J. N. POWERS & A. Y. LEECH, Jr.

POWDER TANK CLOSURE.

APPLICATION FILED JAN. 26, 1917.

1,243,974. Patented Oct. 23, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

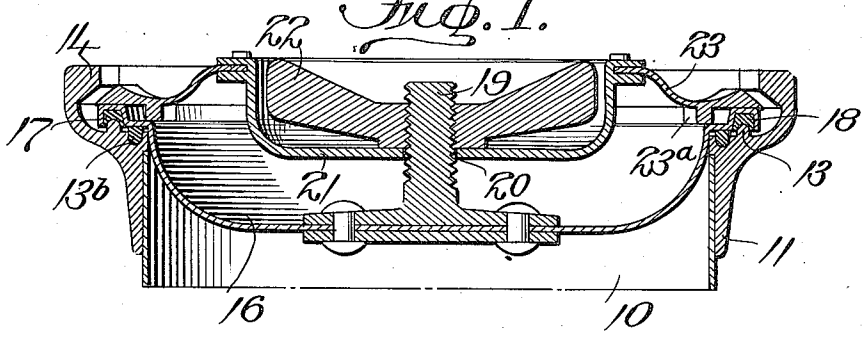


Fig. 2.

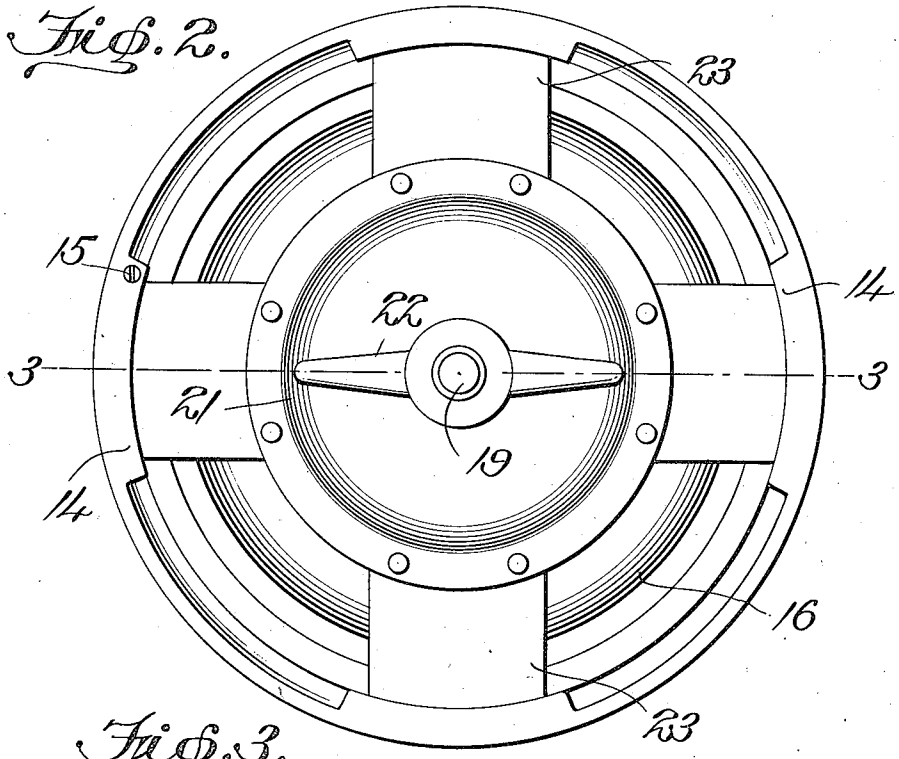
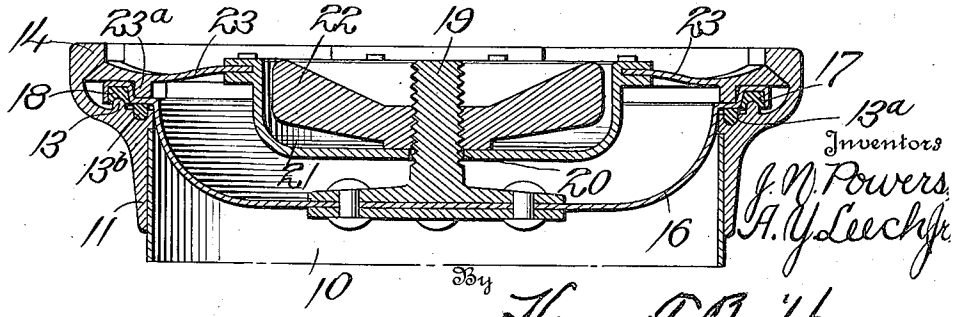


Fig. 3.



Inventors
J. N. Powers
A. Y. Leech Jr.

By Henry P. Wright Attorney.

J. N. POWERS & A. Y. LEECH, JR.

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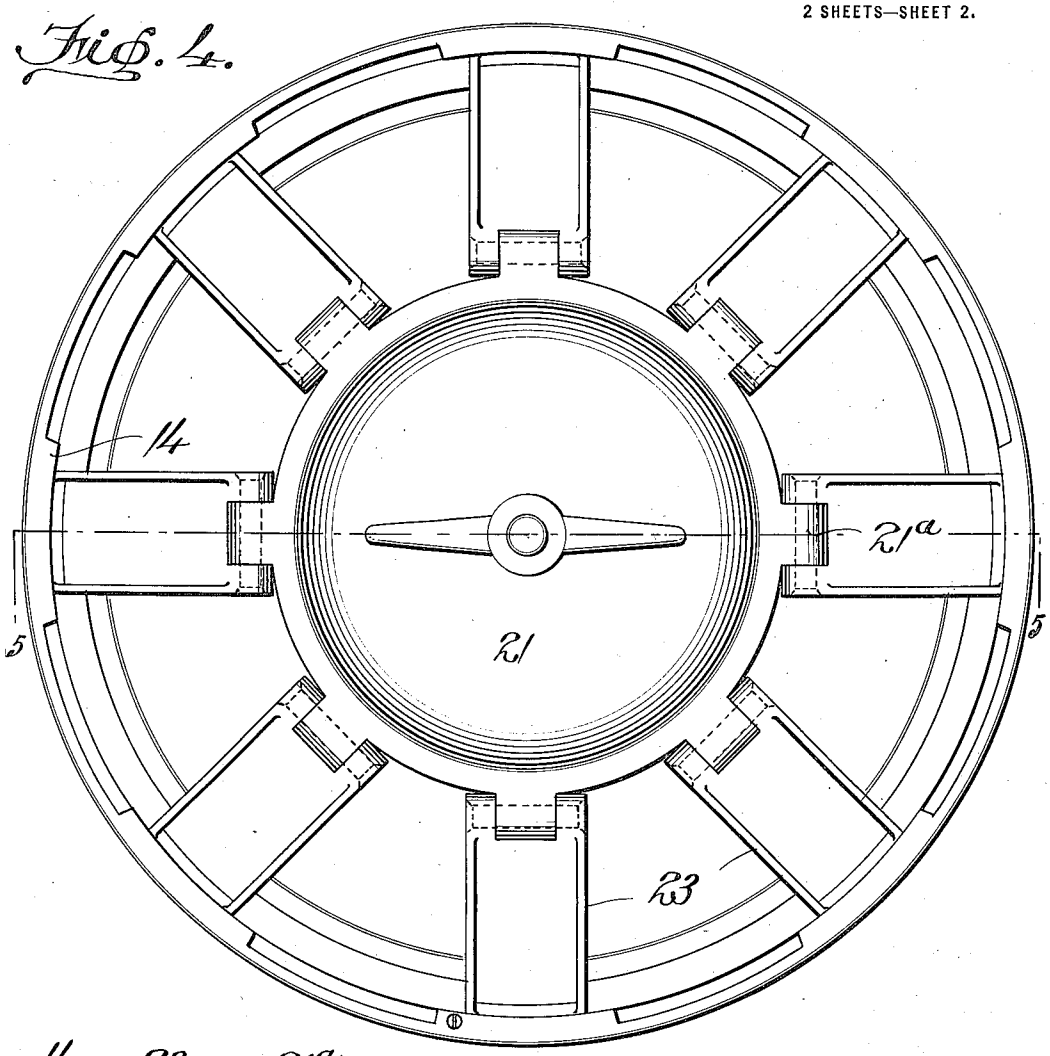
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2 SHEETS—SHEET 2.

Fig. 4.



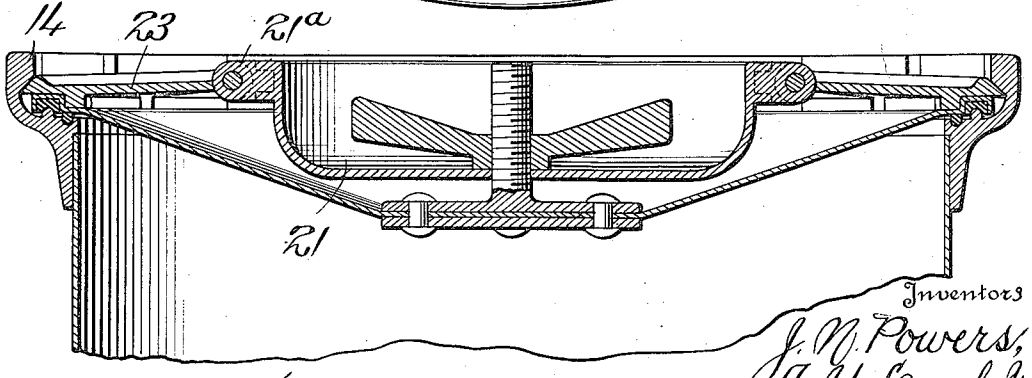


Fig. 5.

Inventors

J. N. Powers,

A. Y. Leech Jr,

By Henry P. Bright

Attorney

UNITED STATES PATENT OFFICE.

JOHN N. POWERS AND ABNER Y. LEECH, JR., OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNORS TO UNITED STATES ORDNANCE COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF VIRGINIA.

POWDER-TANK CLOSURE.

1,243,974. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed January 26, 1917. Serial No. 144,736.

To all whom it may concern:

Be it known that we, JOHN N. POWERS and ABNER Y. LEECH, Jr., both citizens of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Powder-Tank Closures; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Owing to the deterioration of gaskets in powder tank closures it has been a difficult problem to maintain the tanks effectively sealed and thus save the contents from damage and in many cases total loss as a result of atmospheric action. Both rubber and leather gaskets have been employed and the former has been found certain of deterioration, while the latter when subjected to the influence of a dry climate will shrink. In the use of both types of gaskets the seal is eventually impaired and the contents damaged or totally lost.

It is therefore the purpose of our present invention to provide a closure for powder tanks wherein an energized element is employed to force the cover of the tank into sealing engagement with the sealing surface of the top ring, such element when the locking of the closure is completed having a store of energy which acts constantly on the cover directly above the gasket so that when the latter deteriorates or shrinks the spring energy stored in the element will compensate for such deterioration or shrinkage of the gasket and maintain the necessary effective seal.

Furthermore, it is our purpose to provide a powder tank closure which embodies a plurality of seals so arranged and positioned that in the event one of the seals should become impaired the remaining seal or seals will continue to act in an effective manner, the various seals being entirely independent of each other and being acted on independently by the locking device of the closure.

We will describe our invention in the best forms known to us at present but it will be understood that the same is susceptible to changes in form and proportion, and to desirable additions, with the exercise of only ordinary mechanical skill without departing from the spirit of our invention.

In the drawings chosen to illustrate our invention, the scope whereof is pointed out in the claims—

Figure 1 is a vertical section through the closure of a powder tank constructed in accordance with our invention, the closure being shown in unlocked position;

Fig. 2, a plan view of the closure, the same being shown in locked position;

Fig. 3, a section on the line 3—3 of Fig. 2;

Fig. 4, a plan view of a modified form of our closure, and

Fig. 5, a section on the line 5—5 of Fig. 4.

Referring to the drawings 10 indicates the upper end of a powder tank and 11 the top ring carried thereby. This ring 11 is provided with an annular sealing rib 13 and an annular groove 13^a disposed inwardly of the rib. Seated in the groove 13^a is a gasket 13^b of any suitable material. Provided on the ring 11 at predetermined spaced intervals are inwardly directed bearing ledges 14 and mounted in one of these ledges is a stop pin 15 for determining the locking position of the closure in a manner that will hereinafter appear. In this instance I have shown four bearing ledges 14 but the number can be indefinitely increased according to circumstances. The cover element of the closure is indicated at 16 and is provided on its underside and at its periphery with an annular groove 17 in which is seated a gasket 18 adapted to coöperate with the sealing rib 13 as will be obvious. Mounted centrally on the cover 16 is an upwardly extending threaded stud 19 which passes through a non-threaded opening 20 in a locking head 21. Threaded on the stud 19 above the locking head 21 is a locking nut 22 through the medium of which the head 21 can be forced in the direction of the cover 16. Carried by the head 21 is a plurality of locking arms 23 corresponding in number to the number of ledges 14. These arms are constructed of suitable spring steel and in their normal or unlocked position their inner ends are disposed above their outer ends as will be apparent upon an inspection of Fig. 1. Each of the arms 23 is provided with a lug 23^a

which engages the cover 16 directly above the gasket 13b, while the arm proper engages the cover 16 outwardly of the lug 23a directly above the gasket 18.

In applying the closure the arms 23 are inserted through the space between the ledges 14 and after the gasket 18 engages the rib 13 the head 21 and the arms 23 are rotated until one of the arms 23 engages the stop pin 15 when the parts will be correctly positioned for locking the closure. To effect the desired locking the nut 22 is rotated to the right which will force the head 21 in the direction of the cover 16. During this movement of the head 21 the outer ends of the arm 23 will be forced into engagement with the bearing ledges 14. Continued movement of the head 21 in the direction of the cover 16 will energize the arms 23 and the latter will react to force the gaskets into sealing engagement with the cover and with the sealing rib respectively. It will of course be apparent that the lug 23a acts to force the cover against the gasket 13b, while the arm proper acts to force the gasket 18 against the sealing rib 13. As there is a limit to the compression of the gaskets 13b and 18 it will be obvious that the final movements of the head 21 in the direction of the cover 16 will store in the arms 23 a certain amount of spring energy which will progressively act against the cover 16 as the gaskets deteriorate to maintain the desired and effective seal.

It will be noted that the parts of the closure are so arranged and shaped that when the same is in locked position said parts will be disposed entirely within the upper limits of the top ring which is a desirable advantage to maintain in powder tank closures in that it enables the tanks to be stored one upon the other, end to end. Furthermore our construction of closure enables us to maintain a large number of bearing points between the locking elements and the top ring so that uniformity of the seal will be produced.

While we have shown the arms 23 riveted to the head 21 it will be apparent that the arms could be easily connected adjacent their outer ends and the inner ends directly engaged by the nut 22. Under such conditions the arms and the mutual connection therebetween could be stamped out in a single operation.

In the modified construction shown in Figs. 4 and 5 the head 21 is provided with spaced lugs 21a and the arms 23 are pivotally connected at their inner ends to these lugs 21a respectively. In other respects the construction of the closure illustrated in Figs. 4 and 5 is similar to that previously described. It may be noted however that a larger number of ledges 14 and arms 23 are provided and that the seal is effected by the action of the arms 23 fulcruming on the ledges 14. said arms being constructed considerably heavier than the arms 23 disclosed in Figs. 1 to 3. The form of invention which we have illustrated in Figs. 4 and 5 is particularly adapted for use in connection with powder tanks having a relatively great diameter.

What is claimed is:—

1. In a powder tank closure, the combination of a top ring having an interior groove therein forming an annular sealing rib, a cover having an annular groove on its lower side, a gasket in said groove cooperating with the sealing rib, a spring device adapted to progressively act on the cover as the gasket deteriorates to force the gasket into engagement with the rib, and means for energizing said spring device.

2. In a powder tank closure, the combination of a top ring including a sealing surface, a cover coöperating with the sealing surface, a plurality of spring locking arms adapted to force the cover against the sealing surface and having a non-pivotal bearing at their outer ends against the top ring, and means for energizing said arms whereby the spring force stored therein will constantly act against the cover to force the latter into sealing engagement with the sealing surface.

3. In a powder tank closure, the combination of a top ring including a sealing surface, a cover including a gasket coöperating with the sealing surface, a plurality of spring locking arms adapted to act on the cover directly above the gasket to force the latter into sealing engagement with the sealing surface, said arms having a non-pivotal bearing at their outer ends against the top ring, and means for energizing said arms whereby the force stored therein will constantly act against the cover as the gasket deteriorates to force the gasket into sealing engagement with the sealing surface.

4. In a powder tank closure, the combination of a top ring having a sealing surface and a plurality of spaced inwardly directed ledges, a cover coöperating with the sealing surface, a locking head, a plurality of spring locking arms carried by the head and having a non-pivotal bearing against said ledges respectively, said arms having a store of energy when energized which acts against the cover to force the latter into sealing engagement with the sealing surface, and means for forcing the locking head in the direction of the cover to energize said arms.

5. In a powder tank closure, the combination of a top ring having a sealing surface, a cover coöperating with the sealing surface, a locking head, a plurality of spring locking arms carried by the head and having a non-pivotal bearing at their outer

ends against the top ring, said arms normally having their inner ends disposed outwardly of their outer ends and adapted when energized to have a store of energy which acts against the cover to force the latter into sealing engagement with the sealing surface, and means for forcing the locking head in the direction of the cover to energize said arms.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

JOHN N. POWERS.
ABNER Y. LEECH, JR.

Witnesses:
LOUIS A. LEECH,
EDITH STOWELL.