

No. 685,428.

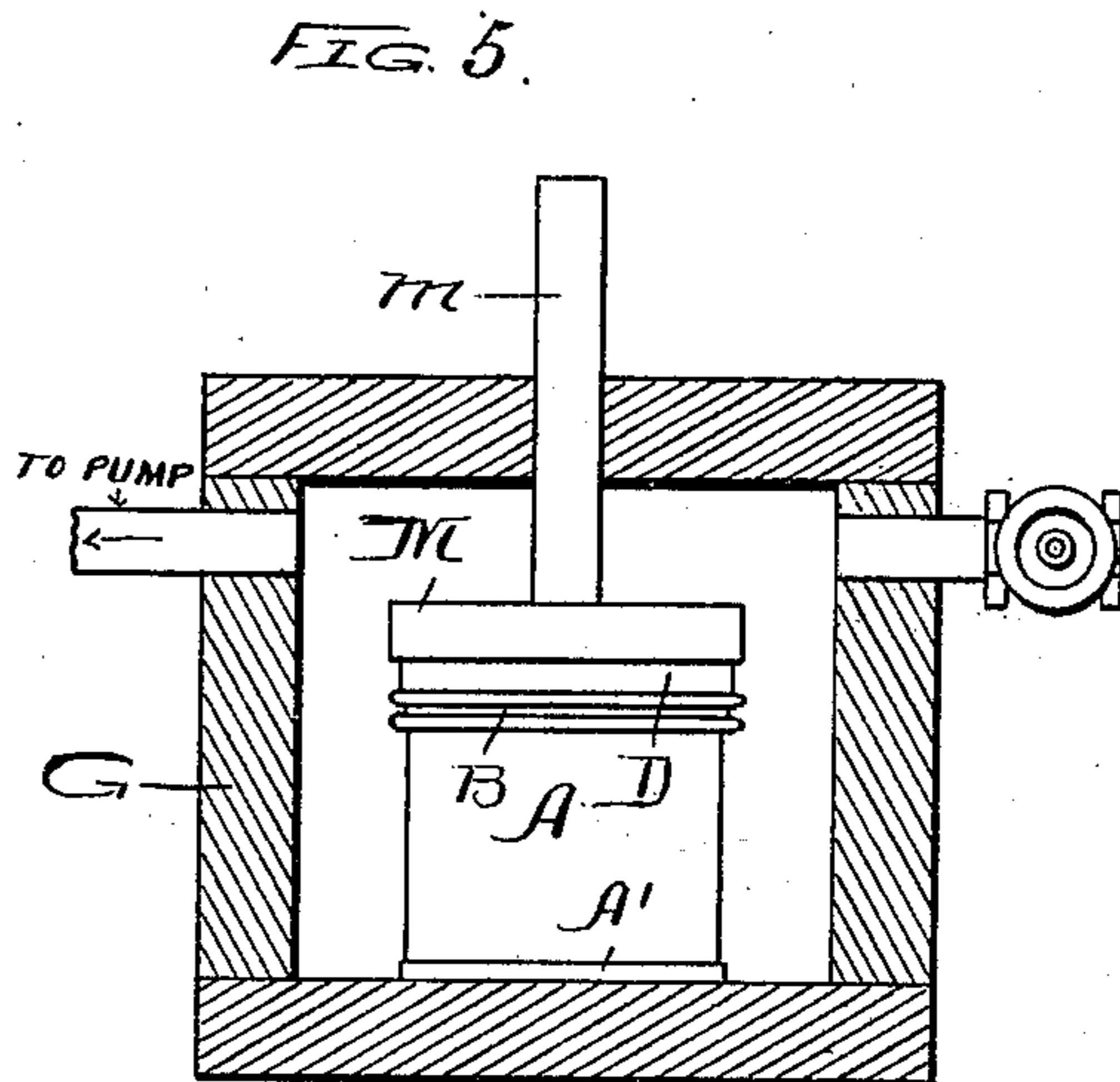
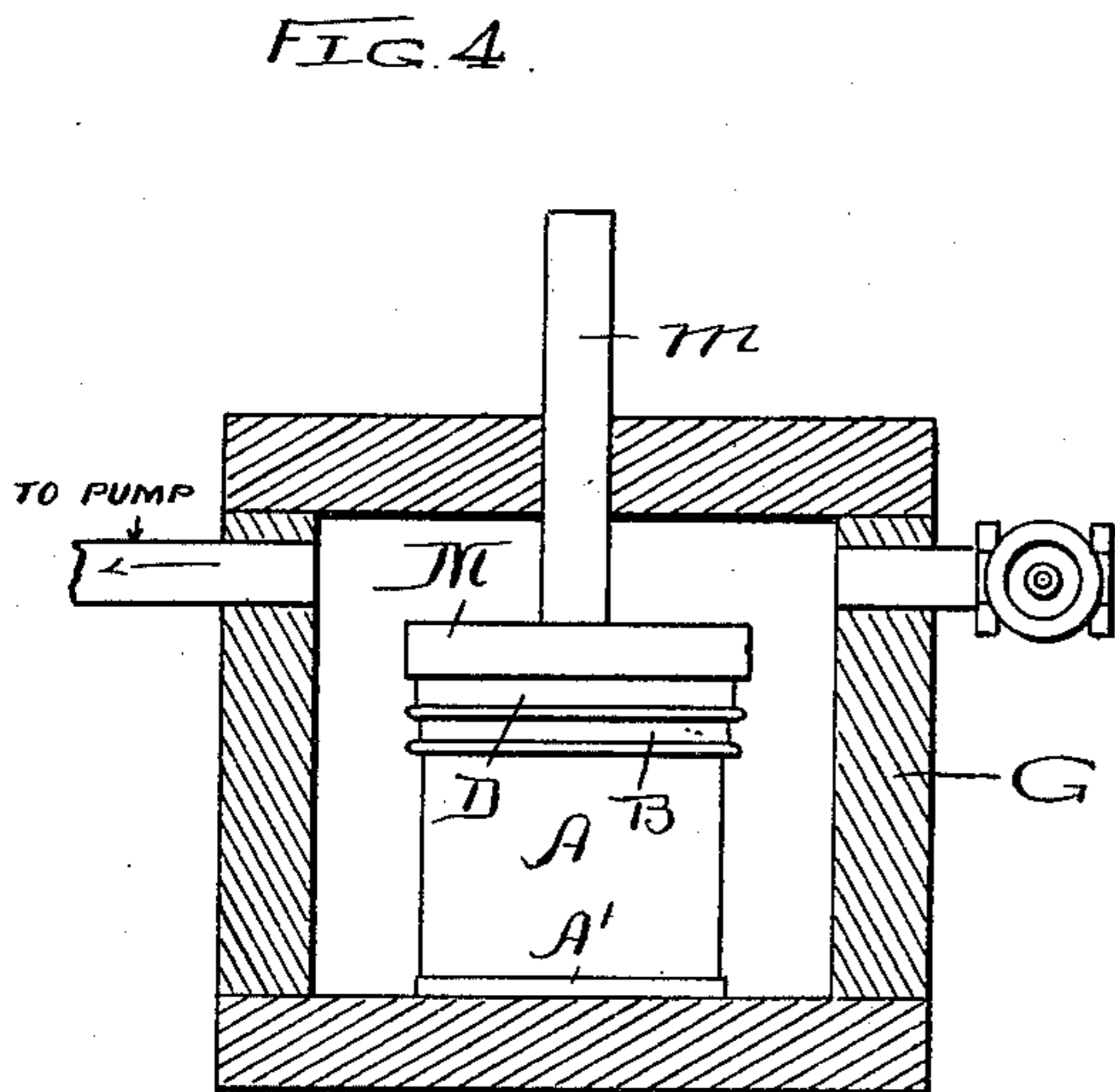
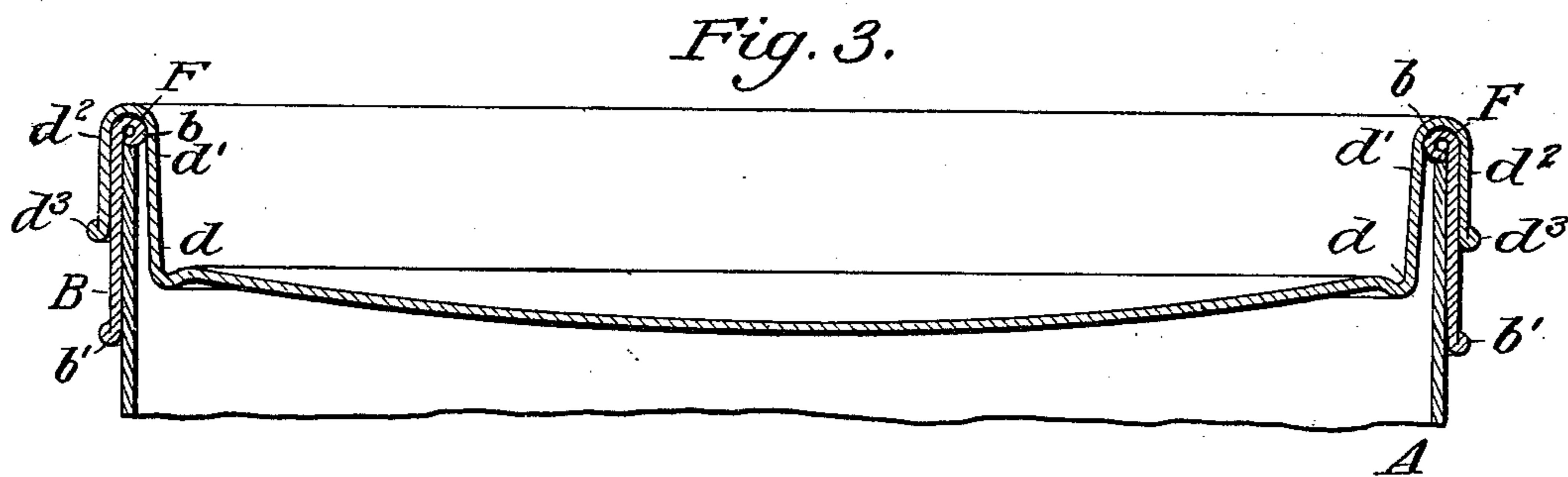
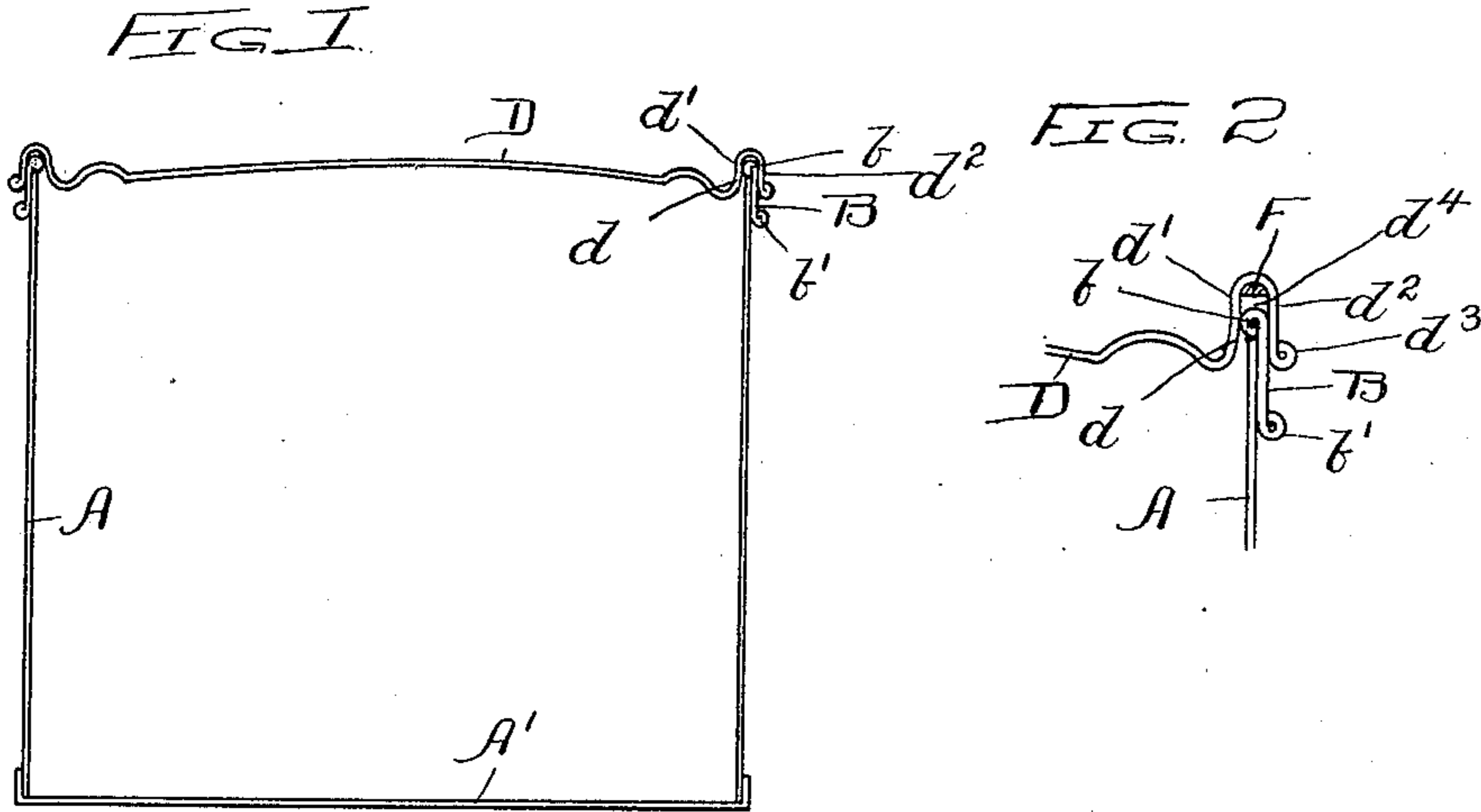
Patented Oct. 29, 1901.

E. NORTON.

ART OF VACUUM SEALING SHEET METAL CANS.

(Application filed Oct. 22, 1900.)

(No Model.)



WITNESSES:

Lew. C. Lewis  
H. W. Munday.

INVENTOR:  
EDWIN NORTON

BY Munday Evans & Adecock  
HIS ATTORNEYS,

# UNITED STATES PATENT OFFICE.

EDWIN NORTON, OF MAYWOOD, ILLINOIS, ASSIGNOR TO THE AUTOMATIC VACUUM CANNING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## ART OF VACUUM-SEALING SHEET-METAL CANS.

SPECIFICATION forming part of Letters Patent No. 685,428, dated October 29, 1901.

Application filed October 22, 1900. Serial No. 33,938. (No specimens.)

*To all whom it may concern:*

Be it known that I, EDWIN NORTON, a citizen of the United States, residing in Maywood, in the county of Cook and State of Illinois, have invented a new and useful Improvement in the Art of Vacuum-Sealing Sheet-Metal Cans, of which the following is a specification.

My invention relates to improvements in the art of sealing sheet-metal cans, and more particularly to the sealing of cans the covers of which are intended and adapted to be sealed to the cans *in vacuo* or by a vacuum or atmospheric-pressure seal and by a mechanical seal or seam.

Sheet-metal cans of the kind or class to which my invention relates have heretofore been patented to me in Letters Patent No. 618,518, of January 31, 1899, and in Letters Patent No. 618,718, of the same date, granted to myself and Bernard H. Larkin, and their process or method of use is fully set forth and described in Letters Patent No. 602,096, granted to me April 12, 1898. As will be readily understood by those skilled in the art by reference to the patents above mentioned, heretofore in the practical operation of vacuum-sealing sheet-metal cans the cover is so constructed that it may rest loosely in place on the mouth of the can while the air or gas is being pumped out of the same and out of the receiver containing the can, the construction being at the same time such that the cover may accurately and properly seat itself automatically by the atmospheric pressure being suddenly restored to the receiver by admission of air thereto, and after the cover has been thus hermetically sealed and secured to the can-body by the vacuum or atmospheric-pressure seal the can thus hermetically sealed is removed from the receiver and placed in a seaming-machine, and the cover is then additionally secured to the can-body by a mechanical seal or seam, which locks the cover on the can-body and prevents the cover coming off and the contents of the can being spilled in case the vacuum or atmospheric-pressure seal should for any reason give way or prove defective. Two separate and distinct operations are thus performed in sealing or securing the cover upon and to the can-

body in the cans of said patents above referred to, one a vacuum or atmospheric-pressure sealing operation, which takes place in the receiver, and the other the mechanical sealing or seaming operation, which is performed upon the can after it has been removed from the receiver. The performance of these two separate and distinct operations requires time and labor and adds materially to the cost. Sometimes, too, there is liability of the vacuum or atmospheric-pressure seal being somewhat defective, thus permitting admission of air to the can before the mechanical sealing or seaming operation is performed, as the sealing of the cover upon the packing-ring of the can is accomplished solely through the agency of the atmospheric pressure, and although the subsequent mechanical sealing operation may make the can perfectly tight, still the goods may spoil or deteriorate by reason of air entering the can while the can is being removed from the receiver to the seaming-machine before the mechanical sealing or seaming operation is performed thereon.

The object of my invention is to provide an improved process of vacuum-sealing sheet-metal cans in which the cover is sealed and secured to the can-body both by a vacuum or atmospheric-pressure seal and by a mechanical seal and the operation of which is such at the same time that the mechanical sealing and securing or seaming and locking of the cover to the body of the can is performed while the can is yet in the receiver and before the air is restored thereto or the vacuum broken, and thus enable me to save one handling of the can—to wit, that for the mechanical sealing operation after the can has been removed from the receiver.

A further object of my invention is to simplify the process of sealing of the can and enable the cover to be hermetically sealed and secured to its body much more rapidly and cheaply than in the methods heretofore in use.

My invention consists in the method or process of hermetically sealing and securing covers on sheet-metal cans by a combined mechanical seal and a vacuum or atmospheric-pressure seal comprising, first, placing the can and its cover loosely in place thereon within

a receiver; second, exhausting the air from the receiver and from the can through the open mouth thereof; third, mechanically sealing and securing the cover on and to the can while in the receiver and while the air is exhausted therefrom, and, finally, restoring the atmospheric pressure outside the can or vessel, and thus additionally sealing and securing the cover on and to the can by a vacuum or atmospheric-pressure seal.

To enable my invention to be more readily understood by those skilled in the art, I have illustrated in the accompanying drawings a form of can and also a form of apparatus suitable for use in practicing my invention, the same being that which I prefer to use and the simplest forms known to me for the purpose.

I have discovered and demonstrated by numerous experiments that by making the can-body and its cover of a particular construction, herein described, I am enabled to pump the air out of the can while the cover is loosely in place thereon in the receiver, as required to produce the vacuum or atmospheric-pressure seal, and also to cause the cover to be mechanically locked, seamed, or secured upon and to the body by a straight downward movement of the cover on the can-body, which movement can be performed while the can is yet in the receiver and before the vacuum is broken by admission of air thereto. In other words, I have discovered and demonstrated by experiments that by combining the vacuum or atmospheric-pressure seal of the cover to the body with a peculiar construction of friction-cover and can-body, producing an effectual mechanical locking or seaming of the can to the body by a simple friction fit produced by forcing the cover on the body by a straight downward movement, which is adapted to be and is capable of being performed while the can is *in vacuo* or in the receiver, an effectual and practical hermetic sealing and securing of the cover on and to the body will result without liability to leak or for the cover to loosen or come off in handling, shipping, storing, or keeping the cans for any length of time desired. As will be seen from the drawings, this preferred construction of can for use in practicing my invention has a flange or roll at its upper end, combined with a cover having a flange forming a tight wedging frictional fit therewith, the can and cover having a packing-ring between them, so that the can may be placed in a receiver with its cover loosely in place thereon to permit the air to be exhausted therefrom and so that then while the can is still in the receiver the cover may be forced home on the can-body by a straight downward movement, thus mechanically sealing and securing the cover on the can by the tight wedging frictional fit between the two, and then when the atmospheric pressure is restored to the receiver and the can removed the cover is additionally sealed and secured thereto by the vacuum or atmospheric-pres-

sure seal. In practice I prefer to provide the upper end of the open-mouth can-body with a seamless ring, fitting on the outside thereof and soldered thereto and having an internal roll at its upper edge, and combined with a cover adapted to be hermetically sealed and secured to the can-body by a vacuum or atmospheric-pressure seal, and provided with an exterior flange fitting the cylindrical portion of the seamless ring on the can-body and also with an internal flange, the upper portion of which is substantially straight or parallel and the lower part or portion of which is inclined or wedging and engages with a wedging frictional fit the inner surface of the internal roll on the upper edge of the seamless ring on the can-body, said roll being tightly embraced between said internal and external flanges on the cover and operating to compress, when the cover is forced firmly down upon the body, the packing-ring, which is seated in the top of the annular channel formed by and between said internal and external flanges of the cover and which packing-ring is thus confined on all sides. The wedging friction fit between the two flanges on the cover and the roll on the upper edge of the seamless ring of the can-body, produced by the lower inclined or wedging portion of the internal flange of the cover, mechanically locks, secures, or seams the cover and body together so very firmly and tightly that the packing-ring is constantly held under great pressure and without any tendency of the parts to give or yield, and this mechanical wedging and frictional locking and securing of the two parts—cover and body—together is supplemented and aided by the coöperative action of the vacuum or atmospheric-pressure seal, which becomes effective the moment air is restored to the receiver or the sealed can removed therefrom. By this simple means I am thus enabled to secure the cover to the can-body by an effectual mechanical seal, lock, or seam while the can is yet in the receiver and before the air is admitted to the receiver, as all that is required is to force a presser-plate, piston, or plunger, extending into the receiver, down upon the cover of the can while it is *in vacuo* in the receiver. As the cover is thus locked and secured firmly and rigidly to the can-body and the packing held firmly compressed by such mechanical lock formed before the air is again admitted to the receiver, it will be seen that no opportunity is given for admission of air to the can by reason of any defective sealing of the cover on the body by atmospheric pressure.

In the accompanying drawings, forming a part of this specification, Figure 1 is a vertical sectional view of a can suitable for use in practicing my invention. Fig. 2 is an enlarged detail section showing the cover loosely in place on the can-body or in position for exhausting the air from the can. Fig. 3 is a similar view showing the cover seated or forced home on the can-body and united

thereto by the vacuum or atmospheric-pressure seal as well as by the mechanical or frictional-fit seal. Fig. 4 is a sectional view showing the can in the receiver with the cover loosely in place and the air being exhausted therefrom. Fig. 5 is a similar view showing the cover forced home while the can is yet in the receiver.

In the drawings, A represents the can-body, A' the bottom head of the can, and B the seamless ring secured at the upper end of the can-body, said seamless ring fitting outside the can-body and being provided with an inward-turned roll *b* at its upper edge and with a reversely-turned roll *b'* at its lower edge.

D is the cover, the same being provided with an interior annular flange *d d'*, the lower portion *d* of which is inclined or wedging and the upper portion *d'* of which is straight or parallel to the can-body. The cover D is also provided with an exterior annular flange *d<sup>2</sup>*, which is furnished with a roll *d<sup>3</sup>* at its lower edge. The interior annular flange *d d'*, in connection with the exterior annular flange *d<sup>2</sup>*, together form an annular channel *d<sup>4</sup>* between them, the upper portion of which receives the packing-ring F. The inclined or wedging lower portion *d* of the interior annular flange and which terminates in the straight or parallel portion *d'* causes the interior annular flange to have a very snug, tight, and wedging fit against the annular roll *b* at the upper edge of the seamless ring B, which roll *b* is also tightly embraced between the said interior and exterior flanges on the cover. As the packing-ring F is confined by the walls of the annular groove or channel and by the rolled upper edge *b* of the seamless ring B when the cover is forced down upon the can-body and as the friction fit between the walls of the annular groove *d* and the roll *b* holds the parts securely together, the packing is firmly compressed and a hermetically tight seal or seam is thus formed.

The operation is as follows: The can containing the articles to be preserved is first placed in the receiver G with the cover D resting loosely in place on the seamless ring of the can-body, so that the air may be freely exhausted from the can through its open mouth. The air is then pumped out of the receiver and can, the air passing freely out, as the cover simply rests loosely on the can-body with the roll *b* in the annular channel *d<sup>4</sup>* and embraced by the two flanges *d d'* and *d<sup>2</sup>* of the cover, so that the cover is kept in proper registry with the can-body and ready to be forced home thereon. The air being exhausted and a substantial vacuum produced in the can and receiver I next mechanically drive or press the cover home on the can-body, a straight downward movement being applied to the cover through a plunger M, the stem *m* of which passes through a suitable stuffing-box (not shown) in the top of the receiver. This mechanically or fric-

tionally locks and secures the cover on the can-body by reason of the wedging action of the lower inclined portion *d* of the internal flange of the cover terminating in the parallel portion *d'* of said flange in connection with the roll *b* on the seamless ring D and the external flange *d<sup>2</sup>*, which embraces the seamless ring on the outside. As the cover D is thus forcibly driven home on the can-body by the plunger the packing-ring F, seated in the upper part of the channel *d<sup>4</sup>*, is compressed by the roll *b* between itself and the cover-flanges, thus effectually and hermetically sealing the cover on and to the can-body while the can is *in vacuo* in the receiver. Air is next admitted to the receiver and its door opened, thus bringing the force of the atmospheric pressure to bear upon the can and its cover to aid in holding the cover on the can and in the maintenance of the hermetic sealing thereof by reason of the vacuum in the can, which thus produces a vacuum or atmospheric-pressure seal in addition to the tight friction-fit seal or mechanical seal already formed. The cover is thus double sealed and locked upon and to the body of the can, and it will be found, as my experiments demonstrate, that by this simple means the cans thus hermetically sealed will successfully withstand the usual and customary handling, shipment, and storage for any length of time without deterioration of contents or any tendency for the covers to loosen or for the cans to develop leaks. To open the can or remove the cover, a small prick or hole may first be made through the cover to break the vacuum or atmospheric-pressure seal, and then the cover may be pried off by any flat instrument or tool applied in the channel formed between the external roll *d<sup>3</sup>* on the outer flange *d<sup>2</sup>* of the cover and the annular roll *b'*, formed at the lower edge of the seamless ring B, which thus form shoulders to engage a tool in prying off the cover little by little at successive points of its circumference. The can may thus be readily and conveniently opened, and the opening is smooth-edged and the full diameter of the can and without any ragged, cut, or jagged edges, which is an advantage in cans for most uses, and especially for paints or like substances, and the cover D is not destroyed and is ready for use as an ordinary slip-cover to temporarily close the can again after it has once been opened and while its contents are being used. If desired, the cover may by application of more force be pried off without first puncturing the cover to break the vacuum or atmospheric-pressure seal of the cover to the can-body.

I claim—

1. The method or process of hermetically sealing and securing covers on cans or vessels by a combined mechanical seal and a vacuum or atmospheric-pressure seal, consisting in first exhausting the air from the can or vessel and from a receiver containing the same;

second mechanically engaging directly together flanges on the can and cover and sealing the cover on and to the can or vessel by a mechanical joint or seam while in the receiver and while the air is exhausted therefrom and then restoring the atmospheric pressure outside the can or vessel and thus additionally sealing and securing the cover on and to the can or vessel by a vacuum or atmospheric-pressure seal, substantially as specified.

2. The method or process of hermetically sealing and securing covers on cans or vessels, consisting in first exhausting the air from the can or vessel and from a receiver containing the same, and then seaming together flanges on the can and cover and forming a hermetically-tight mechanical seal or seam between the can or vessel and its cover while in the receiver and while the air is exhausted therefrom, substantially as specified.

3. The method or process of hermetically sealing and securing covers on cans or vessels, consisting in first exhausting the air from the can or vessel and from a receiver containing the same, and then seaming together flanges on the can and cover and forming a hermetically-tight mechanical seal or seam between the can or vessel and its cover while in the

receiver and while the air is exhausted therefrom by forcibly driving the cover home on the can or vessel and causing the flanges on the cover to embrace and interlock with the flange on the can, substantially as specified.

4. The method or process of hermetically sealing and securing covers on cans or vessels by a combined mechanical seal and a vacuum or atmospheric-pressure seal, consisting in first exhausting the air from the can or vessel and from a receiver containing the same, then hermetically sealing and securing the cover on and to the can or vessel by a tight, wedging, friction fit, seam or joint, formed by forcibly driving the cover home on the can or vessel and causing the flanges on the cover to embrace and interlock with the flange on the can while in the receiver and while the air is exhausted therefrom, and then restoring the atmospheric pressure outside the can or vessel and thus additionally sealing and locking the cover on and to the can or vessel by a vacuum or atmospheric-pressure seal, substantially as specified.

EDWIN NORTON.

Witnesses:

H. M. MUNDAY,  
EDMUND ADCOCK.