

R. E. MEYER.
 APPARATUS FOR SEALING JARS AND BOTTLES.
 APPLICATION FILED JAN. 2, 1903. RENEWED AUG. 7, 1909.

994,179.

Patented June 6, 1911.

3 SHEETS—SHEET 1.

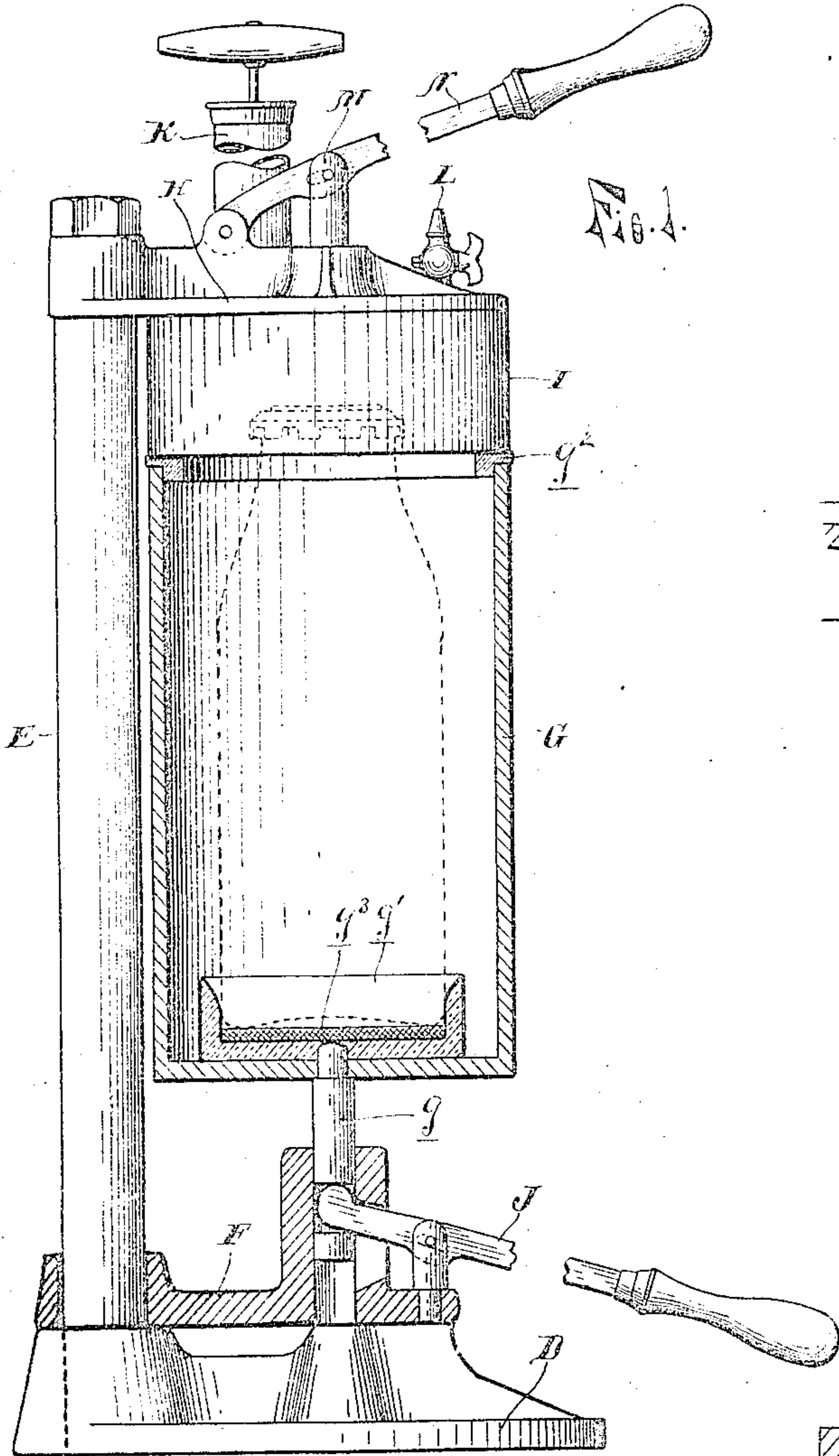


Fig. 8.

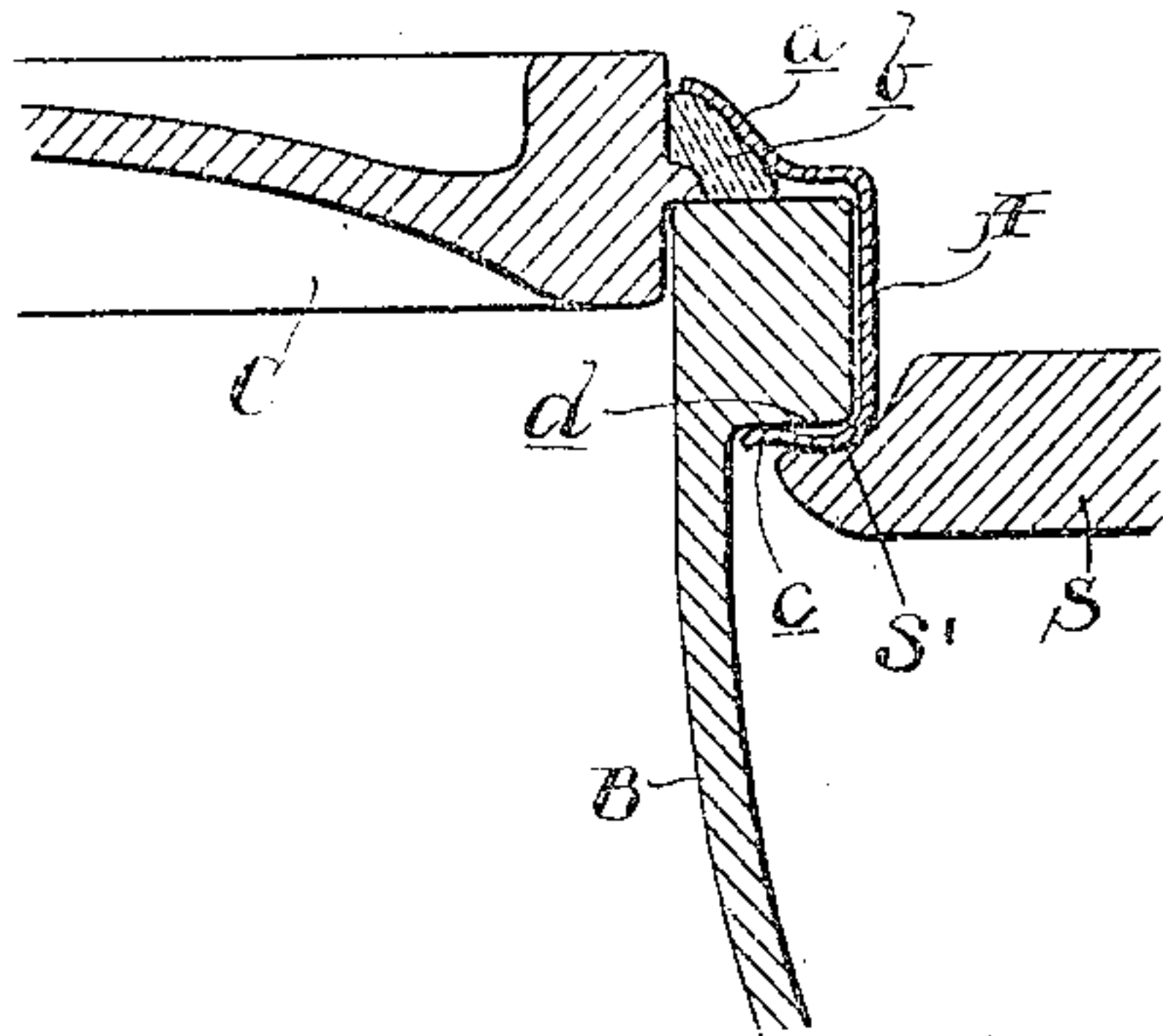
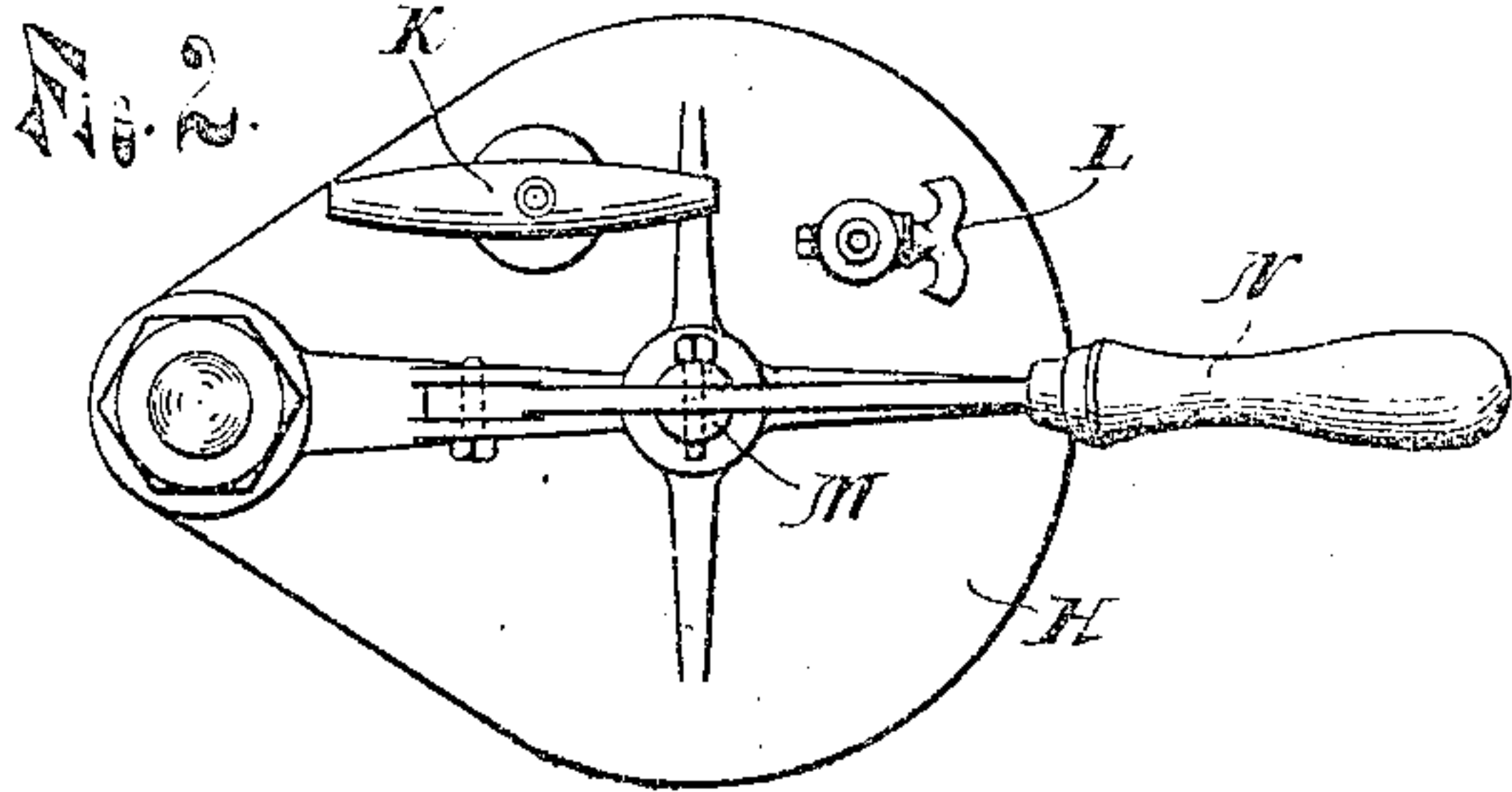
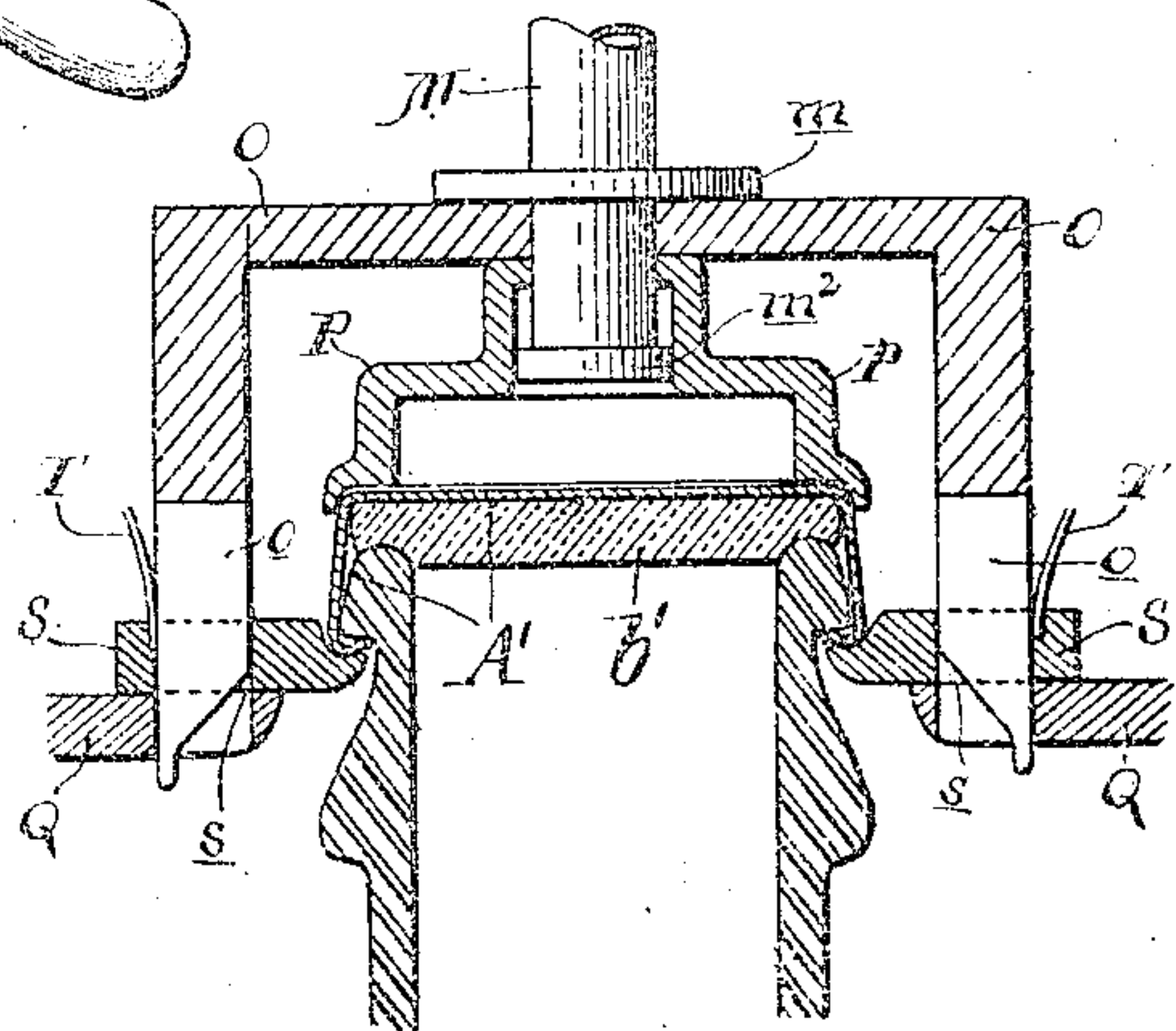


Fig. 9.



WITNESSES.

Lewis Henders
 Thomas S. Longstaff

INVENTOR.

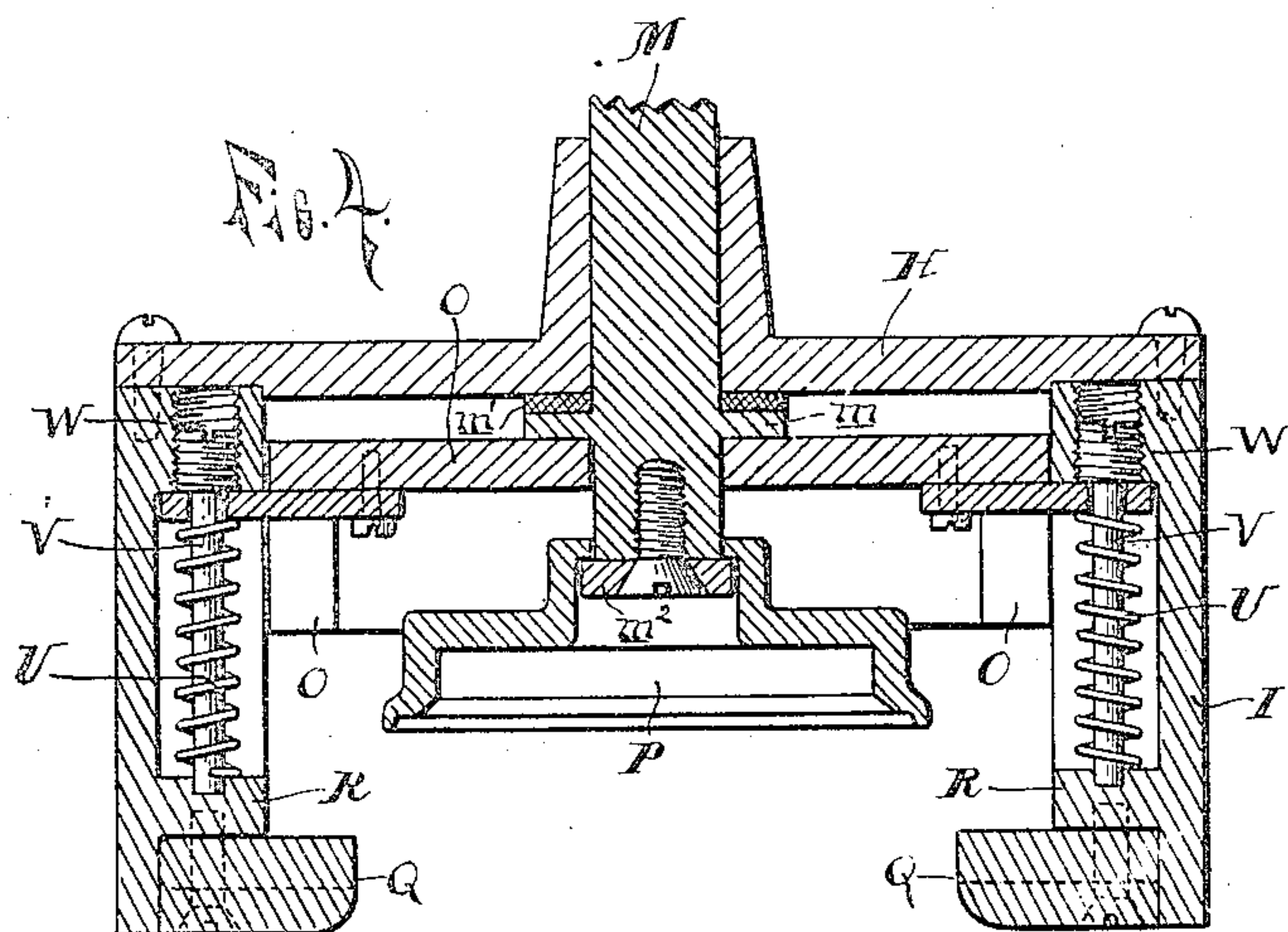
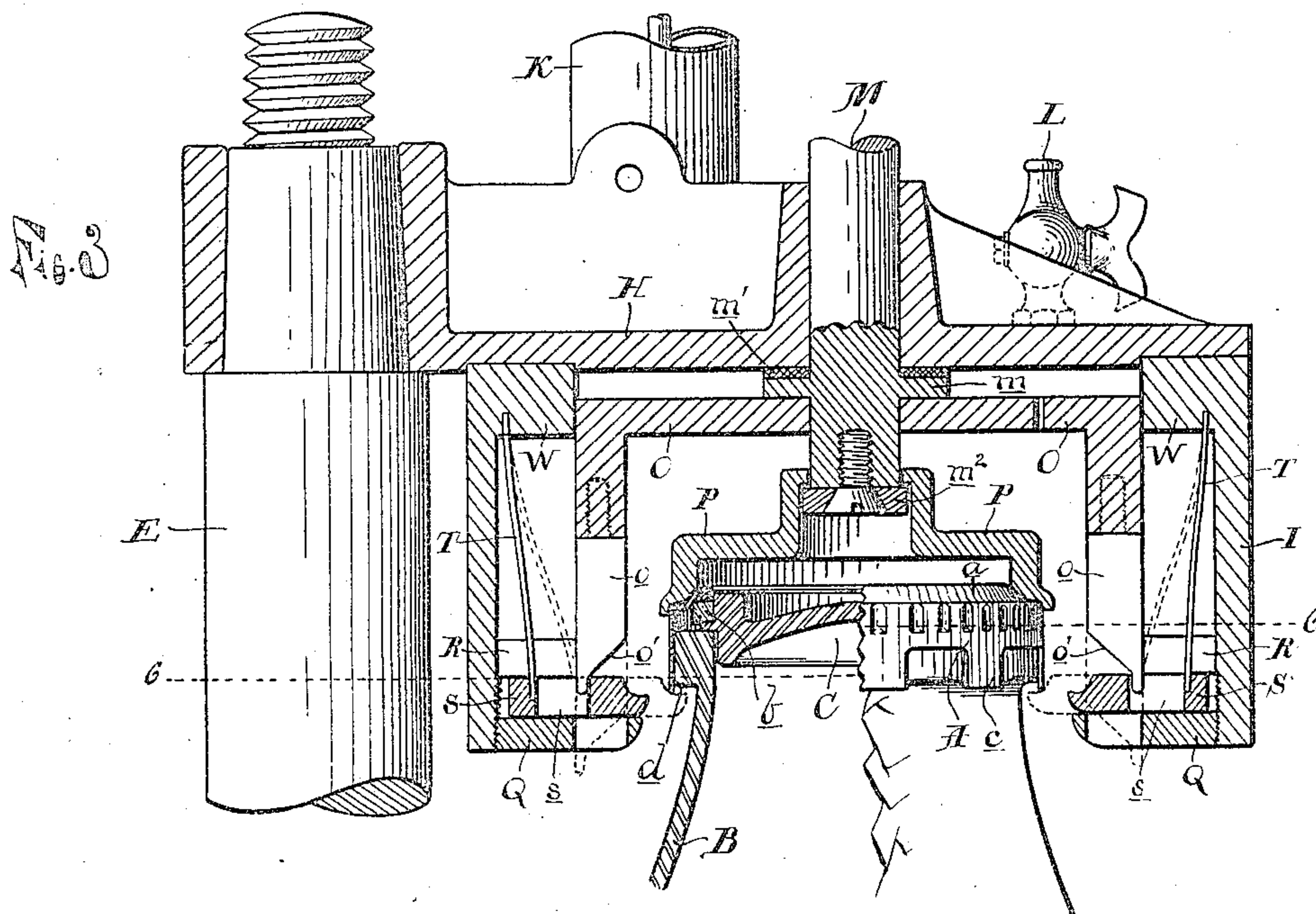
Richard E. Meyer
 By *[Signature]*
 Attorneys.

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3 SHEETS—SHEET 2.



WITNESSES.

Lewis B. Sanders
 Thomas A. Longstaff.

INVENTOR.

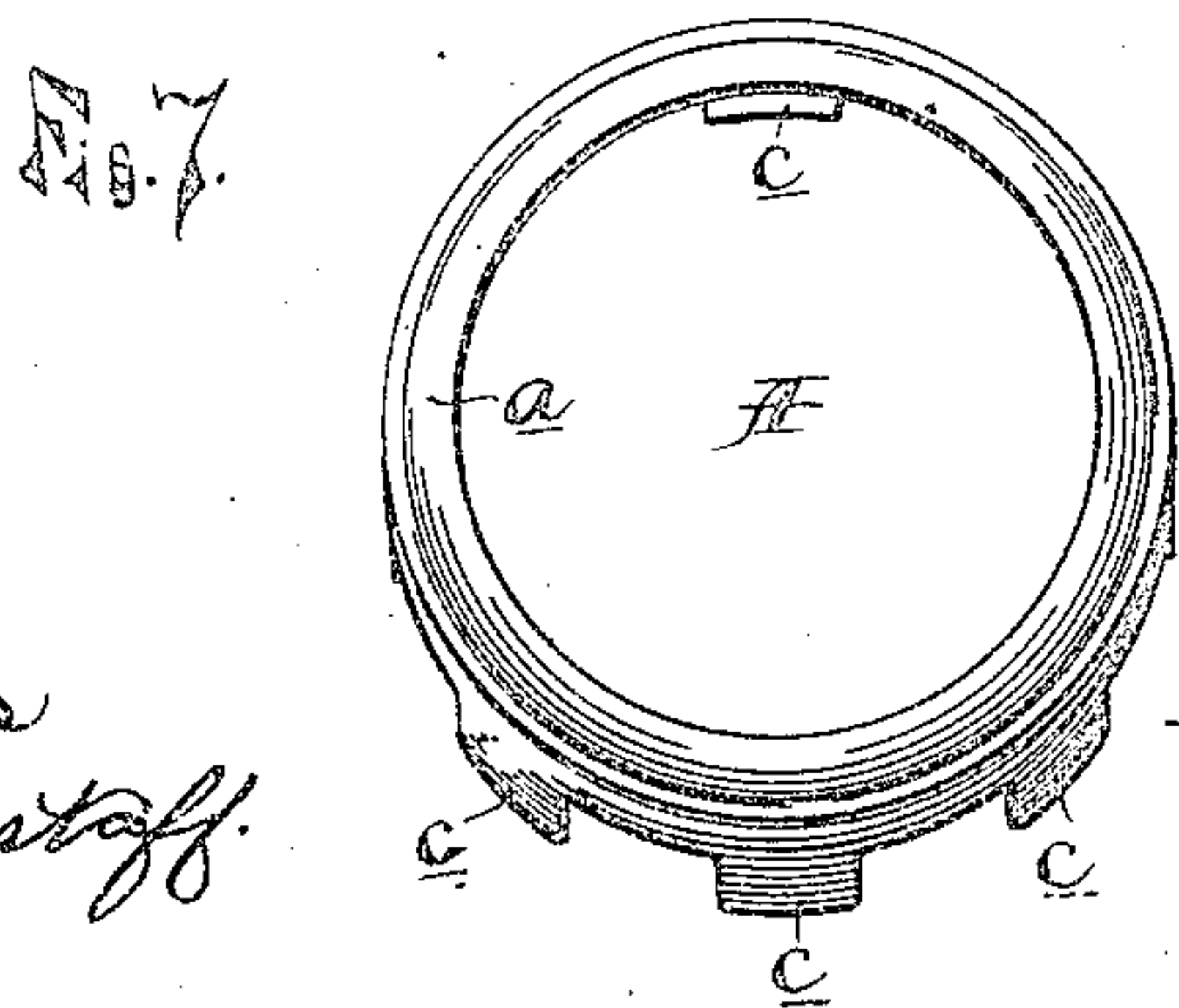
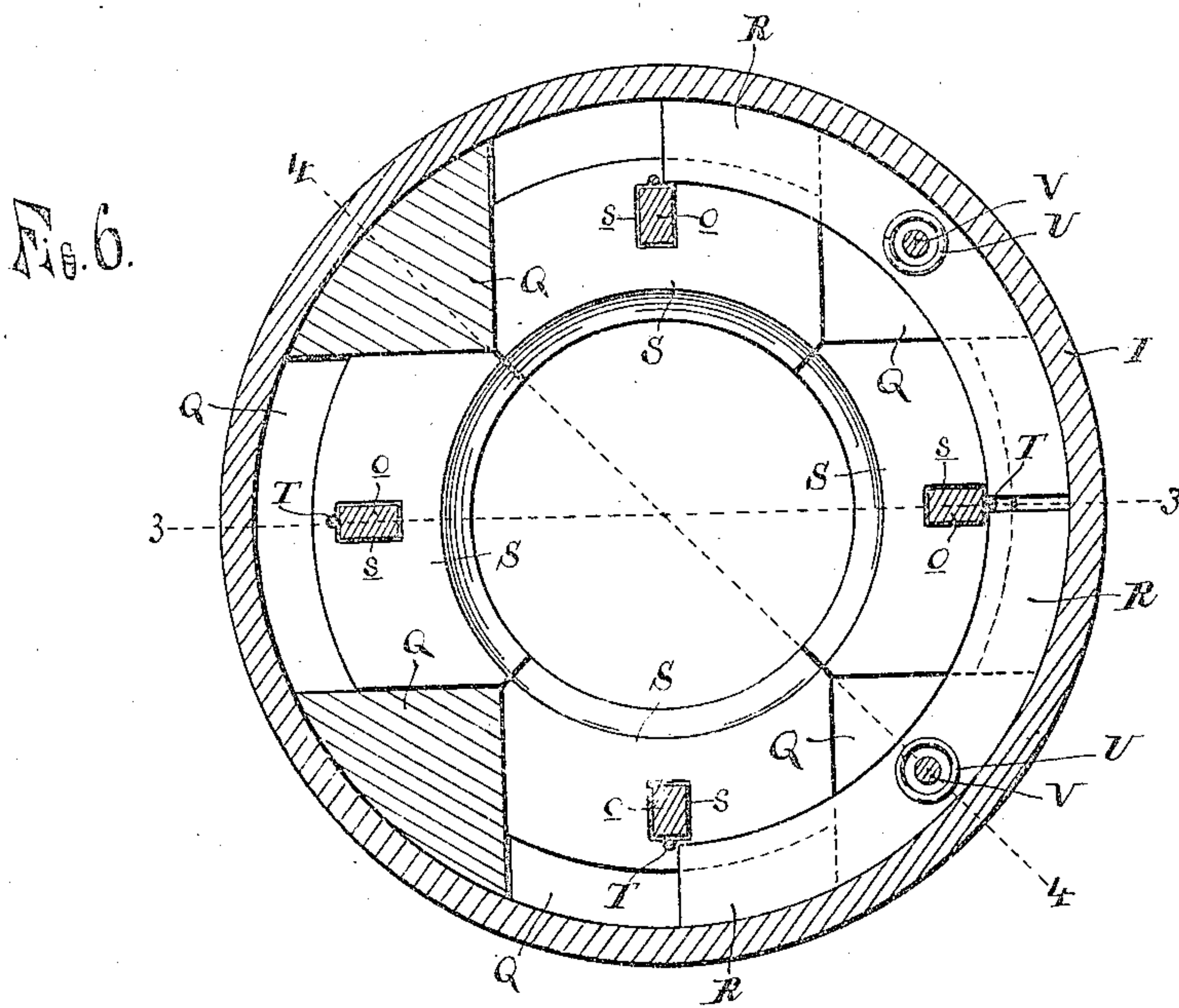
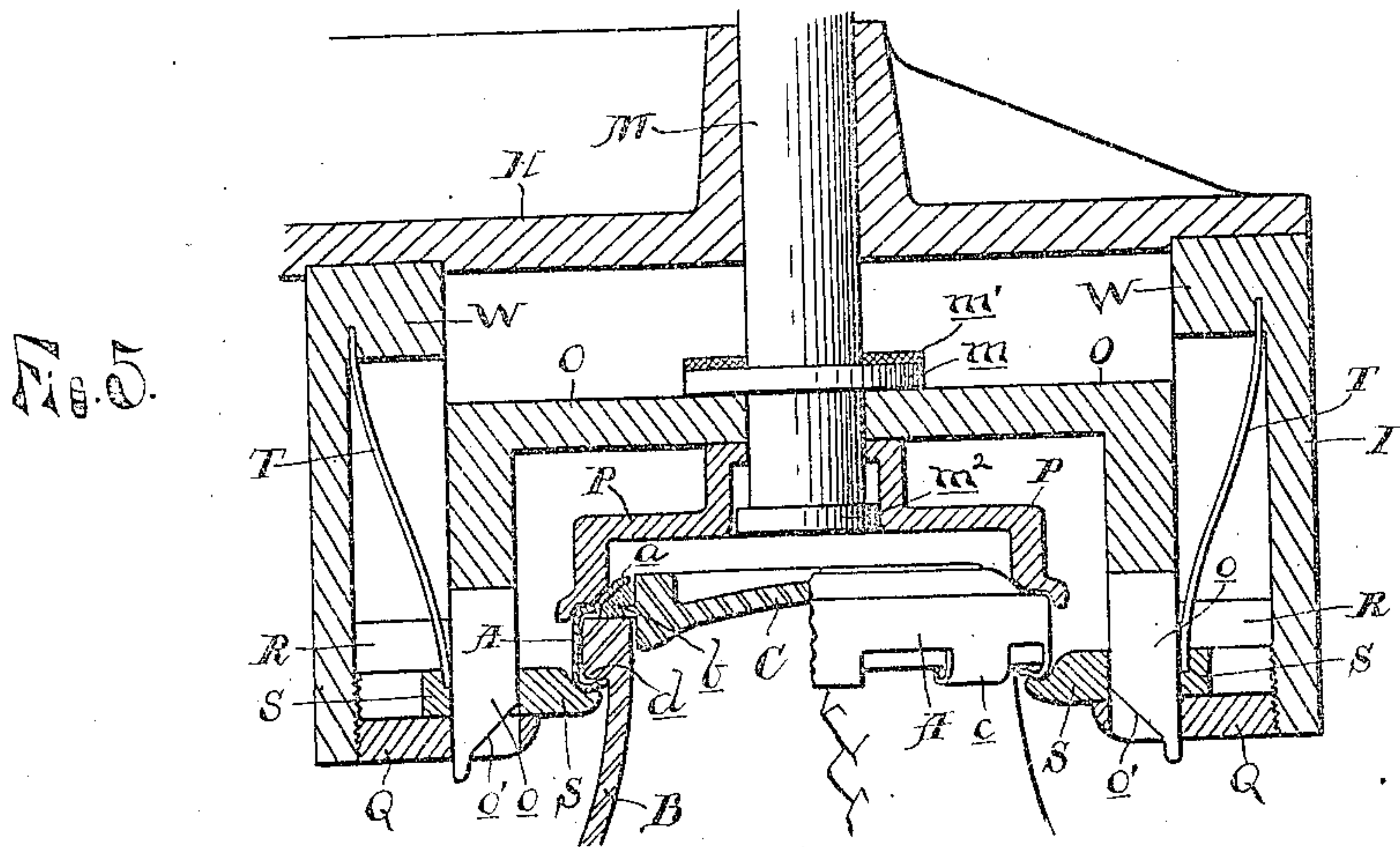
Richard E. Meyer.
 By *Barth & Barth*
 Attorneys.

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3 SHEETS—SHEET 3.



WITNESSES.
 Lewis C. Thanders
 Thomas E. Longstaff.

INVENTOR.
 Richard E. Meyer
 By *[Signature]*
 Attorneys

UNITED STATES PATENT OFFICE.

RICHARD E. MEYER, OF DETROIT, MICHIGAN.

APPARATUS FOR SEALING JARS AND BOTTLES.

994,179.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed January 2, 1903, Serial No. 137,448. Renewed August 7, 1909. Serial No. 511,810.

To all whom it may concern:

Be it known that I, RICHARD E. MEYER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Apparatus for Sealing Jars and Bottles, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is designed for use in connection with sealing devices involving the use of a metallic band or cap in connection with a sealing disk or its equivalent pressed upon the mouth of a jar or bottle and held in place thereon by the band or cap having its lower edge or portion thereof forced into engagement with a locking shoulder on the neck of the jar or bottle. Many forms of sealing devices of this character have been disclosed in prior patents. In some of these, bands are employed formed by rolling sheet metal into the desired shape and these bands may have their ends open or closed, it is also common to detachably secure the ends of the bands together. In others, caps are used which are formed by stamping sheet metal into the desired shape. As my invention includes the use of both caps and bands, I use the term cap hereafter as being interchangeable with the word band, also in speaking of jars only, I mean bottles and packages of other description as well.

My invention has particular reference to an apparatus for sealing jars by the use of sealing devices of this general character as well as for use in connection with the particular sealing device described in my Letters Patents No. 711,452 and in which a glass cover and rubber gasket are the equivalent of the sealing disk in forming what I call an outside seal as distinguished from an inside seal in which the rubber gasket would be placed beneath the cover instead of being above the cover.

In the present state of the art of sealing jars, involving the use of a metallic cap in the manner above described, the general method followed, is to first press the cap upon the mouth of the jar, the sealing disk or its equivalent being interposed between it and the jar and then, while the pressure is being maintained, to lock the cap in engagement with the jar by pressing the lower edge or portion thereof under the locking shoulder.

der. To obtain a perfect hermetic seal by this method considerable pressure has to be applied, but as the amount of this pressure must depend entirely upon the strength of the body of the jar, it is obvious, that the application of the method is limited to jars of greater strength than could be used with other sealing devices. In sealing hermetically by the above described method it must also be taken into account that even if the caps are made of hard metal, there will always be a little looseness in the fastening after the pressure is taken off. There is always a slight resiliency to any metal available for the purpose and the mere bending or forcing of the lower edge thereof into surface contact with the locking shoulder does not set the cap in such absolute surface contact with the glass as to prevent a slight loosening or slackening thereof to take place after the pressure is removed and this has to be compensated for by the expansion of the sealing disk, in other words a sealing pressure must be applied greater than is merely required to produce a seal and it is not alone necessary that the sealing disk should be compressible but it must also be expansible like rubber. The above described method in present use has therefore certain limitations and to remove these I have invented a new method and an apparatus for carrying it out. According to my new method I support the lower edge or depending portions of the cap during the act of applying pressure thereto in such manner that simultaneously with the act of sealing the lower portions of the cap will be deflected inwardly and upwardly under the locking shoulder of the jar and thus by the one single operation the act of sealing is completed. In thus sealing by this new method the pressure during the whole operation is wholly or nearly so sustained by the support and the only part of the jar which may have to sustain a crushing strain is the small part directly inclosed by the cap, and as this portion is for other reasons always made heavier and stronger than the rest, there is practically no limit to the pressure which may be applied without fear of cracking the jar. At the same time a superior lock is formed by this method of sealing inasmuch as the bending inwardly and upwardly of the portions of the cap which form the lock, takes the spring out of the metal and presses the very edges of

the metal against the locking shoulder instead of making a contact between surfaces as in the old method.

As my invention embodies a new method as well as a new apparatus I will present the same in separate applications, the present application being restricted to the subject matter of the apparatus alone and embraces aside from those features directly involved in carrying out my new method of sealing, certain features of construction relating to the formation of a vacuum and sealing in a vacuum, all as more fully hereinafter described and shown in the accompanying drawings, in which—

Figure 1, is a sectional elevation of my apparatus; Fig. 2, is a plan view thereof; Figs. 3 and 4 are vertical central sections through the top portion of the apparatus substantially in vertical planes on lines 3—3 and 4—4, respectively, of Fig. 6—Fig. 3, illustrating the parts as in operation; Fig. 5, is another vertical section like Fig. 3, illustrating the same parts as in a subsequent stage of the operation; Fig. 6, is a horizontal section in a plane on line 6—6 in Fig. 3; Fig. 7, is a detached perspective view of the cap or band employed in sealing; Fig. 8, is an enlarged sectional detail of a portion of the jar showing the seal completed; and Fig. 9, is a section similar to Fig. 5 illustrating a modification of the apparatus as constructed for use in sealing bottles.

For securing the best results I prefer to adopt the special form of sealing device described in my former Letters Patent No. 711,452 and the apparatus as shown in the drawings is specifically adapted for it, but it will be understood that the changes which must necessarily be made to adapt it to various other sealing devices of like character are mere matters of detail. This sealing device as shown in the drawings, Figs. 1 to 6, consists of a metal cap A composed of hard metal such as tinned iron plate and may be stamped from sheet metal or formed by rolling, and having more or less the character of a metal band. It is formed with an inwardly turned flange *a* adapted to press upon the rubber gasket *b* employed in sealing and with depending portions *c* of suitable dimensions to be engaged with a locking shoulder *d* formed on the jar B to hold the cap in place upon the jar. In connection with this cap I use a cover C which is seated upon the mouth of the jar. The vertical portion of the cap between the flange *a* and the depending portions *c* is also preferably corrugated as shown in Fig. 3. In a jar sealed with this device the cap presses directly upon the rubber gasket by means of the flange *a* and presses it over the joint formed between the cover and the mouth of the jar thus forming what I call an outside

seal as distinguished from an inside seal in which the rubber gasket would be interposed between the cover and the jar.

The construction of my apparatus is as follows: Fastened in a suitable base or bed plate D is an upright standard E which carries a lower bracket F swinging upon the standard and carrying the lower section G of the vacuum chamber, and an upper rigid bracket or head H which carries the upper section I of a vacuum chamber or forms a part thereof. The lower section G which is carried by the swinging bracket F is supported thereon in vertical guide bearings free to be raised and lowered in any suitable manner, the drawings showing a lever J carried by the bracket and engaging with the vertical stub shaft *g* held in vertical guide bearings in the bracket F. The section G has removably secured upon its bottom a centering piece *g'* of wood or other elastic material for the support of the jar within which centering piece is a removable pad *g''* of rubber or other compressible material, and upon its upper end said section is provided with a packing ring *g''* all so arranged that by first swinging the section G out from under the section I, then introducing the jar (with the sealing device in place upon it) and swinging the section G back again in position, the depressing of the lever J will raise the section G against the section I and thereby bring the jar into position for sealing while inclosed in an air tight chamber formed by the sections G, I. The upper section I communicates with a device for exhausting air, or as shown in the drawings, a small pump K for exhausting air by manual operation may be directly mounted upon it, and the section is also provided with an air cock L.

M is a plunger rod passing through a vertical guide bearing in the head of the upper section and pivotally secured at its upper end to a lever N fulcrumed upon the section H. The lower end of this plunger projects into the top of the vacuum chamber formed by the sections G and I and carries two heads O and P, both having a limited sliding movement on the plunger rod. The head O which is carried above the head P is of a larger diameter than the head P and carries a peripheral series of vertically depending fingers *o* which are formed upon their lower free ends with inclines *o'* and the head P is of a size and shape to conform to the size and shape of the top of the cap and forms a pressure head for the same. The plunger rod M is limited in its upward movement by a flange *m* formed or provided thereon and supporting a packing ring *m'*, the function of which is to maintain an air tight joint at the point where the piston rod passes through the head which carries the section I in the position of the

parts shown in Figs. 3 and 4. The vertical movement of the heads O and P on the plunger rod, is limited by the before mentioned flange *m* and by a flange *m*² formed or provided on the lower end of the plunger rod.

Secured within the lower end of the section I and seated against an annular horizontal flange R formed or provided on the inner wall of the section I is a ring Q which is recessed upon its upper side to form horizontal guide bearings for the sliding cap abutments S, the guide bearing for the upper side of these abutments being formed by the flange R. These sliding cap-abutments which are more fully shown in Fig. 6, when fully projected, close together along their inner edges and form a complete ring, and these inner edges are peculiarly formed in that they have a concave bevel S'. Further these cap abutments have openings *s* formed in them with which the depending fingers *o* are adapted to register in such manner as to cause the inclines of said fingers in their downward movement to project the supports against the tension of springs T suitably applied to hold them normally retracted.

Interposed between the flange R and the head O carried by the plunger rod are springs U (see Figs. 4 and 6) the tension of which presses the head O upward and normally holds it in the position shown in Fig. 4. As shown in the drawings, the head O is guided by means of vertical guide rods V secured upon the interior wall of the section I between the flanges R and W thereof and pass through guide ears formed or provided for on the head O, the springs U being sleeved upon these guide rods.

In practice, after a jar is introduced into the vacuum chamber with the sealing devices placed in position thereon and the vacuum chamber closed by depressing the lever J and holding or locking it there, the parts are in the relative position shown in Fig. 3. The first step in sealing (if desired to seal under a vacuum) is to exhaust the air and this accomplished the lever N is depressed. In thus depressing the lever N, the heads O and P will both be lowered. But the head O resting against shoulder or flange *m* will be forcibly depressed and cause the fingers *o* carried by said head to actuate the sliding cap-abutments and project them inwardly so that their inner beveled ends are placed directly beneath the lower edges of the cap. Meanwhile the head P has also lowered upon the cap but being free to slide on the plunger rod it will at first seat itself upon the cap without bringing any pressure thereon and being somewhat loosely sleeved will adjust itself thereon in conformity with the shape of the cap. As soon, however, as the cap-abutments have been fully projected, and remain

stationary, the head P has arrived at the limit of its free movement on the plunger rod and the further pressure upon the lever N will be transmitted by the head P to the cap to force it down upon the jar, compressing the rubber gasket and sealing the joint. As soon as the cap however, begins to bear down upon the rubber gasket, the cap itself will impinge with the lower edges of its depending portions upon the concaved edges of the projected cap abutments and the latter being held rigidly in position, will cause said portions to deflect inwardly and upwardly under the locking shoulder of the jar, thus operating as a stationary flanging die. It will be understood that as soon as the depending clamping portions of the cap are deflected inwardly and upwardly they will impinge against the shoulder on the jar and thus instead of the pressure being brought upon the jar, the clamping portions will form a support for the jar and take the pressure off the body thereof. Further it will be seen that the tendency of the cap abutments is to turn the depending portions upwardly at a very abrupt angle almost turning them back like a clench, and thus the very lower edges of the depending portions will first contact with the locking shoulder and then, the pressure upon the cap being continued, they will be forced inwardly and flattened out. In thus being flattened or opened out the spring or resiliency which may be left in these portions tends to press them against the shoulder, whereas, in the old method of sealing, the tendency of these portions is in the opposite direction, away from the shoulder, and therefore when the pressure is removed from the jar at the end of the operation, the cap will have no tendency to loosen, and any compressible substance, such as heavy paste board, can be relied upon to make as perfect a seal as a rubber gasket. After the sealing is completed the air cock is opened to admit air to the chamber that it may be opened to allow the jar to be removed.

I have shown my apparatus as constructed in its more simple form but it is obvious that my invention may be employed in constructing an apparatus of larger capacity.

To adapt my apparatus to other sealing devices of like character, requires but an obvious change of some of the minor details, thus in Fig. 9, I show a well known sealing device particularly adapted for sealing bottles and comprising a metallic cap A' of the same character as before described and a compressible disk b'. Beyond a change in the size and proportion of the parts, there is no change required in the device, in adapting it to conform to this cap.

The depending clamping portions of the cap may be three or more in number and it is obvious that a like number of independent

cap supports therefor, may be provided in the apparatus, it is however an advantage to form a complete ring support composed of few sliding sections to avoid the necessity of registering the clamping portions of the cap with the supports.

As it is quite feasible in manufacturing the cap to form the lower edge of the clamping portion of the cap with an initial inward bend, it will be obvious that if this is done there is no necessity for forming the abutment with the concave operating face and a plain bevel or a perfectly level face may therefore accomplish the same result.

My apparatus is not limited in its application to such sealing devices in which a compressible disk or gasket is used, as it will work quite as well without as far as fastening the cap is concerned by supporting the jar yieldingly. This may be done by placing a rubber cushion below the jar of sufficient capacity to allow the jar and cap to yield both together a sufficient distance in pressing to effect the formation of a flange on the cap in the manner described and such a cushion may be obviously used in connection with such sealing devices in which the compressible disk or rubber gasket does not yield enough under compression to form a clamping flange of desired size for clamping.

Having thus fully described my invention, what I claim is:—

1. In a jar sealing apparatus, the combination of a chamber adapted to inclose the jar and composed of a fixed upper and a movable lower section, means for moving said lower section in and out of position, a jar support in the lower section, a pressure head in the upper section for applying downward pressure upon the top of a metallic sealing cap supported on the head of the jar, an abutment for the cap located within the upper section and composed of radially movable sections, and means for actuating said sections and applying pressure to the pressure head, said means actuating the sections in advance of the pressure head.

2. In a jar sealing apparatus, the combination of a casing adapted to inclose the jar and composed of a fixed upper and a movable lower section forming the support of the jar, a pressure head in the upper section for applying downward pressure upon the top of a metallic sealing cap supported on the head of the jar by the sealing medium, and an annular abutment in the upper section composed of radially movable sections adapted to be actuated beneath the shoulder of the jar in advance of the pressure head and support the cap and the jar against the pressure of the pressure head.

3. In a jar sealing apparatus, the combination with a suitable support for the jar and metallic sealing cap supported on the head thereof and having a vertical flange

formed with depending portions, of a pressure head above the cap for applying downward pressure upon the top of the cap and an annular abutment below the cap located in relation to a locking shoulder on the jar and adapted to operate as a stationary flanging die to force the lower edges of the depending flanges into clamping contact with the locking shoulder on the jar, said abutment composed of complimentary sections supported in horizontal guide bearings and means for collectively moving said sections in and out of operative position, said means adapted to lock said sections in the operative position of the same.

4. In a jar sealing apparatus, the combination with a suitable support for the jar and metallic sealing cap supported on the head thereof and having a vertical flange formed with depending portions, of a pressure head above the cap conforming to the shape of the cap and adapted to bear upon the top thereof, a plunger carrying said head and upon which said head has a limited sliding movement, an annular abutment below the cap composed of complementary sections supported in horizontal guide bearings and means operated by the plunger for collectively moving said sections in and out of operative position independently of any movement of the pressure head and adapted to lock said sections in their advanced position during the movement of said pressure head, the abutment composed of said sections located in reference to a locking shoulder in the jar and adapted to operate as a stationary flanging die upon the lower edge of the depending flanges of the cap in the advanced position of said sections.

5. In a jar sealing apparatus, the combination with a suitable support for the jar and metallic sealing cap supported on the head thereof; of a pressure head adapted to bear upon the top of the cap, a plunger carrying said head and upon which said head has a limited vertical play in the downward movement of said plunger, a lever for actuating said plunger, means for holding said lever in a normally raised position, an annular abutment composed of radially slidable sections located in a horizontal plane in relation to the locking shoulder on the jar and adapted to operate in their advanced position as a stationary flanging die upon the lower edge of the depending flange of the cap or portions thereof in sealing the cap, means to hold said sections in a normally retracted position and means operated by the plunger to advance said sections and lock the same in their advanced position in advance of the movement of the pressure head in the downward movement of the plunger in applying pressure to the cap for sealing it upon the jar.

6. In a jar sealing apparatus, the combi-

nation with a suitable jar support and pressure head adapted to apply downward pressure upon the top of a metallic sealing cap supported on the head of the jar and adapted
5 to be fastened to a locking shoulder thereon, of an abutment composed of radially slidable sections supported in horizontal guide bearings in relation to the locking shoulder on the jar and adapted to form in their advanced position a stationary flanging die for
10 the lower edge of the depending flange of the cap or portion thereof by the pressure applied to the top of the cap and means operated by the movement of a single lever to

move said sections in and out of operative position and to apply downward pressure to the pressure head, said means operating to project said sections in advance of the pressure head and to lock the same in their advanced position during the movement of the same. 15 20

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD E. MEYER.

Witnesses:

OTTO F. BARTHEL,

THOMAS G. LONGSTAFF.