June 23, 1959 A. S. TAYLOR ET AL 2,891,468

METHOD AND MACHINE FOR MARKING BOTTLE CLOSURES

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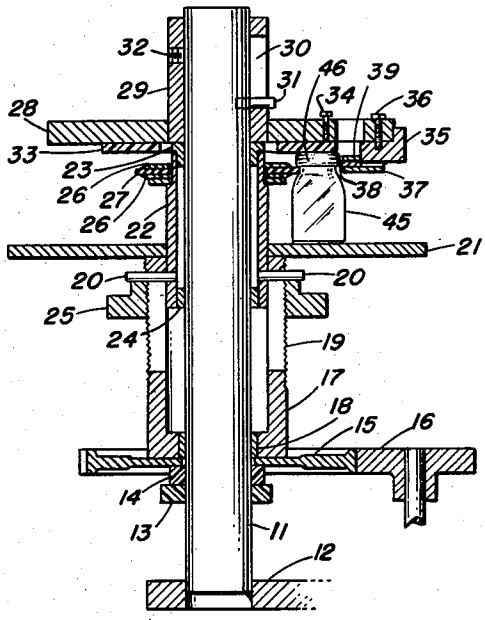


Fig. 1.

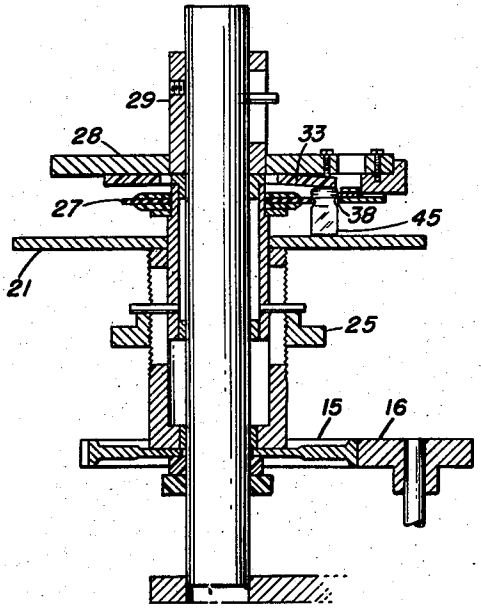


Fig. 2.

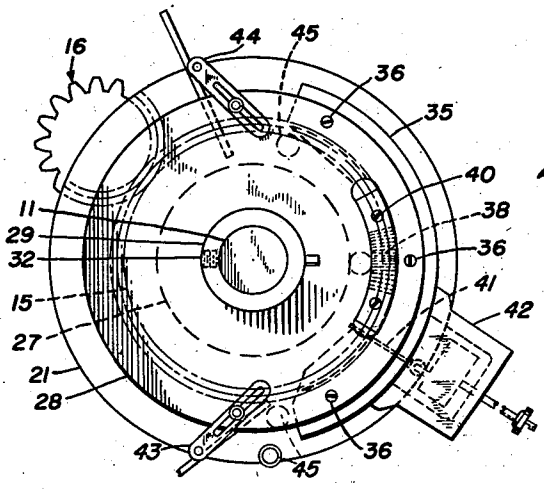


Fig. 3.

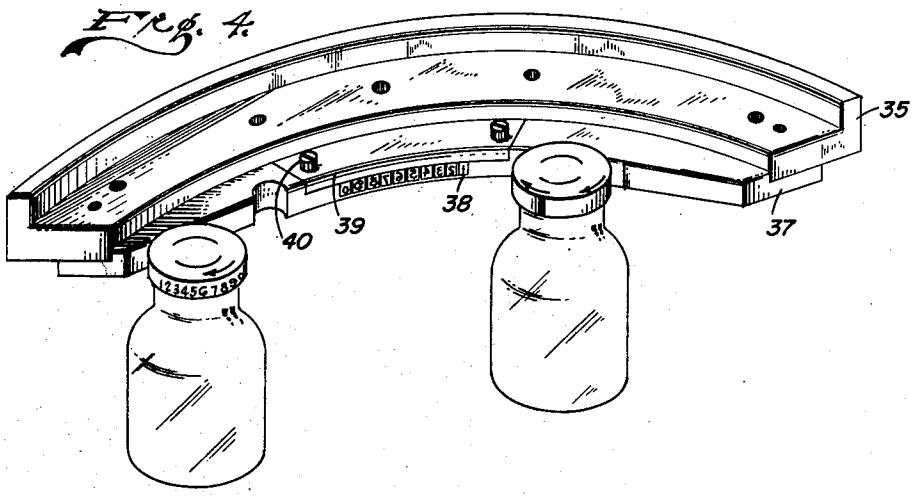
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Fig. 4.



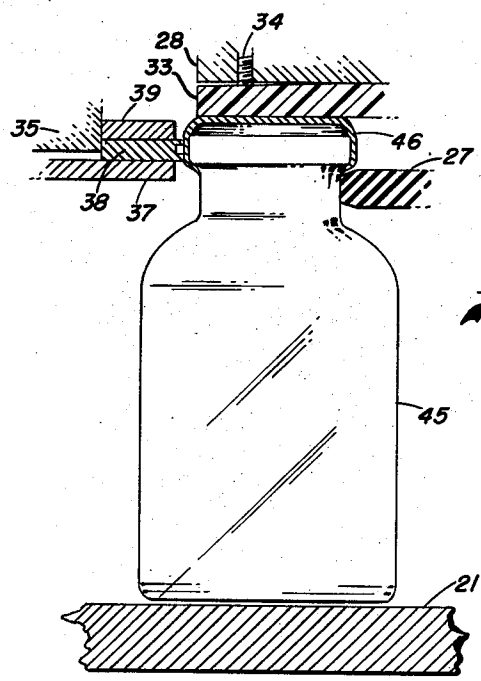


Fig. 5.

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METHOD AND MACHINE FOR MARKING BOTTLE CLOSURES

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8 Claims. (Cl. 101—5)

This invention relates to improvements in a method and machine for marking the seal closures on glass bottles with identifying indicia.

In many types of manufacturing operations, particularly in pharmaceutical laboratories, the problem of identifying bottles and their contents is of importance. At times in handling materials which are toxic, or for the treatment or alleviation of disease, it is absolutely essential that the contents be exactly as indicated. In the manufacture of many pharmaceuticals there is a question at the time of manufacture as to what is to be placed on the label. The same vial may move in commerce in any of several different countries so that different languages are desired on the label as sold. It is therefore desirable to be able to make a fairly large production run of a particular material, and postpone the labelling until a decision is made as to the country of distribution. This delay increases the chances of errors. Further, labels, once applied sometimes wash off or are otherwise mutilated, so that the contents of a bottle may be in question. It is desirable to be able to mark on the bottle in such a fashion that once filled there is no chance for error. A permanent non-alterable marking reduces counterfeiting and markedly simplifies problems of control.

In pharmaceutical practice it is quite customary to use what are known as "seals," usually aluminum seals, which are small retaining rings of aluminum or caps of aluminum, which hold an elastic closure such as a rubber stopper in a bottle and are crimped underneath the rim on the bottle so as to permanently hold the stopper in position. Other materials may be used as a substitute, but aluminum is the material of construction which has met with commercial acceptance at present because of its economic availability and ease of handling. The present invention is particularly satisfactory with aluminum seals, but is not limited thereto.

If the seal is marked before being placed on the bottle, there is always doubt as to whether or not too many were marked, and whether the right seal was placed on the right bottle at the right time. Premarking is particularly confusing where the seals are being crimped by automatic machinery and two or three seals may be retained in the feeding mechanism when batches are changed. The first bottle or two of the new run may be closed with seals which had been intended for a preceding run.

In the past attempts have been made to mark containers on the edges or rims thereof with identifying niches. A patent to Huntley, 2,316,517, discloses a method of marking the rims on cans with niches which are coded to give the date of sealing when compared with a master guide.

The present invention relates to marking a seal closure on a glass bottle in such a fashion that the identifying indicia appear in the seal. The identifying indicia are preferably letters and numbers embossed in the metal. Such information as lot numbers, source, expiration dates, code numbers and code letters or other marks may be included in the groups of information present in the indicia.

Such marking can be used with one-piece aluminum seals, two-piece aluminum seals or three-piece aluminum seals, all of which are well known in the industry, and are referred to generally hereafter as "seals."

To be acceptable the indicia must be marked in the seal in such fashion that the rim of the seal is not wrinkled or crumpled. In production runs the size of the seal will vary slightly and the size of the neck of the bottle will vary slightly so that there has to be a certain amount of clearance between the inside of the seal and the outside of the bottle rim at the time of the application of the seal. The seal is pressed down on the bottle and crimped underneath the rim. Even though crimped, and even though at first glance it would appear that the seal is firmly in position, we have discovered that the seal will slide slightly on the bottle, so that for proper marking it is necessary that the bottle be pressed against the type in such a fashion that the seal may slide slightly. The glass rim of the bottle thus serves as a backing member for the seal at the point of contact with the type. Otherwise, if the pressure is brought to bear on the seal itself, as is customary in marking cans, the seal will be crumpled and an unattractive appearance is given to the finished article.

Crumpling is prevented by using a drive wheel to support the bottle against the type, which drive wheel contacts the bottle below the seal. Preferably, the drive wheel contacts the neck of the bottle just below the seal so that not only is lateral support given to hold the bottle against the type, but also vertical support is given to the lower part of the seal by the top of the drive wheel so that tilting or angular displacement of the bottle is minimized. Other guide members may also be used, but a drive wheel which is in close contact with the bottom of the seal and the neck of the bottle, and which holds the bottle against the type and against an upper pressure plate, furnishes sufficient support for small bottles in passing through the marking machine.

In pharmaceutical practice it is customary to use various different sizes of bottles. The bottles, frequently called vials, in the smaller sizes, may vary from a capacity of around 5 milliliters or less to 500 milliliters or more. It is desirable to be able to use a single filling line interchangeably for handling these different sizes of bottles.

Our machine may be easily adjusted to handle different sizes of bottles.

In filling operations and packaging it is convenient to have all of the equipment mounted so that the bottom of the bottles are a uniform distance from the floor. The various machines which operate on the bottles may then be adjusted to the same height as the top of the bottles so that when various size bottles are passed down the line the various machines are raised or lowered if necessary, but without a change in the conveyor height or conveyor organization.

In the present machine this is easily accomplished by moving the parts which operate on the top of the bottle up and down. Our machine is so constructed that the adjustment for the various sizes of bottles is very easily and rapidly accomplished. The change from one size to another may be normally accomplished in less than two minutes. Also our machine is so constructed and arranged that there is no chance of the bottles jamming or sticking as they are fed to or away from the machine. Also all of the bottles can be seen at all points as they are fed through to the machine so that it is possible by inspection from a considerable distance to see if the filling line has been cleared. It is also convenient to change the marking type after a particular group of bottles has

gone through, so that a different code number may be placed on the next group.

Additionally our machine may have incorporated therein a counting device so that each bottle as it is coded, is counted, thereby giving an unequivocal count of the number in each code group. For many purposes it is absolutely necessary that complete control be maintained so that there are no unaccounted for bottles and no chance of error in the counting.

Other advantages of our machine may be seen from a description of a particular embodiment thereof shown in the accompanying drawings:

Figure 1 is a sectional view through our machine when set for tall bottles.

Figure 2 is a similar view through the machine set for medium sized bottles.

Figure 3 is the top view of the machine showing bottles being fed thereto and certain of the feed and counting mechanism.

Figure 4 shows the type holder and the relationship of the bottles thereto and the type in the type holder during the marking operation.

Figure 5 is an enlarged sectional view showing the relationship of the drive wheel, the pressure plate and the marking type.

As shown in Figure 1, a support shaft **11** is fastened to a pedestal **12**. The support shaft is stationary and furnishes the basic structure about which the bottles **45** revolve. Fastened to the support shaft is a support collar **13**. Resting on the support collar is a support bearing **14**. The support bearing may be a porus metal bearing which is oil impregnated, or may be of the resin impregnated fiber type, such as is sold under the tradename "Micarta." Resting on the support bearing is a primary drive gear **15**. The primary drive gear may be driven by a drive pinion **16** which in turn is driven by any suitable means, such as an electric motor through a variable speed drive. This drive means is not shown.

Attached to the primary drive gear is a height adjustment sleeve **17**. The height adjustment sleeve has at the bottom end thereof a height adjustment sleeve bearing **18**. The height adjustment sleeve is fastened to the primary drive gear **15** and rotates therewith. The height adjustment sleeve is concentric with the support shaft and extends upward. There are two slots **19** in the height adjustment sleeve bearing for drive wheel support pins **20**. At the upper end of the height adjustment sleeve **17** and attached thereto is the accumulator plate **21** on which the bottles stand. The accumulator plate is at a fixed elevation, so bottles may be easily fed from a conveyor to the accumulator plate and from the accumulator plate to the next step in the packaging operations. The accumulator plate rotates about the support shaft, and the bottles are fed onto and away from the accumulator plate. The accumulator plate, the height adjustment sleeve and the primary drive gear rotate together at a fixed height.

Sliding up and down on the support shaft inside of the height adjustment sleeve is the drive wheel support **22**. The drive wheel support is journalled on the support shaft by an upper drive wheel support bearing **23** and a lower drive wheel support bearing **24**. Extending out from the drive wheel support **22** are drive wheel support pins **20**, which extend through the slots **19** in the height adjustment sleeve and rest on the adjusting nut **25**. The adjusting nut **25** is threaded and screws up and down on the externally threaded surface of the height adjustment sleeve so that its vertical position may be easily adjusted. The drive wheel support pins **20** in turn rest upon the adjusting nut. The drive wheel support pins are in slots in the height adjustment sleeve. The drive wheel support rotates with the height adjustment sleeve. Attached to the drive wheel support are the drive wheel retainers **26**. Positioned between the drive wheel retainers is the drive wheel **27**. The drive wheel **27** is preferably made of an elastic material such as rubber. Conveniently the drive wheel retainers are readily removable from the drive wheel support so that the drive wheel may be easily changed.

The drive wheel and its associated parts rotate during operation of the device and may be moved up and down vertically to adjust for the height of the bottle.

Above the drive wheel and its associated parts is the head plate **28**. The head plate is attached to a head sleeve **29** which slides up and down on the shaft support. The head sleeve has a slot **30**, therein, through which a head sleeve positioning pin **31** extends. The head sleeve positioning pin is fastened to the support shaft. The head sleeve is thereby permitted to slide up and down but prevented from rotating. The head sleeve is locked in position with the head lock screw **32**. The head plate is usually lowered so that it rests without binding on the top of the upper drive wheel support bearing. Attached to the head plate is a pressure plate **33**. The pressure plate is preferably of a somewhat flexible material such as a laminated thermo-setting plastic, for instance, "Micarta." The pressure plate may be pressed slightly away from the head plate by the pressure plate screw **34**, which causes the pressure plate to be brought down into an adjustable relationship with the type and drive wheel to allow for small variations in the height of the bottles and to insure that the type marks the rim of the seal **46** at the desired location.

Around one side of the periphery of the head plate is a type holder segment **35**. The type holder segment is fastened to the head plate with the segment screws **36**. Attached to the under side of the type holder segment is the bottle guide **37**. The bottle guide is arcuate in shape with ramps at each end. The bottle guide has slots cut therein in which movable type bars **38** are placed. The type are held in position by a type retainer **39**. The type retainer is attached to the bottle guide by the type retainer screws **40**.

In operation the type retainer screws **40** may be removed, releasing the type retainer **39** and the movable type **38** may then be changed. The type are of a uniform length so that the marking ends of the type extend slightly beyond the inner surface of the bottle guide **37**, and mark on the periphery of the seal as it rolls over the bottle guide. The bottle guide contacts the outer surface of the seal. The drive wheel contacts the bottle just beneath the seal as shown in Figure 5, and as the bottle moves between the bottle guide and the drive wheel it is caused to rotate and is pressed firmly against the type. The drive wheel contacts the surface of the glass just underneath the seal and holds the seal up against the pressure plate **33**, thereby fixing it as to height, and causing it to rotate.

The type holder segment together with the associated bottle guide, type bars, and type retainer may be easily changed to allow for different diameters of seals. The drive wheel and its associated elements together with the pressure plate and bottle guide and associated elements may be moved up and down to adjust for various heights of bottles. The individual type may be changed within the bottle guide by loosening the type retainer and changing the type bars. An entirely new type holder segment may be inserted whenever convenient to arrange for changing in marking. The type holder segments may be set up by the control laboratory and the complete segment changed, thereby insuring against mismarking. It is convenient to have the person in charge of a particular product retain the type holder segment under his control and thus be certain that there is no chance of the type being inadvertently used to mismark even a single bottle.

The bottle guide may extend under the rim of the seal, but usually this is not necessary as the drive wheel, type, the bottle guide, and the pressure plate are sufficient to control the path of the bottle by their contact with the

seal as the sealed bottles are passed through the marking machine.

As shown in Figure 3 a counting pin **41** extends through the bottle guide and slightly outward into the path of the seals. The other end of the counting pin contacts a microswitch counter **42** which may be a microswitch connected to any suitable electrically operated counter, or mechanically operated counter, so that as each seal rotates between the drive wheel and the bottle guide it depresses the counting pin thereby giving a single count. By having the counter thus interlocked with the marking mechanism it is possible to be absolutely certain that the count agrees with the number of marked vials.

As shown in Figure 3, a feed guide **43** and a discharge guide **44**, are associated with the accumulator plate so that as bottles are fed by a conveyor onto the plate they are caused to pass into the proper relationship with the bottle guide and drive wheel and as the bottles are discharged from between the drive wheel and the bottle guide and are rotated by the accumulator plate they are scraped from the accumulator plate and discharged onto a discharge conveyor to remove them from the marking machine.

The bottles may be placed on the accumulator plate by hand. In large scale production it is more convenient to have the bottles fed on an endless belt from a preceding operation, which belt turns over a horizontal pulley adjacent to but with a convenient operating clearance from the accumulator plate. A short flat plate, called a dead plate, because it has no motion, fills the gap between the belt and the accumulator plate. Parallel guides are placed along the sides of the path of bottle travel, and as bottles are fed along the belt, the bottles force those ahead of them over the dead plate onto the accumulator plate. These bottles are oriented and guided by the feed guide **43** and bottle guide **37** as they move along with the accumulator to the marking position.

After the bottles are marked, they are scraped off the accumulator plate by the discharge guide **44**. A conveyor may be positioned to remove the marked bottles, but conveniently a box is placed to receive them as they fall off the plate, and the bottles are stored in these boxes until ready for labeling.

Variations and modifications in the exact form of the apparatus and its use will suggest itself to those skilled in the art. Such modification and changes are part of the present invention as set forth in the following claims.

We claim:

1. A method of marking seal closures on glass bottles which seals are slightly larger diametrically than the rims of the bottles and diametrically slideable on the rims of the bottles which comprises passing a glass bottle having a seal retaining a resilient stopper in said bottle in marking contact with type, pressing against the glass of the bottle adjacent to but not on the area covered by the seal to force the seal against the type, to simultaneously shift the seal slightly diametrically so that the seal is glass supported at the point of type contact, and to retain the bottle in marking position.

2. A method of marking seal closures on glass bottles which seals are slightly larger diametrically than the rims of the bottles and diametrically slideable on the rims of the bottles which comprises rotating a glass bottle having a seal retaining a resilient stopper in said bottle in rolling marking contact with type, rotating and pressing against the glass of the bottle adjacent to but not on the area covered by the seal to force the seal against the type, thus shifting the seal slightly diametrically so that the seal is glass supported while in rolling contact with the type, and retaining the bottle in position.

3. In an apparatus for marking identifying indicia on a glass bottle seal which seal is slightly larger diametrically than the rim of the bottle and diametrically slideable on the rim of the bottle, marking type, a holder for said marking type, a pressure plate to hold the seal adjacent said marking type and against axial displacement, an elastic drive wheel to force the seal against the marking type and slide the seal on the rim of the bottle so that the seal is supported by the glass bottle rim at the point of type contact, said drive wheel being in position to contact the bottle but not the cylindrical surface of the seal, support means for said bottle and means to position the marking type and the drive wheel in a variable height relationship to the bottle support means so that different heights of bottles may be marked with the same marking machine.

4. In an apparatus for marking identifying indicia on a glass bottle seal, a vertical support shaft, a drive means journaled on said shaft, a height adjustment sleeve driven by said drive means, an accumulator plate on said height adjustment sleeve, a drive wheel support driven by said height adjustment sleeve, means for varying the height of said drive wheel support with relationship to said accumulator plate, a glass bottle contacting drive wheel on said drive wheel support, means for supporting marking type in non-rotating vertically adjustable relationship to said accumulator plate, and a seal contacting bottle guide in concentric relationship with said drive wheel; whereby the bottle is rotated and advanced by contact with the drive wheel; the bottle guide and the marking type contact only the seal; and the drive wheel contacts only the glass portion of the bottle.

5. In an apparatus for marking identifying indicia on a glass bottle seal, a vertical support shaft, a drive means journaled on said shaft, a height adjustment sleeve driven by said drive means, an accumulator plate on said height adjustment sleeve, a drive wheel support driven by said height adjustment sleeve, means for varying the height of said drive wheel support with relationship to said accumulator plate, a glass bottle contacting drive wheel on said drive wheel support, means for supporting marking type in non-rotating vertically adjustable relationship to said accumulator plate, and a seal contacting bottle guide in concentric relationship with said drive wheel; whereby the bottle is rotated and advanced by contact with the drive wheel; the bottle guide and the marking type contact only the seal; and the drive wheel contacts only the glass portion of the bottle; and means to count the bottles as the seals are marked.

6. In an apparatus for marking identifying indicia on a glass bottle seal, a vertical support shaft, a drive means journaled on said shaft, a height adjustment sleeve driven by said drive means, an accumulator plate on said height adjustment sleeve, said accumulator plate being at constant height, a drive wheel support driven by said height adjustment sleeve, means for varying the height of said drive wheel support with relationship to said accumulator plate, a glass bottle contacting drive wheel on said drive wheel support, means for supporting marking type in non-rotating vertically adjustable relationship to said accumulator plate, and a seal contacting bottle guide in concentric relationship with said drive wheel; whereby the bottle is rotated and advanced by contact with the drive wheel; the bottle guide and the marking type contact only the seal; and the drive wheel contacts only the glass portion of the bottle.

7. In an apparatus for marking identifying indicia on a glass bottle seal, a vertical support shaft, a drive means journaled on said shaft, a height adjustment sleeve driven by said drive means, an accumulator plate on said height adjustment sleeve, said accumulator plate being at constant height, a drive wheel support driven by said height adjustment sleeve, means for varying the height of said drive wheel support with relationship to said accumulator plate, a glass bottle contacting drive wheel on said drive wheel support, means for supporting marking type in non-rotating vertically adjustable relationship to said accumulator plate, and a seal contacting bottle guide in concentric relationship with said drive wheel; whereby the bottle is

rotated and advanced by contact with the drive wheel; the bottle guide and the marking type contact only the seal; and the drive wheel contacts only the glass portion of the bottle; and a counting means operating pin through said bottle guide in seal contacting position, whereby said bottles are counted as the seals are marked.

8. In an apparatus for marking identifying indicia on a glass bottle seal which seal is slightly larger diametrically than the rim of the glass bottle and diametrically slideable on the rim of the bottle, an elastic drive wheel in position to contact and press against the bottle on the glass portion thereof adjacent to the seal and diametrically opposed to marking type thereby sliding the seal on the bottle until the glass of the bottle supports the portion of the seal which is in contact with marking type and by pressure imprinting on the glass supported seal, marking type, means to position said marking type in seal contacting arcuate position concentric with said drive wheel, a stationary pressure plate above and in contact with the bottle seal to hold the bottle down and against the drive wheel, means to feed the bottles, and means to remove the bottles.

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