

No. 711,431.

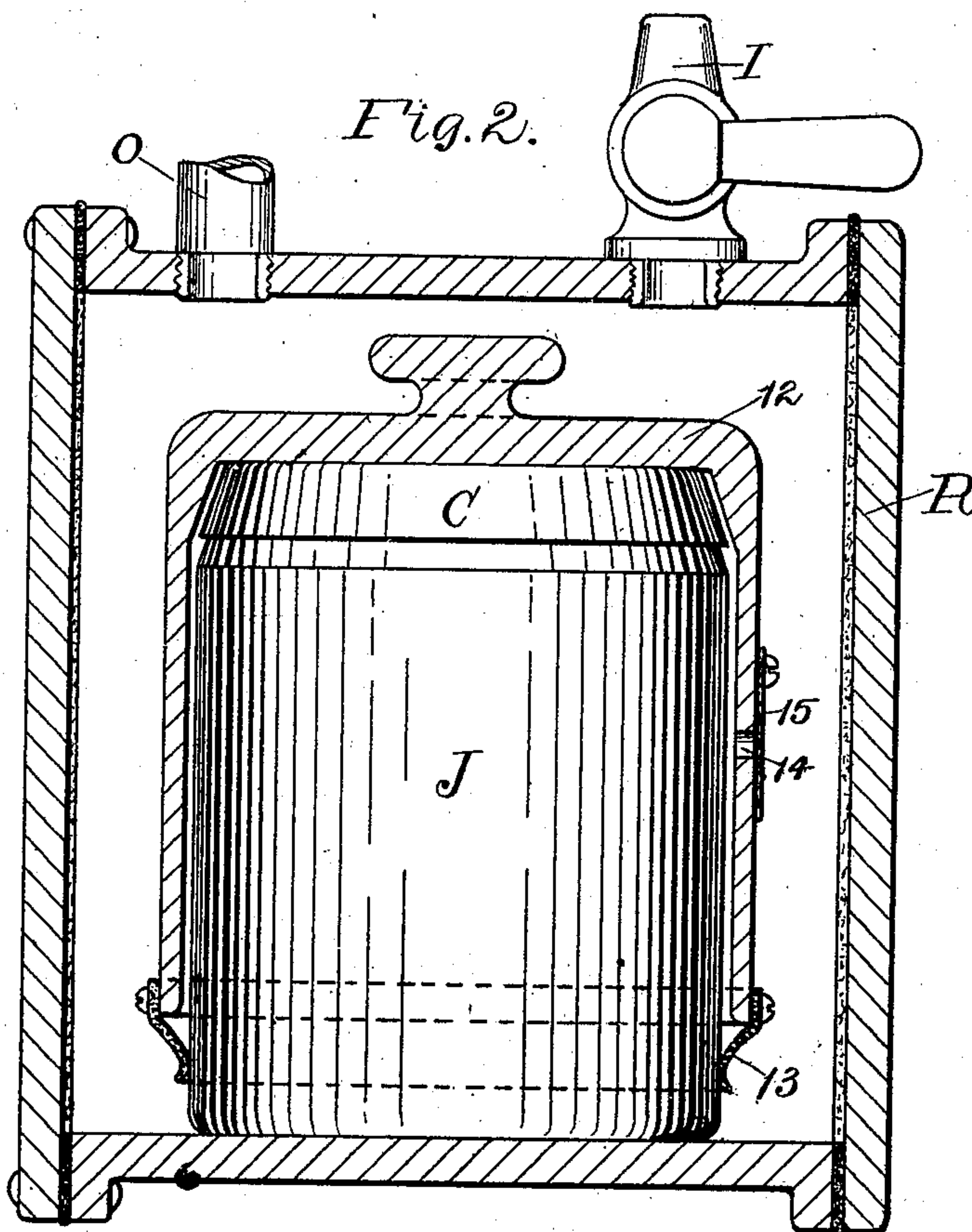
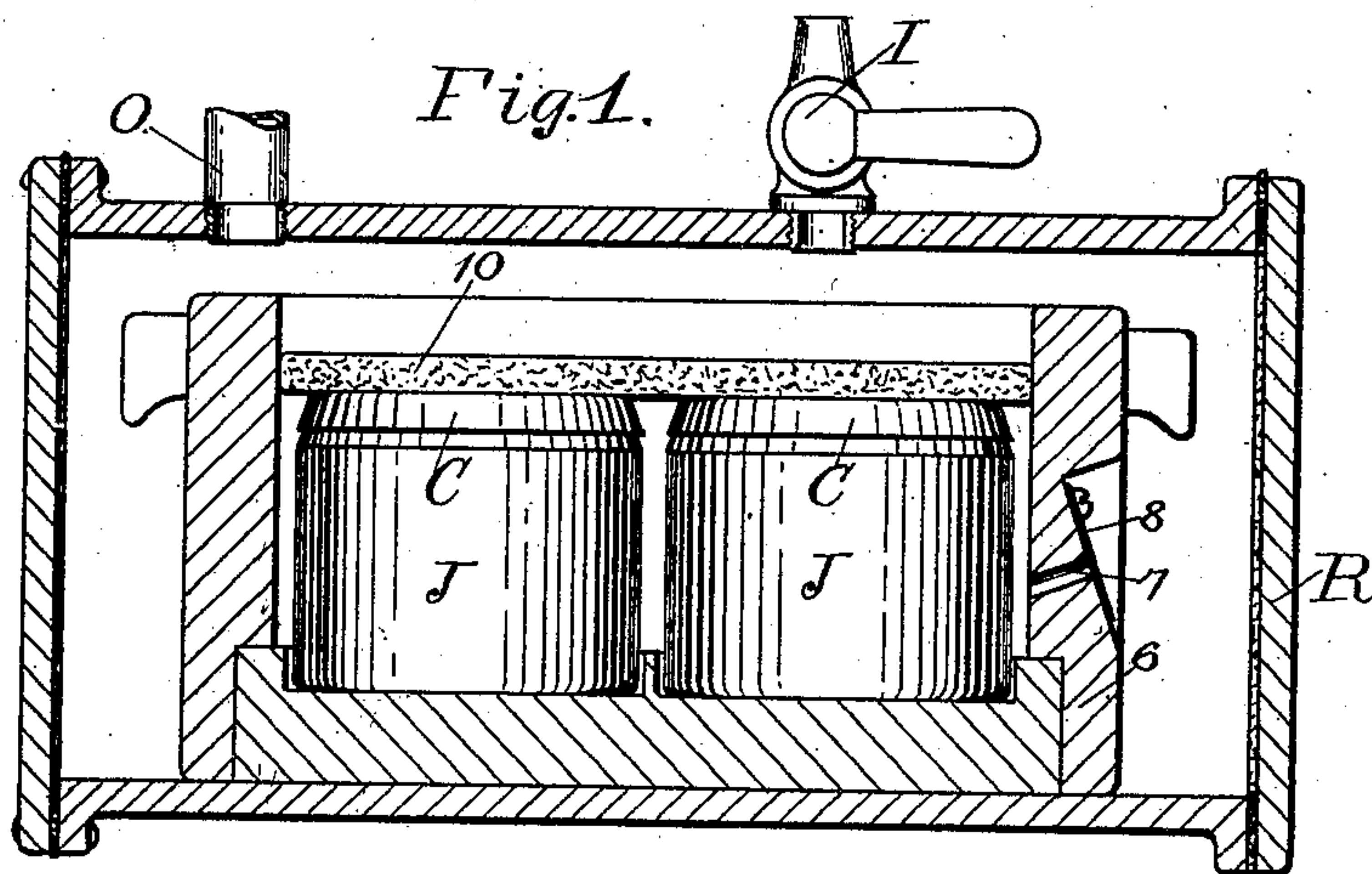
Patented Oct. 14, 1902.

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PROCESS OF EXHAUSTING AND CLOSING HERMETICALLY SEALED JARS.

(Application filed Jan. 5, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PROCESS OF EXHAUSTING AND CLOSING HERMETICALLY-SEALED JARS.

SPECIFICATION forming part of Letters Patent No. 711,431, dated October 14, 1902.

Application filed January 5, 1901. Serial No. 42,171. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. LORENZ and WILLIAM H. HONISS, citizens of the United States of America, and residents of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Processes of Exhausting and Closing Hermetically-Sealed Jars, of which the following is a specification.

10 This invention is an improved process relating to the art of obtaining an improved vacuum in hermetically-sealed jars, cans, and similar receptacles and for hermetically closing those jars while *in vacuo*, whereby the readmitted air-pressure is utilized for automatically closing the joint to make the seal between the jar and the cap before the air can reach the joint.

20 In order to preserve food and other products from deterioration by contact with air, it is customary to inclose them in hermetically-sealed jars from which the air has been previously exhausted to a suitable extent to produce the desired vacuum. Among the many difficulties attendant upon the commercial preparation and preservation of food in this manner is that of reliably sealing the closure-joint without readmitting the air, so as to preserve the vacuum previously obtained.

30 The results of these operations as heretofore performed are very uncertain, no reliable way being yet known of testing the jars after sealing in order to ascertain the degree of vacuum therein. The operation of sealing jars of this class is ordinarily performed by placing them after being filled in the closed receiver of an air-exhausting apparatus, from which the air is then exhausted. Although the degree of vacuum obtained in the receiver may readily be determined by means of a vacuum-gage, it is by no means certain that a similar vacuum exists within the jars. If the caps rest lightly upon their gaskets, when in position upon the jars, to allow of the free exit of the air during the exhausting operation, it frequently happens that they rest only upon the higher or larger portions of the gasket, due to irregularities in the jars, the caps, or gaskets, leaving intermediate passages,

which while they facilitate the ready exit of the air from the jars, and hence allow of a vacuum being obtained within the jar equal to that within the receiver, also serve to allow the air-pressure which is subsequently readmitted to the receiver to reënter the jars to a greater or less extent before the caps are forced down sufficiently to effect a hermetic closure, in many cases preventing the sealing altogether by readmitting the full atmospheric pressure within the jars. If, on the other hand, the caps are pressed tightly down or held down by weights or springs during the exhausting operation in order to prevent this readmission of the air, this measure also defeats its intended purpose to a greater or less extent, and certainly to an indeterminate extent, since it operates to prevent the ready exit of the air during the exhausting operation, thereby confining within the jar an indeterminate amount of air, which, even if not sufficient to prevent the external pressure from holding the cap firmly in position, subsequently operates to deteriorate the contents of the jar, and that usually after it has passed from the manufactory to the store or warehouse of a customer perhaps in a distant part of the country, thereby injuring the reputation of the goods.

The object of this improved process is to effect the reliable sealing of the jars, making the seal by the automatic operation of the readmitted air without permitting that air to enter the interior of the jars, even though the jar-covers may, as is preferable, have been left loosely in place during the exhausting operation.

This process consists in exhausting the air from the exterior and the interior of the closure-joint employed for sealing the jar, then readmitting the air-pressure and directing it so as to press the jar and cap together, while obstructing its passage to the closure-joint sufficiently to enable the readmitted air-pressure to automatically close the joint and make the seal before the air itself can reach the joint. In our preferred application of this process the way or passage which the readmitted air must take to reach the joint di-

rects it against a movable presser, which is thereby automatically forced against the jar cap or caps.

The accompanying drawings represent two of the many kinds of apparatus which may be utilized or devised to carry out this process.

Figure 1 is a side view in longitudinal section, showing a receptacle for containing a plurality of jars located in position within a receiver for the operation of this process. Fig. 2 is a side view, also in section, showing another apparatus in position and adapted for acting upon a single jar.

In the apparatus illustrated in Fig. 1 the jars J are contained in an open-sided receptacle 6, placed within a receiver R. The caps C of the jars are assumed to rest lightly in position and are surmounted by a presser 10, which is made of rubber or material substantially impervious to air and preferably of light weight. This presser has an area considerably exceeding the aggregate area of the jar-caps which it covers and more or less substantially closes the open side of the receptacle 6, according to the area of the plate or according to the perfection or accuracy with which the process is to be carried out. If, as is preferable for the most uniform and reliable results, the presser entirely closes the open side of the receptacle, an outlet for the contained air should be provided either through the presser or between the presser and the receptacle or in the side of the receptacle, as shown at 7, and this outlet is preferably provided with a return check-valve 8 or an equivalent device which permits the ready exit of the air, but prevents its return.

With such an apparatus as that above described the operation of this process is as follows: The filled jars, with their gaskets and caps, are placed in position in the receptacle 6, the presser 10 is applied, and the receptacle placed within the receiver R of the exhausting apparatus, having an outlet O and an inlet-valve I. As the air is exhausted from within the apparatus the caps rest lightly upon their gaskets, thus permitting the ready exit of the air from the interior of the jars, so that at the conclusion of the exhausting operation the vacuum within each of the jars will be substantially equal to the vacuum in the receptacle 6 and the receiver R. The external air-pressure is then readmitted through the valve I, and being obstructed by the presser on its way to the closure-joints, by which it would otherwise be liable to reënter the jar, it acts upon that presser, forcing it down with a pressure proportional to its area, thus sealing the jars. When a flexible presser is employed, the readmitted air-pressure is distributed uniformly, even upon jars of differing heights. The receptacle 6, with the sealed jars, may then be removed from the receiver and the air readmitted to the interior of the receptacle by opening the return check-valve 8 or by lifting the edge of the presser, after which

the receptacle may be reloaded and the process repeated upon succeeding lots of jars.

The apparatus shown in Fig. 2 is adapted to operate upon a single jar, which is sometimes desirable in case of large jars. In this case the presser consists of a cap 12, inclosing the mouth or closure end of the jar J, a hermetic closure between the rim of the presser-cap and the outside of the jar being made by means of the ring or band 13, of rubber or similar flexible material, attached to or integral with the presser-cap. The operation of our process with such an apparatus is substantially like that already described. The jar and its inclosing apparatus are placed in the receiver R and subjected to the exhausting operation through the outlet O. If the band 13 be sufficiently flexible, it will permit the ready exit of the air from the interior of the jar, or an outlet 14, covered by a return check-valve 15, as shown in Fig. 1, may be provided, if desired. When a proper vacuum has been obtained, air is readmitted through the valve I and operates upon the presser-cap 12 to force down the jar-cap and seal the closure-joint without being able to reach the exterior side of that joint on account of the obstruction formed by the inclosing presser-cap.

Although substantially improved and in some cases commercially satisfactory results may be obtained by causing the readmitted air to act upon a presser which substantially obstructs the passage of the air to the exterior of the closure-joint, the best effects of this process are obtained by entirely closing all passages or ways by which the readmitted air could reach the closure-joint from its exterior side. It is therefore preferable where the best results are desired to make the presser not only obstruct but entirely close that way air-tight by means of gaskets or packing. When an air-tight obstacle is imposed against the return of the air to the exterior of the closure-joint, an inlet-valve will be found most convenient for readmitting the air thereto after the conclusion of the sealing operation in order to balance the pressure against the outer side of the presser and enable the jars to be removed.

We claim as our invention—

1. The process of obtaining and maintaining a vacuum in a jar of the class specified having an externally detachable cap, and of automatically sealing the closure-joint thereof, which consists in exhausting the air from the interior and exterior sides of the closure-joint, then readmitting air-pressure and directing it to automatically press the cap and jar together and make the seal while substantially excluding air-pressure from the joint.

2. The process of obtaining and maintaining a vacuum in a jar of the class specified having an externally detachable cap, and of automatically sealing the closure-joint thereof, which consists in exhausting the air from

the interior and exterior sides of the closure-joint, then readmitting air-pressure and directing it to automatically press the cap and jar together and make the seal while substantially excluding air-pressure from the joint, and then readmitting air-pressure to the exterior of the joint.

3. The process of obtaining vacuum in a jar of the class specified having an externally detachable cap, and of automatically sealing the closure-joint thereof, which consists in placing the jar within a chamber, with a presser placed adjacent to the jar or cover, then exhausting the air from the chamber and the jar and from both sides of the presser, and then readmitting air to the outer side of the presser while substantially excluding it from the inner or jar side thereof, whereby the cover will be forced down to seal the closure-joint automatically by the pressure of the readmitted air upon the outer side of the presser.

4. The process of obtaining and maintaining a vacuum in jars of the class specified, and of automatically sealing the closure-joints thereof, which consists in placing the jars within a tank or chamber with their caps or covers loosely supported, and with a presser placed adjacent to the caps or covers, to prevent displacement thereof during the exhausting operation, then exhausting the air-pressure from the tank and the jars and from both sides of the presser, and then readmitting the air-pressure to the outer side

of the presser while substantially excluding it from the inner or jar side thereof, whereby the covers will be forced down to seal their closure-joints automatically and with substantial uniformity, by the pressure of the readmitted air upon the outer side of the presser, and then readmitting the air-pressure to the inner or jar side of the presser.

5. The process of obtaining and maintaining a vacuum in jars of the class specified, and of automatically sealing the closure-joints thereof, which consists in placing the jars within a tank or chamber with their caps or covers loosely supported, and with a flexible blanket placed adjacent to the caps or covers, to prevent displacement thereof during the exhausting operation, then exhausting the air from the tank and the jars and from both sides of the blanket, and then readmitting the air to the outer side of the blanket while substantially excluding it from the inner or jar side thereof, whereby the covers will be forced down to seal their closure-joints automatically and with substantial uniformity, by the pressure of the readmitted air upon the outer side of the flexible blanket.

Signed at Hartford, Connecticut, this 29th day of December, 1900.

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Witnesses:

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