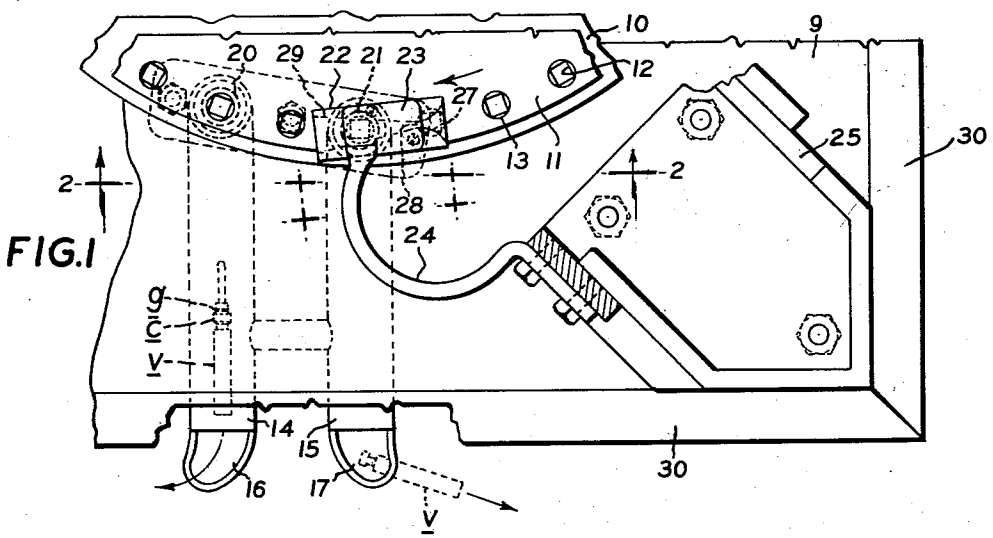


FIG.1

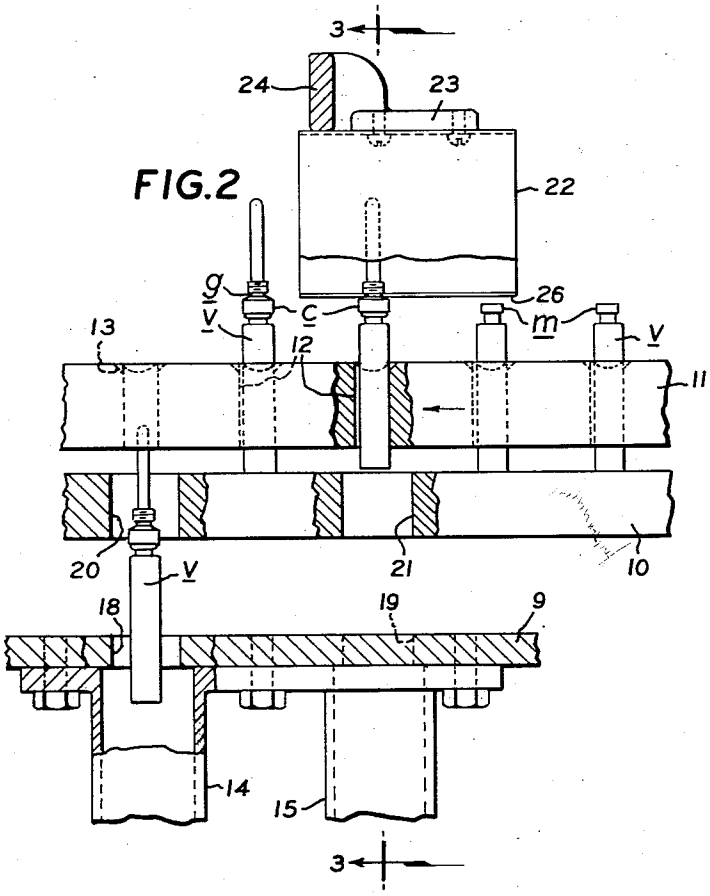


FIG.2

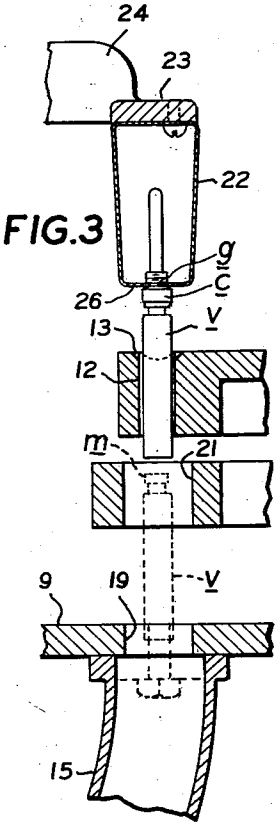


FIG.3

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FIG.4

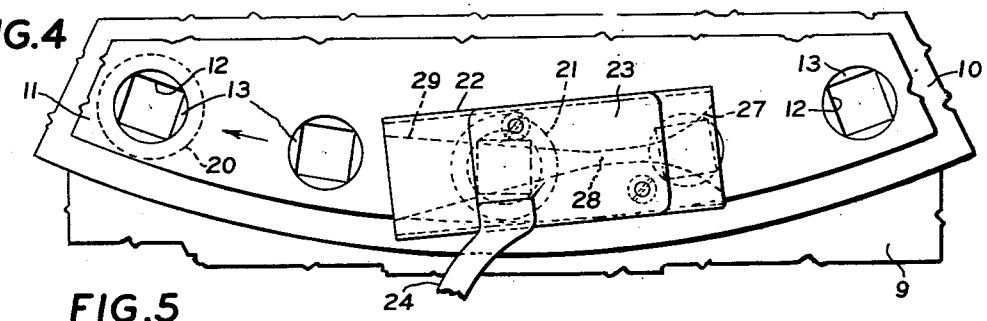


FIG.5

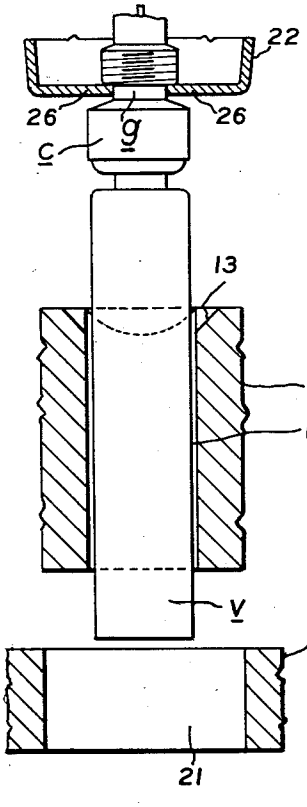


FIG.6

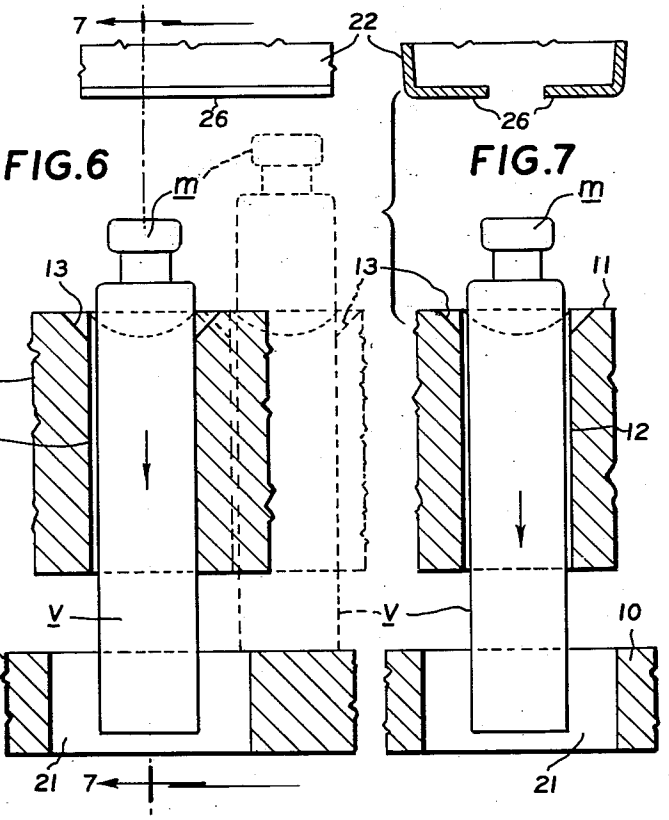
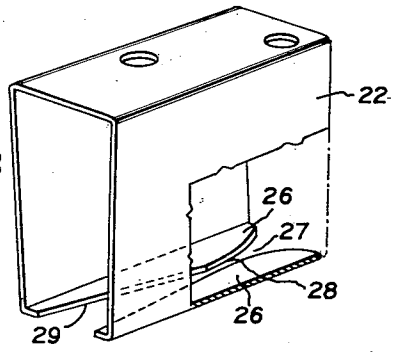


FIG.7

FIG.8



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DEVICE FOR SELECTIVELY DISCHARGING VIALS HAVING CLOSURE CAPS SEALED THERETO AND VIALS WITHOUT CLOSURE CAPS FROM A VIAL FILLING AND SEALING APPARATUS

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This invention relates to apparatus for filling vials with a liquid medicament, such as novocain and penicillin, positioning closure caps on the filled vials, sealing the closure caps to the filled vials and selectively discharging vials having closure caps sealed thereto and vials without closure caps from the apparatus.

This invention particularly relates to a device for selectively or separately discharging vials having closure caps sealed thereto and vials without closure caps from the apparatus.

It is an object of the invention to provide a selecting device having means extending above the line of travel of the tops of the vials and in the line of travel of a part of the closure caps to engage the closure caps and support the vials independently of vial supporting means.

It is another object of the invention to provide a vial support with discharge openings arranged relative to the selecting device whereby the first opening in the path of travel of the vials will receive the vials without closure caps thereon and the second opening in the path of travel of the vials will receive the vials with closure caps sealed thereto.

Other objects and advantages of the invention will be set forth in the detailed description of the invention.

In the drawings accompanying and forming a part of this application:

FIGURE 1 is a top plan view of part of the apparatus arranged with the embodiment of the invention;

FIGURE 2 is a sectional view, on an enlarged scale, taken on the line 2—2 of FIGURE 1 looking in the direction of the arrows;

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 2 looking in the direction of the arrows;

FIGURE 4 is a view similar to FIGURE 1 on a larger scale to more clearly show the selecting device;

FIGURE 5 is a cross-sectional view in a vertical plane, on an enlarged scale, to show the manner of supporting a vial having a closure cap sealed thereto relative to the discharge opening for vials without closure caps;

FIGURE 6 is a sectional view taken along the path of travel of the vials to show the manner of discharging a vial without a closure cap;

FIGURE 7 is a sectional view taken on the line 7—7 of FIGURE 6 looking in the direction of the arrows; and

FIGURE 8 is a perspective view of the selecting device.

The embodiment of the invention is used in conjunction with apparatus for filling vials with a liquid medicament, positioning closure caps on the filled vials and sealing the closure caps to the vials. Part of the apparatus is shown as consisting of a table **9** supporting a platform **10** in a horizontal plane for supporting a plurality of vials *v* in upright position. A member **11** is rotatably mounted on the table **9** to rotate in a horizontal plane spaced above the platform. The member **11** is arranged with an annular series or row of equidistantly spaced square openings **12** for transporting the vials along the platform **10**. The openings **12** are slightly larger than the diameter of the vials to permit lateral adjustment of the vials in the transporting member **11**, as shown in FIGURES 2, 3, 5, 6 and 7, for a purpose to be hereinafter described. The upper ends of the openings **12** are rounded, as at **13** in FIGURES 1 and 4, to facilitate the initial engagement of empty vials into the openings **12**.

In the step of positioning a closure cap *c* on a vial *v*, there may be a few vials which do not receive a closure cap for a number of reasons, such as the absence of a closure cap at the positioning station. To avoid the discharge of all vials from the apparatus regardless whether they have a sealed closure cap thereon or not into a common depository, there is provided means after the closure caps are sealed to the vials to selectively or separately discharge from the apparatus vials having closure caps sealed thereto and vials without closure caps. This is accomplished by first providing the table **9** with two discharge tubes **14** and **15** secured to the underface of the table and curved laterally to have the delivery ends **16** and **17**, respectively, extend from the side of the table, as shown in FIGURE 1. The inlet ends of the tubes **14** and **15** communicate with openings **18** and **19**, respectively, in the table, as shown in FIGURES 2 and 3. The platform **10** is provided with openings **20** and **21** corresponding to and in vertical alignment with the openings **18** and **19**, respectively. The centers of the tubes **14** and **15**, of the openings **18** and **19** and of the openings **20** and **21** are spaced from each other a distance equal to the distance between the centers of alternate openings **12** in the transporting member **11**, as shown in FIGURE 2.

It is the object of the invention to permit vials without closure caps thereon to be discharged through the openings **21** and **19** into the tube **15** and to restrain the vials having closure caps sealed thereto from entering the opening **21** while permitting said latter vials to be discharged through the openings **20** and **18** into the tube **14**.

This is accomplished by a selecting device comprising a U-shaped member **22** secured at the connecting portion to a horizontal end portion **23** of a bracket arm **24** mounted on a housing **25** supported by and extended upwardly from the table **9**, as shown in FIGURE 1. The side walls of the U-shaped member **22** converge toward each other from the connecting portion, as shown in FIGURES 3, 5, 7 and 8, and the converging end portions are bent inwardly to form a pair of horizontal walls **26** spaced from each other. The opposed edges of the walls **26** extend in arcuate directions toward and away from each other in the direction of travel of the vials on the platform **10** to form a passage having a converging mouth or entrance portion **27**, a neck or restricted intermediate portion **28** and a diverging exit or release portion **29** of greater length than the combined lengths of the entrance and neck portions **27** and **28**, respectively. The horizontal walls **26** extend in a horizontal plane above the plane of travel of mouth portions *m* of the vials *v*, as shown in FIGURES 2 and 6, so that the vials having no closure caps sealed thereto will pass below the walls **26** and drop through the openings **21** and **19** into the tube **15**, as shown in FIGURES 2, 3, 6 and 7. The mouth portion **27** of the passage is positioned in the path of travel of an annular groove *g* above the closed end of the closure caps *c*, so that the opposed edges of the horizontal walls **26** will extend into said groove *g* and support the vials during the travel of the vials along the platform **10** from the inner narrow end of the mouth **27** to the commencement of the diverging portion of the exit **29** which is in vertical alignment with a point in the platform **10** beyond the opening **21** therein whereby the vial is supported by the horizontal walls **26** while it is transported by the member **11** past the opening **21** in the platform **10**, as shown in FIGURES 2, 3 and 5. When the groove *g* of the closure cap *c* is released by the opposed edges of the horizontal walls **26**, the vial will be supported by the platform **10** until the vial is moved by the transporting member **11** to the opening **20** in the platform **10** where it will drop through the openings **20**, **18** unto the tube

14, as shown in FIGURES 1 and 2. To accomplish supporting the vials by the neck portion 28, two-thirds of the length of the member 22 extends rearwardly of the center of the tube 15 and one-third of the length of said member 22 extends forwardly of the center of the tube 15, as shown in FIGURE 2.

The vials travel along the platform 10 in an annular path and the center line of the passage 27—29 in the member 22 extends at a tangent to said annular path with the point of contact in the neck portion 28 of said passage, as shown in FIGURE 4, so that the inner edge of the passage will remain in the groove *g* longer than the outer edge of the passage. The square openings 21 and the larger size of the openings 21 will permit the adjustment of the closure cap groove *g* in the passage 27—29 without causing damage to the vial.

The tubes 14 and 15 discharge the capless vials and the capped vials into separate depositories, not shown. The depository for the capless vials is adapted to receive the liquid in said vials. To restrain the free flow of the liquid which might be spilled during the discharge of the capless vials from the transporting member 11 through the opening 21 to the opening 19, the table 9 is provided with a raised edge portion 30, as shown in FIGURE 1.

Having thus described my invention, I claim:

1. In a device for selectively discharging vials having closure caps sealed thereto and vials without closure caps from a vial filling and sealing apparatus, a table arranged with spaced discharge tubes arranged in a predetermined path, a platform mounted in a horizontal plane above the table to support vials in upright position and having openings in vertical alignment with the discharge tubes, a member rotatably mounted in a horizontal plane spaced above the platform and having a series of equidistantly spaced openings for transporting the vials along the platform and past the openings in the platform, and a selecting member mounted above the transporting member in vertical alignment with the platform opening first in the path of travel of the vials and having a pair of walls spaced from each other and extending in a horizontal plane spaced a predetermined distance above the transporting member, whereby the vials without closure caps will drop through the platform opening first in the path of travel of the vials and into the discharge tube aligned with said first platform opening, and the closure caps on the vials being supported by the pair of walls during the travel of the vials past the first platform opening and released from said walls after passing said first platform opening to be supported by the platform and drop through the platform opening second in the path of travel of the vials and into the tube aligned with said second opening.

2. A device as claimed in claim 1, wherein the spaced walls are arranged with opposed edges extending in arcuate directions toward and away from each other to form a passage between the walls having a narrow portion intermediate the ends thereof for engaging the part of the closure caps and supporting the vials independently of the platform.

3. A device as claimed in claim 1, wherein the centers of the discharge tubes are spaced from each other a distance equal to the distance between the centers of alternate openings in the transporting member.

4. A device as claimed in claim 1, wherein one-third of the length of the pair of walls extend forwardly of the center of the platform opening first in the path of travel of the vials and two-thirds of the lengths of the pair of walls extend rearwardly of the center of said platform opening in the direction of travel of the vials.

5. A device as claimed in claim 2, wherein the width of the narrow portion of the passage between the walls is slightly larger than the smallest diameter of the closure caps.

6. A device as claimed in claim 5, wherein the passage of the selecting member is arranged with a mouth portion having the sides converging toward the intermediate narrow portion and an exit portion having the sides diverging from the intermediate narrow portion.

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