May 5, 1959 R. H. BREEBACK 2,884,686

FILLING HEAD AND METHOD OF MAKING SAME

Filed Sept. 28, 1955

FIG. 1.

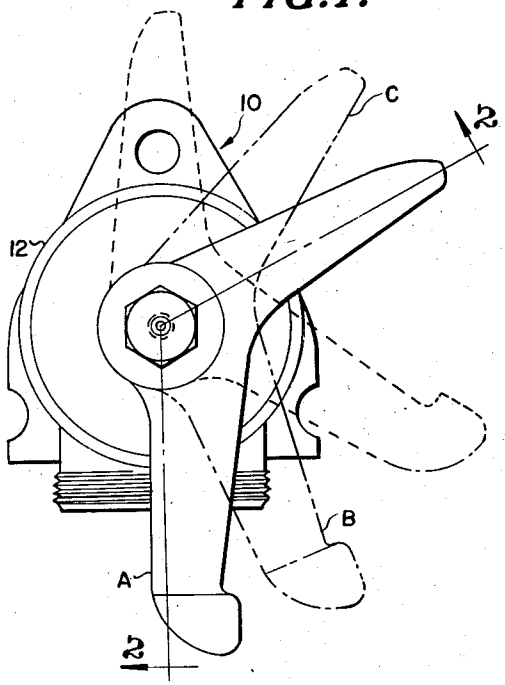
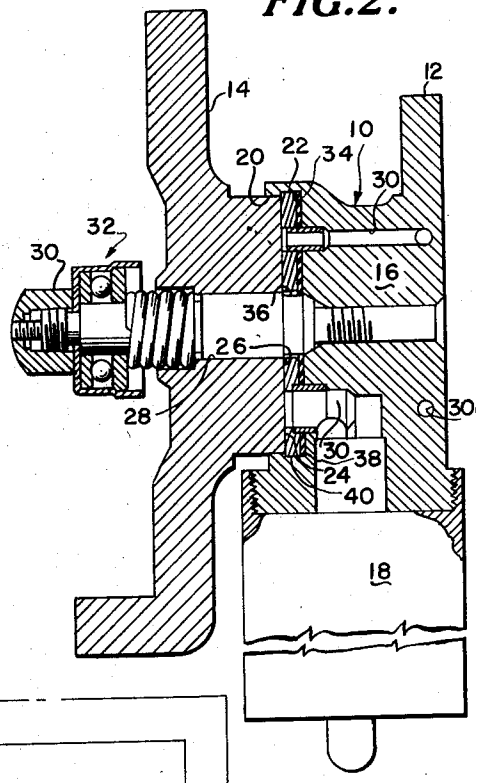



FIG. 2.



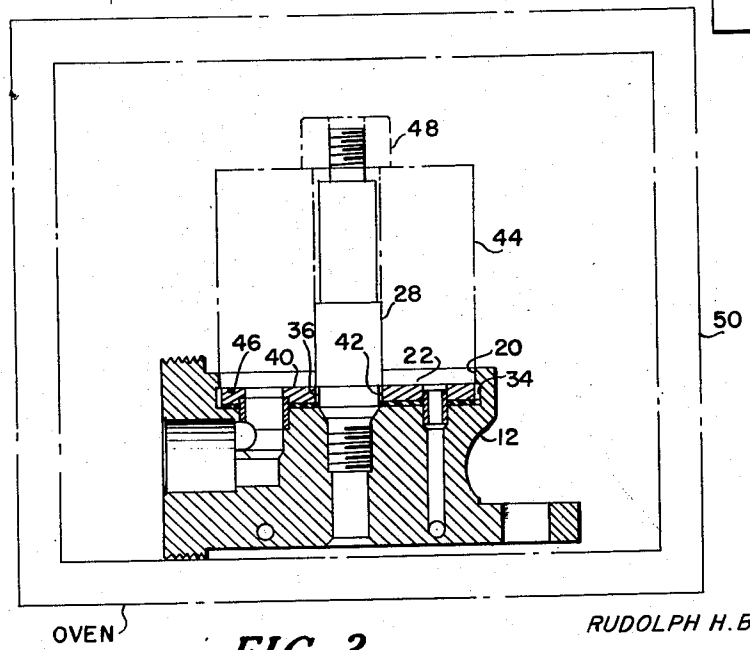




FIG. 3.

INVENTOR

RUDOLPH H. BREEBACK

BY Cushman, Darby & Cushman

ATTORNEYS

United States Patent Office

2,884,686

Patented May 5, 1959



2,884,686

# FILLING HEAD AND METHOD OF MAKING SAME

Rudolph Henry Breeback, Baltimore, Md., assignor to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Application September 28, 1955, Serial No. 537,167

11 Claims. (Cl. 29—157.1)

The present invention relates to a valve and the method of making the same and, more particularly, the invention relates to a filling valve of a filling head for filling containers.

Filling machines of the type used in filling containers such as bottles or cans are normally provided with a plurality of filling heads, each having a disk type filling valve therein. Containers are normally brought into sealing engagement with the filling heads and the disk type filling valves are then rotated to various positions to align various fluid passages in the valve body during the filling cycle. For example, in filling a carbonated beverage such as beer or the like, the valve body of a filling head is provided with liquid and gas passages which communicate conduits from the filling machine reservoir with the valve seat and liquid and gas passages which communicate the interior of the container with the valve seat. A disk valve element having a seat face cooperating with the valve seat of the valve body is provided with liquid and gas passages adapted to align the liquid and gas passages in the valve body. In other words, the disk valve element is rotated to first align suitable passages in the valve body so as to place the container under counter pressure and then the disk valve element is rotated to align liquid and vent passages in the valve body so as to fill the container while gas within the container is vented.

In United States Patent No. 2,202,033, issued May 28, 1940, to Robert J. Stewart and Wiltie I. Gladfelter, such a filling head as described above, is disclosed. The valve body of the filling head is provided with a circular recess in which a gasket member, made up of a rubber disk element and a lather disk element is inserted, the leather disk element providing the valve seat for cooperating with the seat face of the disk valve element. Since fluids, such as liquid and gas, are flowed through the filling head, at pressures normally in excess of atmospheric pressure, leaks would often occur between the valve seat of the leather disk and the seat face of the disk valve unless the valve seat and seat face were perfectly matched.

An object of the present invention is to provide a filling head with a filling valve having an improved seal between the valve body and the movable valve element, the seal being such as to eliminate leaks even though the filling valve is subject to high pressures.

Another object of the present invention is to provide a method of manufacturing a filling head wherein the valve seat of the packing is formed while the packing is positioned in the valve body.

Still another object of the present invention is to provide an improved packing for and a method of installing in the filling valve of a filling head.

A further object of the present invention is to provide a micro-finish on the seat face of a leather packing or gasket used in a disk valve. Heretofore leather packings or gaskets used in valves as a seating material were merely finished to have a flat surface, but such a surface could be as much as .01 to .015 inch out of parallel without being detected by the human eye. The present method of finishing the seating surface of the leather packing insures a micro-finish to the surface and, thereby, eliminating leaks between the seating surface of the packing and the cooperating lapped surface of the valve.



These and other objects of the present invention will appear more fully in the following specification, claims and drawings, in which:

Figure 1 is an elevational view of the filling head of the present invention, portions of the filling valve body being omitted;

Figure 2 is a cross-sectional view taken on the line 2—2 of the filling head disclosed in Figure 1 and showing the lower portion of the filling valve body in elevation;

Figure 3 is a view illustrating the forming of the valve seat on the packing or gasket positioned in the valve body of the filling head.

Referring now to the drawings wherein like character or reference numerals represent like or similar parts, the filling head, generally designated by the numeral **10** and disclosed in Figures 1 and 2, is of the type for use with a rotary filling machine such as disclosed in the aforementioned Stewart et al. patent. The filling head **10** includes a valve body **12**, which is adapted to be connected to the periphery of a reservoir carrying superstructure of a filling machine and a disk valve element **14** rotatably supported on the valve body **12**. Valve body **12** is made up of an upper body portion **16** and a usually detachable lower body portion **18**. A container (not shown) is adapted to sealingly engage lower body portion **18** for filling. Such containers may be bottles or cans, the lower body portion **18** being structurally designed to receive one or the other.

As best shown in Figure 2, valve body **12** is provided with a circular recess **20** in which a packing element **22** is positioned. The packing element **22** is provided with a valve seat face **24** on which a seat face **26** of disk valve element **14** bears against for rotation with respect thereto. Disk valve element **14** is rotatably supported on a valve stem **28**, which projects centrally and axially of the recess **20**. Valve stem **28**, which is threadedly received in valve body **12**, is also threaded at its outer end to receive a nut **30** which retains disk valve element **14** of the valve stem. An anti-friction member **32** is interposed between the nut **30** and the disk valve element **14** so that the seat face **26** of the disk valve element will bear against the valve seat face **24** of valve body **12** with the proper pressure to prevent leaks while permitting rotation of the disk valve element with respect to the valve body.

Suitable liquid and gas flow passages **30**, terminating in alignment with apertures provided in packing **22**, are provided in valve body **12** and are adapted to be aligned or nonaligned with passages in the disk valve element **14** by rotational movement of the disk valve through the several positions shown in Figure 1. For example, if the filling head is utilized on a filling machine for filling containers with beer, the disk valve, when in a position A, is closed and none of the gas and liquid passages **30** are aligned. When the disk valve **14** moves to a position B, shown in broken lines in Figure 1, by suitable trip means in the filling machine (not shown), gas passages between the seat face **24** of filling head **12** and a suitable source of gas pressure will be aligned with gas passages in the filling head leading from its seat face to the container and, thus, placing the container under counter pressure. After a container is placed under counter pressure, disk valve element **14** moves to a position C, wherein liquid passages in valve body **12** extending from a source of liquid to the seat face thereof are aligned with liquid passages in the valve body extending from its seat face to the container.

During the filling stage, suitable gas passages in the valve body are aligned so that the container can be vented of the counter pressure gas while liquid is flowing into the container.

Referring in more detail to Figure 2, it will be noted that recess **20** in valve body **12** is provided with an undercut annular groove **34** into which gasket or packing **22** extends. Further, valve stem **28** is provided with an undercut annular groove as indicated at **36**, the undercut groove **36** being in alignment with annular groove **34**. It will be further noted that gasket **22** also extends into the undercut groove **36** in the completed assembly of the filling head.

Gasket or packing **22** consists of a rubber disk **38** which bears against the bottom surface of recess **20** and a leather disk **40** on which the valve seat **24** is formed. Rubber disk **38** is made of any suitable rubber compound which is nontoxic, resistant to detergents, and which has a normal resiliency. Leather disk **40** is treated with a nontoxic wax prior to positioning in the valve body. As mentioned above, in the past the leather disk used as a valve seat was merely dressed smooth to thereby insure a minimum degree of friction between it and the disk valve, the sealing action between the leather disk and the seat face of the disk valve element depending mainly on the pressure exerted on the leather disk by the seat face of the disk valve element. The present invention contemplates as will be subsequently described in detail, the forming of a seat face on the leather disk which will form a seal with the seat face of the disk valve element when contiguous therewith and thereby resulting in reducing the amount of pressure required between the seat face of the disk valve element and the leather disk to maintain a proper seal while permitting easy rotation therebetween.

Referring now to Figure 3, it will be noted that when gasket **22**, formed of rubber and leather disks **38** and **40**, respectively, is originally positioned within recess **20** adjacent the annular grooves **34** and **36** in the recess and stem respectively, its outside diameter is slightly less than the diameter of the groove **34**, whereas its inside diameter **42** is slightly greater than the diameter of the undercut or annular groove **36** of stem **28**. To form a micro-finished valve seat on the leather disk **40**, a suitable platen **44** having a micro-finished, lapped surface **46** is placed on stem **28** with the surface **46** bearing against the leather disk **40**. A nut **48** is then threaded on to stem **28** to cause platen **44** to tightly hold gasket **22** in position in recess **20** adjacent the grooves **34** and **36**. Platen **44** holds gasket **22** tightly in place as shown in Figure 3, but does not appreciably compress the same.

With the platen held in place on the valve body **12**, the whole unit is then placed in a suitable thermostatically controlled electric oven and baked. Of course, it is not necessary to have the lower portion **18** of valve body **12** attached to the upper portion **16** when baking gasket **22** is in the recess of upper portion **16**. The assembly is allowed to bake at about 300° F. for about 30 minutes so that heat may penetrate the metal mass of the platen and valve body and soften the wax-treated leather disk **40** so that it flows radially outwardly and inwardly to fill the grooves **34** and **36** and assumes the contour of the micro-finished surface **46** of platen **44**. After proper baking, the assembly is removed from the oven and nut **48** is rechecked to make sure the platen is still firmly pressing against gasket **22**. After checking nut **48** for tightness and tightening if necessary, the hot platen and valve body assembly are immediately quenched in cold water until such time that the wax and leather of wax-treated disk **40** have assumed their original hardness.

Platen **44** is removed from the valve body and a thin coating of an odorless, tasteless and nontoxic grease is applied to the valve seat surface **24** formed on the leather disk **40**. The grease removes any loose dirt from the valve seat of packing **22**.



Disk valve element **14**, which is provided with a seat face **26**, is ready to be assembled onto valve body **12**, thus forming the filling head. However, it will be understood that prior to assembly of disk valve element **14** onto the stem of valve body **12**, the seat face **26** of the disk valve element is hydro-lapped to a micro-finish so that it corresponds to the micro-finished valve seat **26** molded in the leather disk **40** of packing **22**.

By manufacturing a filling head as described above, the filling valve of the filling head is provided with a micro-finished valve seat capable of maintaining a tight seal with the seat face of the disk valve with a minimum of pressure being applied between the two elements. Further, the method of making the valve seat face on the leather disk of the packing provides a means of retaining the gasket in place in the valve body. In other words, by providing the grooves **34** and **36** recess **20** and stem **28**, respectively, and permitting the gasket to flow radially inwardly and outwardly, the gasket is locked or anchored in position in the valve body.

It will of course be understood that it is within the scope of the invention to mount the leather packing in the valve disk and lap the mating surface of the valve body, the disk being provided with a recess adapted to receive the packing and the valve body.

The terminology used in the specification is for the purpose of description and not limitation, the scope of the invention being defined in the claims.

I claim:

1. A method of manufacturing a filling head of the type having a valve body element with passages therein and a disk valve element carried by a valve stem and rotatable with respect to the valve body for aligning passages in the valve body element, one of the elements having its seat face received in a circular recess provided in the other, the steps comprising: providing an annular groove in the peripheral wall of the recess of the element adapted to receive the seat face of the other element, positioning a wax-treated leather gasket of smaller diameter than the annular groove into the recess adjacent the groove, utilizing a lapped surface to firmly position the gasket in the recess adjacent the groove, baking the gasket and element at a temperature sufficient to cause the leather and wax to soften and flow to thereby assume the shape of the lapped surface and fill the groove in the recess of the element, quickly quenching the gasket and element in cold water to harden the leather and wax to its original hardness, removing the lapped surface from the gasket and element, lapping the seat face of the other element, and then assembling the elements together with the lapped seat face of the last mentioned element bearing against the formed seat face of the wax-treated leather gasket of the first mentioned element.

2. The method of claim 1 wherein baking of the gasket and first mentioned element is at a temperature of about 300° F. for about 30 minutes.

3. The method of claim 1 including the step of applying grease to the formed seat face of the wax-treated leather gasket after the gasket has been baked and quenched in cold water to remove any loose dirt therefrom.

4. A method of manufacturing a filling head of the type having a valve body element with passages therein and a disk valve element carried by a valve stem and rotatable with respect to the valve body for aligning passages in the valve body, one of the elements having its seat face received in a circular recess provided in the other, the steps comprising: providing an annular groove in the wall of the recess of the element adapted to receive the seat face of the other element, positioning a wax-treated leather gasket of smaller diameter than the annular groove into the recess adjacent the groove, utilizing a lapped surface to firmly hold the gasket in the recess adjacent the groove, heating the gasket and element at a temperature sufficient to cause the leather and wax to

soften and assume the shape of the lapped surface and fill the groove in the recess of the element, checking pressure of the lapped surface against the gasket after heating to assure the gasket is still firmly positioned in the recess of the element, quickly quenching the gasket and element in cold water to harden the leather and wax to its original hardness, removing the lapped surface from the gasket and element, lapping the seat face of the other element, and then assembling the elements together with the lapped seat face of the last mentioned element bearing against the formed seat face of the wax-treated leather gasket of the first mentioned element.

5. A method of manufacturing a filling head of the type having a valve body with a circular recess therein and a valve stem extending axially of the recess, a disk valve carried by the valve stem and rotatable with respect to the valve body for aligning passages in the valve body, the steps comprising: providing an annular groove in the peripheral wall of the recess in the valve body, providing an annular groove on the valve stem in alignment with the annular groove in the peripheral wall of the recess, positioning a wax-treated leather gasket of smaller diameter than the annular groove on the valve stem into the recess adjacent the grooves, utilizing a lapped surface to apply a predetermined pressure for firmly holding the gasket in the recess adjacent the groove, baking the gasket and valve body at a temperature sufficient to cause the leather and wax to soften and thereby assume the shape of the lapped surface and fill the groove in the recess and valve stem, quickly quenching the gasket and valve body in cold water to harden the leather and wax to its original hardness, removing the lapped surface from the gasket and valve body, treating the gasket with a non-toxic grease to remove dirt from the seat face formed thereon, lapping the seat face of the disk valve, and then assembling the disk valve onto the stem of the valve body so that the lapped seat face of the disk valve bears against the formed seat face of the leather gasket of the valve body.

6. The method of claim 5 wherein heating of the gasket and the valve body is at a temperature of about 300° F. for about 30 minutes.

7. A method of forming a seat face on a leather gasket used to provide a seal in a valve between movable elements thereof, the steps comprising: placing a wax-treated leather gasket in position on one element, utilizing a lapped surface to firmly hold the gasket in position on the element, baking the gasket and element at a temperature sufficient to cause the wax-treated leather gasket to soften and assume shape of the lapped surface, and cooling the gasket while the gasket is still held



in position on the element by the lapped surface to harden the gasket to its original hardness.

8. A method of forming a seat face in a valve between movable elements thereof, the steps comprising: providing a recess in one valve element, placing a wax-treated leather gasket of size slightly smaller than the recess into the recess of the element, utilizing a lapped surface to firmly hold the gasket in position in the recess of the element, baking the gasket and the element at a temperature sufficient to cause the wax-treated leather gasket to soften and assume the shape of the lapped surface and fill the recess of the element, and quickly cooling the gasket while still held in position on the element by the lapped surface to harden the gasket to its original hardness.

9. A method of forming a seat face in a disk valve of the type having a valve body element and a disk element rotatable with respect to the body element, the steps comprising: providing a circular recess in one element for rotatably receiving the other element, undercutting the wall of the recess to provide an annular groove therein, positioning a wax-treated leather gasket of smaller diameter than the diameter of the annular groove into the recess and adjacent the groove, utilizing a lapped surface to firmly hold the gasket in position in the recess adjacent the groove, baking the gasket and element at a temperature sufficient to cause the wax and leather of the gasket to soften and flow to thereby assume the shape of the lapped surface and fill the groove in the recess, and then quickly quenching the gasket and element in cold water to thereby harden the wax and leather of the gasket to its original hardness.

10. The method of claim 9 wherein the baking of the gasket and element is at a temperature of about 300° F.

11. The method of claim 9 wherein the baking of the gasket and element is at a temperature of about 300° F. for about 30 minutes.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,026,457 | Reynolds | May 14, 1912 |
| 1,593,719 | Gouldbourn | July 27, 1926 |
| 2,034,829 | O'Malley | Mar. 24, 1936 |
| 2,058,715 | O'Malley | Oct. 27, 1936 |
| 2,377,166 | Mayer | May 29, 1945 |
| 2,649,112 | Barnett et al. | Aug. 18, 1953 |
| 2,696,363 | Monson | Dec. 7, 1954 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 130,792 | Australia | Jan. 6, 1949 |