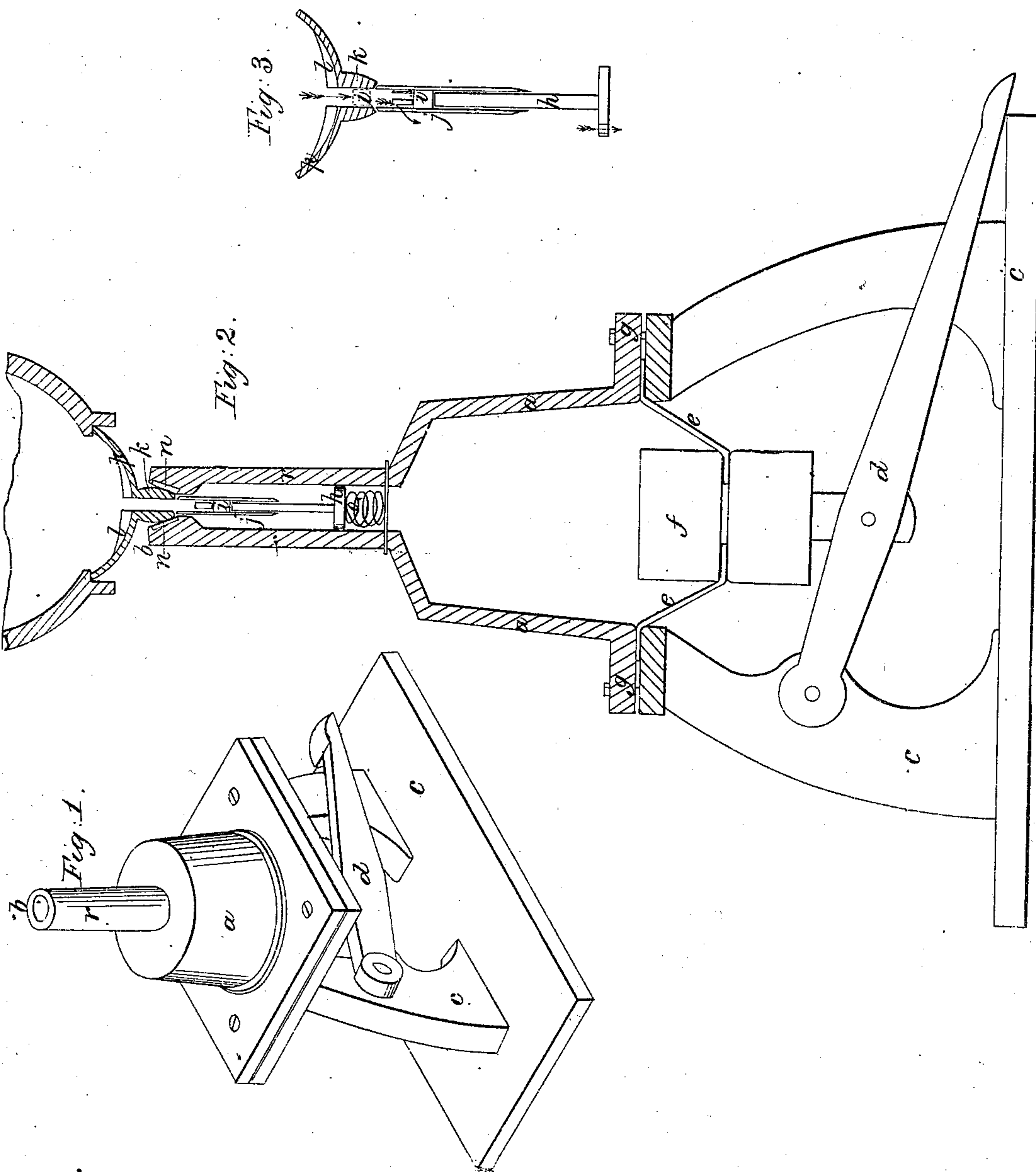


H. H. ELLIOT.
EXHAUSTING AND SEALING APPARATUS.

No. 13,291.

Patented July 17, 1855.



UNITED STATES PATENT OFFICE.

W. H. ELLIOT, OF PLATTSBURG, NEW YORK.

IMPROVEMENT IN DEVICES FOR SEALING PRESERVE-CANS.

Specification forming part of Letters Patent No. **13,291**, dated July 17, 1855.

To all whom it may concern:

Be it known that I, W. H. ELLIOT, of Plattsburg, county of Clinton, State of New York, have invented a new and Improved Mode of Exhausting and Sealing Preserve Cans and Bottles; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in removing water or other liquid from preserve-bottles for the purpose of producing a more perfect vacuum than can be obtained by other means, said liquid being placed in such connection with a vacuum in the pump that it will fall by its own weight from the bottle into said vacuum, leaving a perfect vacuum in the bottle; and in the combination of certain devices which, with or without a liquid in the bottle or vessel to be exhausted, may be used to exhaust the same; and my invention further consists of a device by which the liquid after it leaves the bottle is made to assist in sealing the bottle, said device consisting of a plug or seal and the tube and plunger for carrying said seal to its place.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, reference being had to the accompanying drawings and the letters of reference marked thereon, the same letters indicating the same part in each figure.

Figure 1 is an isometrical drawing of a diaphragm-pump; *a*, the cylinder; *b*, the mouth of the pump; *c c*, the frame; *d*, the lever; *e*, the neck.

Fig. 2 is a perpendicular section of a diaphragm-pump, showing the sealing apparatus in the neck, with a part of a bottle having a metallic tubular stopper in its mouth, and the tube of the stopper placed in the mouth of the pump, as when used; *e*, the diaphragm; *f*, the piston, which is in two parts, and secured together upon the inner edge of the diaphragm, so as to make an air-tight joint; *g g*, bolts which fasten the cylinder to the frame. Between the cylinder and the frame the outer edge of the diaphragm is secured, as the inner, the only inlet or outlet to the pump, is its mouth, there being no valve in it.

Fig. 3 is a sealing device; *j*, a steel tube which serves for cutting out the plug, and for placing said plug in the stopper of the bottle; *k*, the plun-

ger, which is held against the plug *i* by spiral spring *o*. The plunger, steel tube, and plug are thrown a little way out of the mouth of the pump when at liberty by the spring; but when the tube *k* of the stopper *p* is placed in the mouth of the pump the plunger, together with the steel tube containing the plug, is depressed, as seen in Fig. 2. The lever in the figures is depressed, but when raised the piston and diaphragm occupy nearly the whole of the cylinder.

The operation of exhausting and sealing with this apparatus is done in the following manner: Take a bottle and pack it full of fruit or any preservable substance, and then fill the bottle nearly to the shoulder within the mouth with water or other liquid, place a metallic tubular stopper in the bottle and seal around its edges with some suitable wax. The bottle should then be completely filled with the liquid, so that no air remains in it. Then raise the lever of the pump and fill the remaining space in the cylinder and neck with the liquid. Both the pump and the bottle being now perfectly filled, place the tube of the stopper in the mouth of the pump and press it gently down upon the india-rubber lining *n*, so as to insure an air-tight connection. Then place one foot upon the end of the lever and depress it. This opens a large vacuum within the cylinder of the pump, into which the water runs from the bottle by its own weight, leaving a vacuum in its place. This vacuum must be perfect, or nearly so, because no air was in the bottle or the pump when the operation commenced. The water, in passing from the bottle, follows the direction of the arrows in Fig. 3. It first passes through the tube of the stopper into the steel tube, then through the openings in the sides of the steel tube into the neck of the pump, through openings in the plunger into the cylinder, and when the bottle is properly drained the lever is suddenly allowed to rise, when the liquid rushes up the neck of the pump, striking the plunger with considerable force, driving the plug *i* into the tube of the stopper, thus forming a perfect temporary seal, which is afterward made permanent by wax or solder. The steel tube and the tube of the stopper form a perfectly continuous opening, which is insured by the steel tube being received a little way into the

mouth of the stopper-tube, and held there by the spiral spring.

The plug is made by taking a slice of potato or other suitable material of a proper thickness. The lower end of the steel tube is then pressed through it, which cuts out and retains a plug exactly suited to the purpose. The plug is then pushed up to the openings in the steel tube, which may then be placed on the plunger in the mouth of the pump.

C are projections on the inside of the stopper to prevent anything within the bottle from closing the tube by falling over it. Dotted lines in Fig. 3 show the position of the plug when driven home.

As the time allowed for draining the bottle after exhausting and before sealing must be limited, and consequently more or less of the liquid left upon the substance preserved, it becomes necessary to use such a liquid in all cases as will have none but a decidedly preservative influence.

It is well known that brandy preserves peaches, as well as nearly all kinds of fruit.

All kinds of fruit are preserved also in sirup, animal substance in brine, &c. Any of these liquids may serve for the purpose of exhausting in their proper place. The quantity of liquid left in the bottle after exhausting must always be so small as not to affect the taste of the preserve in the slightest degree, and consequently can have but one influence upon it, and that a preservative one. In case any difficulty arises in this respect, the juice of the fruit itself may always be safely relied on for this purpose.

The tube *k* in the stopper should be slightly tapering, its inner end being the smaller, so that the plug *i* may easily enter the tube, but require more force than the weight of the atmosphere to drive it through the tube into the bottle.

It has been found by experiment that a tube which contracts one-eighth of its diameter at its inner end when plugged with fresh potato will resist a force equal to not less than ten nor more than sixteen atmospheres, so that no difficulty need be apprehended from the pressure of the atmosphere if the tube be immediately sealed with wax after leaving the pump.

A very convenient way of sealing these tubular stoppers is by placing over the end of the tube a metallic cap with wax under it.

Among the devices employed in this process and mentioned in the following claim, the liquid used in exhausting and the force—viz., gravity—made use of for removing the liquid from the bottle, are considered of great importance in the production of a vacuum by this process.

Among the important features of the exhausting apparatus may be considered the peculiar combination and arrangement of the lever *d*, the cylinder or chamber, with its elastic bottom or diaphragm, the orifice serving both as ingress and egress, with its elastic or

yielding lining, and the liquid used within the chamber for the purpose of expelling the air. Among those of the sealing devices may also be considered the plug or seal *i*, so arranged that during the process of exhaustion it leaves the mouth of the stopper *p* open, but when exhaustion is completed is carried to its place in the stopper by the plunger *h*, so as to seal the exhausted vessel, said plunger being operated by the reactionary motion of the exhausting devices, by a lever, or by any mechanism applied for the purpose.

The peculiar form of the plug or seal represented in the drawings is not necessary to success. A cap of the same or any yielding material may be carried by the plunger or its equivalent device and placed upon the end of the tubular stopper *p*. The steel tube *j*, which cuts out the plug and holds it upon the end of plunger *h*, may be dispensed with and the plug held by other means. The stopper may be so constructed as to retain the plug at one point and let the fluid or liquid contained in the bottle pass out by it; and when exhaustion is completed it may be driven farther into the stopper by the plunger, to where it fills the tube of the stopper perfectly, and so seal the bottle, thus making the stopper serve one of the purposes for which the tube is used; but the simplest of all these equivalent devices are those which are represented in the drawings. The slots or openings in the side of the steel tube *j*, through which the fluid passes from the bottle to the exhausting-chamber, may, however, be dispensed with, and the tube still used with equal advantage by removing the spring *o* below the plunger *h*, so that the plunger, tube, and plug may all drop down out of the way, so as to leave the tube *k* of the stopper open during exhaustion. Then, when the plunger is caused to rise, the tube *j* and plug *i* are carried up with it till the tube comes in contact with the stopper and stops; but the plunger, continuing its motion, carries the plug *i* out of the tube *j* into the tube *k* of the stopper, and thus seals the vessel.

By constructing the bottles with a groove to receive the edge of the stopper, instead of a shoulder, the wax or cement may be melted and poured into the groove while the bottle is heated, which would give the cement a firmer hold upon the glass. The stopper may then be set into its place.

In certain cases it may be necessary to use a perforated plate, instead of projections, on the inside of the stopper *p*, to prevent the contents of the bottle from stopping up the tube *k* during the process of exhaustion.

Having described my invention, I claim—

The use of the plug *i*, or its equivalent, in sealing exhausted vessels, with or without the tube *j*, in connection with the plunger *h*, or its equivalent, operating in the manner herein set forth.

Witnesses:

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