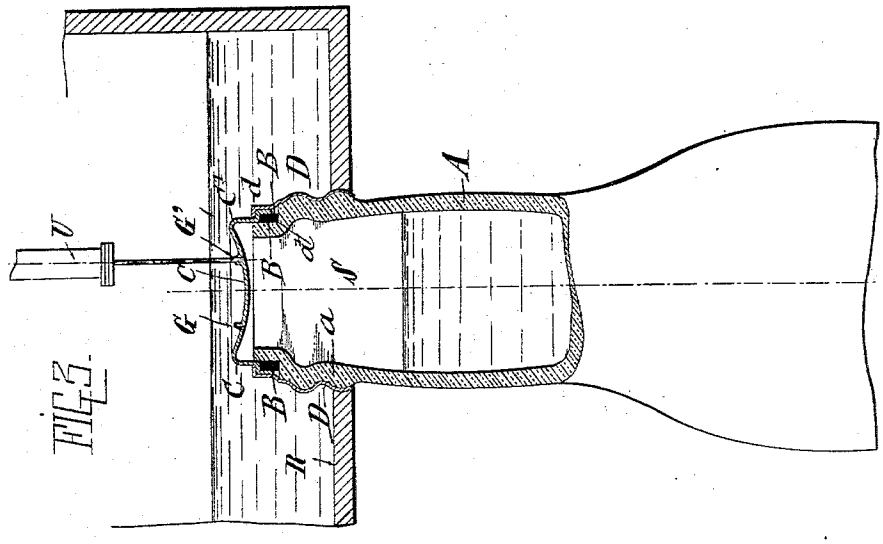
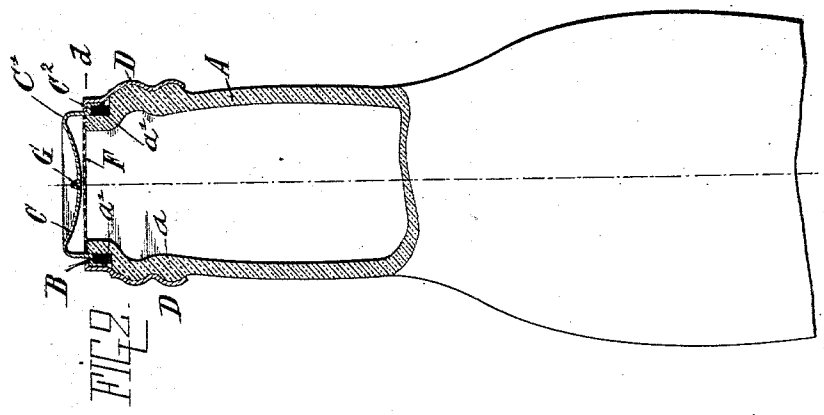
(No Model.)

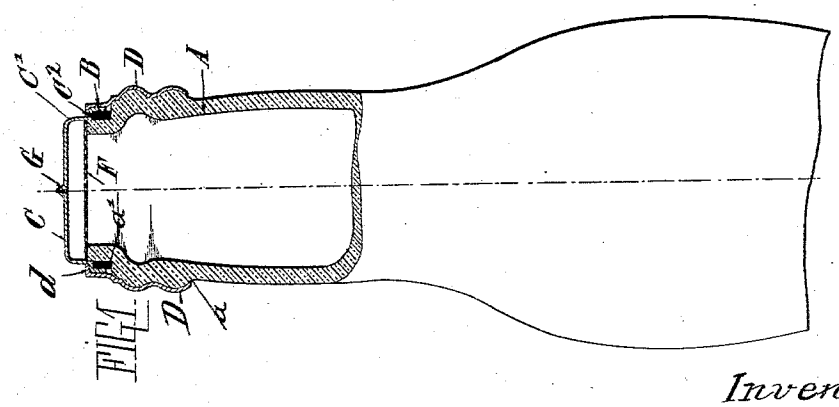
L. M. G. J. LOUSTALOT.

CORKING BOTTLES.

No. 546,169. Patented Sept. 10, 1895.







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UNITED STATES PATENT OFFICE.

LOUIS MATHIEU GUSTAVE JEAN LOUSTALOT, OF PARIS, FRANCE.

CORKING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 546,169, dated September 10, 1895.

Application filed January 10, 1895. Serial No. 534,470. (No model.)

To all whom it may concern:

Be it known that I, LOUIS MATHIEU GUSTAVE JEAN LOUSTALOT, a citizen of the Republic of France, residing at Paris, (Seine,) France, have invented certain new and useful Improvements in Corking Bottles, of which the following is a specification.

This invention has reference to certain improvements in the hermetical closing of bottles for the preservation of alimentary and pharmaceutical products and other solids and liquids, which system of closure is applicable to all kinds of bottles, jars, vessels, &c., whatever be the shape or nature of the vessels. My improved system of closing bottles or other vessels produces an absolutely tight closure and permits the indefinite preservation of the products by the absolute exclusion of the atmospheric air from the same.

The invention consists of a device for closing bottles and other vessels, which comprises a circumferential recess in the rim of the bottle, a flanged disk placed in said recess and having a small aperture, an elastic gasket also placed in said recess between the rim of the bottle and the flange of the disk, and a cap applied to the exterior of the neck and provided with a flange for retaining the disk.

The invention consists, further, of the process, hereinafter described, of hermetically sealing bottles, jars, vessels, &c., and of certain details of construction, which will be fully described hereinafter, and finally pointed out in the claims.

In order to render my improved system of closing vessels as clear as possible, the accompanying drawings represent, as one instance of its application, a bottle provided with my improved closing device.

Figure 1 represents a vertical central section of a bottle with the closing device in position on the same before being finally closed; Fig. 2, a like section of a bottle, showing the closing device applied so as to hermetically seal the bottle; and Fig. 3, the means employed for completing the filling of the bottle under exclusion of the atmospheric air.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the neck of a bottle or other vessel, which is provided with a circumferential screw-thread *a*, and furthermore with an exterior recess *a'* at its upper end, in which recess is located a gasket B, of rubber or other suitable elastic material.

A disk C, of tin or other suitable flexible material, is bent up so as to form an annular flange C' adapted to encircle the rubber gasket B on the upper end of the bottle-neck A, the flange of said disk being enlarged at its outer part so as to provide a shoulder C^2, which fits over the gasket B, and around which extends the inturned retaining-flange *d* of a cap D fitted around the corrugated neck and which retains the disk C firmly in position on the bottle-mouth. On the rim of the bottle-neck A, below the disk C, is supported a disk-shaped wire-screen F, which is preferably made of material not affected by the solid or liquid substance in the bottle. The disk C has at its center a small teat G, provided with a small aperture for the escape of the air in the bottle or other vessel. The retaining-cap D is provided with a screw-thread, which engages the exteriorly-threaded portion of the bottle-neck A, the cap being turned down on the same until the flange *d* engages the shoulder C^2 of the disk C and presses the same tightly against the gasket B. The use of the retaining-cap D permits the closing of the bottle without a machine; but it is obvious that the cap may be replaced by a yielding cap which may be placed at the required moment on the neck of the bottle.

When the bottle or other vessel is filled with the substance to be preserved and is closed, as indicated in Fig. 1, by the various parts which compose the closing device, it is placed into a boiler which is filled with water at ordinary temperature, so that the bottle is immersed to a depth of from four to five centimeters. This being done, the surrounding water is slightly heated by means of steam or the direct application of heat. By the raising of the temperature of the water the air is gradually driven out of the substance placed in the bottle, and this air escapes through the aperture in the small teat G, so as to produce thereby the "slow disoxygenation" of the substance. This operation is continued at a low temperature as long as air-bubbles escape and are caused to rise on the surface of the water in which the test is be-

ing made. As soon as the escape of air-bubbles ceases the perforated teat in the disk C is closed immediately by a tweezers or other suitable tool. The substance contained in the bottles is thereby entirely disoxygenized, and can then be preserved in the bottle for an indefinite period of time. In most cases this operation of driving out the air is sufficient; but in some special cases, where the substance has to be subjected to a high temperature of from 100° to 150° centigrade, the bottles are subjected to this temperature after the disoxygenation and the closure of the teat, which is accomplished without removing the bottles from the bath in which they are immersed. While the bottles are subjected to this high temperature, the closing disks bulge out and assume a hemispherical shape or sometimes a spheroid shape. The next step which has to be taken is the cooling off of the bath, which is done by admitting cold water to the hot bath, the hot water being drawn off at its upper level while the cold water enters at the lower part of the vessel in which the bath is provided. This mode of cooling off the hot bath permits a quick lowering of the temperature of the bath without injuring the bottles.

All the operations which are described—namely, the disoxygenation; second, the closing of the perforated teat; third, the raising of the bath to a high temperature, and fourth, the cooling off of the bath—are effected by making use of the same bath of water.

During the cooling off of the bottles the following peculiar phenomenon is produced: By the absence of the air contained in the substance in the bottle, and also by the enlargement of the volume of the substance which is produced by the raising of the temperature thereof, there takes place during the cooling off of the bath a contraction of the substance, which leaves a space in the neck of the bottle between the disk and upper portion of the substance in the same. The atmospheric pressure operates then on the hemispherical surface of the disk, so that the surface of the disk gradually changes from a convex shape and assumes a concave shape, leaving a depression therein, as shown in Fig. 2. The flange of the disk presses thereby with considerable force on the rim of the bottle, so that the elastic gasket can be dispensed with as well as the retaining screw-cap D, the closure of the bottle being in reality produced by the atmospheric pressure upon the disk, which presses it against the exterior circumference of the rim of the bottle.

If the bottles contain alimentary substances which are covered by a liquid—such as small peas, dressings, sauces, &c.—it may happen that during the disoxygenation some parts of the substances detach themselves and obstruct the small aperture in the teat of the disk, so that the substance in the bottle cannot give off its air-bubbles until the aperture has been opened by a needle. For the purpose of obviating this inconvenience a wire screen F is placed on the rim of the bottle below the disk, which screen arrests any small particles which might be forced upward against the same and prevents them from closing up the small aperture or air-hole in the teat of the disk, so that even if some of the openings of the screen are closed there will always be a sufficient number left to permit communication with the perforated teat. The bottles, jars, or other vessels have to be filled completely before the closing operation is started; but during the disoxygenation the volume of the escaping air leaves in the bottle a partial vacuum, which is produced by the diminution of the volume of the cold liquid contained in the same.

If it be desired to preserve milk—for instance, in the bottle or vessel which can resist all changes of climate—the bottle or vessel has to be completely filled by the following process in order to prevent any fermentation. The bottle which is to be subjected to treatment contains cold milk, above which remains a small empty space in the neck at a less pressure than the atmospheric pressure. The closed bottle is then held by its retaining-cap on a receptacle R, which is provided in its bottom with an opening of sufficient size for the bottle-neck, in which receptacle is placed a body of milk which has been heated to a high temperature. A second perforated teat G′ is then pierced in the disk by a piercing-needle U. At the moment when the needle is withdrawn the hot milk is drawn quickly into the neck of the bottle by the vacuum which exists in the space S above the level of the milk in the same. The teat G′ is then closed and the milk in the bottle is sealed entirely by sterlized milk at high temperature without the contained milk having been subjected to the least contact with the atmosphere. The bottles, jars, boxes, or vessels which are treated and filled in this manner can be kept for any length of time and can be shipped without change in the condition of the milk, which without this precaution would become sour and deteriorated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the neck of a bottle or other vessel, a circumferentially-flanged concave disk composed of thin expansible and contractible metal and having a small apertured teat integral therewith and adapted to be closed by compression, and means for firmly securing the disk to the neck, whereby when heat is applied to the bottle and the disk bulged or expanded the same is retained, said teat being contained in the concavity of the contracted disk, substantially as set forth.

2. The process herein described of sealing bottles, jars, boxes, or other suitable vessels hermetically, which consists in tightly applying a disk, provided with a suitable aperture, to the mouth of the vessel, expelling the air

from the contents of the vessel by subjecting the same to a gradually heated water-bath, then closing the air-aperture, next increasing the temperature of the bath to or above the boiling-point, and then slowly cooling off the water-bath, by drawing off the hot water at a high level and admitting cold water at a low level whereby the closing-disk is forced by the atmospheric pressure tightly on the mouth of the vessel and the same hermetically sealed thereby, substantially as set forth.

3. The process herein described of hermetically sealing bottles and other vessels, which consists in filling the same with the substance to be preserved up to a certain distance from the mouth of the vessel, applying tightly to the mouth of the vessel a disk provided with an air-aperture, disoxygenizing the contents of the vessel by slowly heating the same, closing the air-aperture in the disk, heating the contents of the vessel to a temperature at or above the boiling-point, piercing an air-aperture into the closing-disk, while keeping the head of the vessel submerged in a similar liquid which is contained in the vessel, filling the space left above the contained liquid by drawing in the superposed liquid, and closing the hole pierced into the disk, and gradually reducing the temperature in the vessel, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS MATHIEU GUSTAVE JEAN LOUSTALOT.

Witnesses:
CLYDE SHROPSHIRE,
EDOUARD BARBARY.