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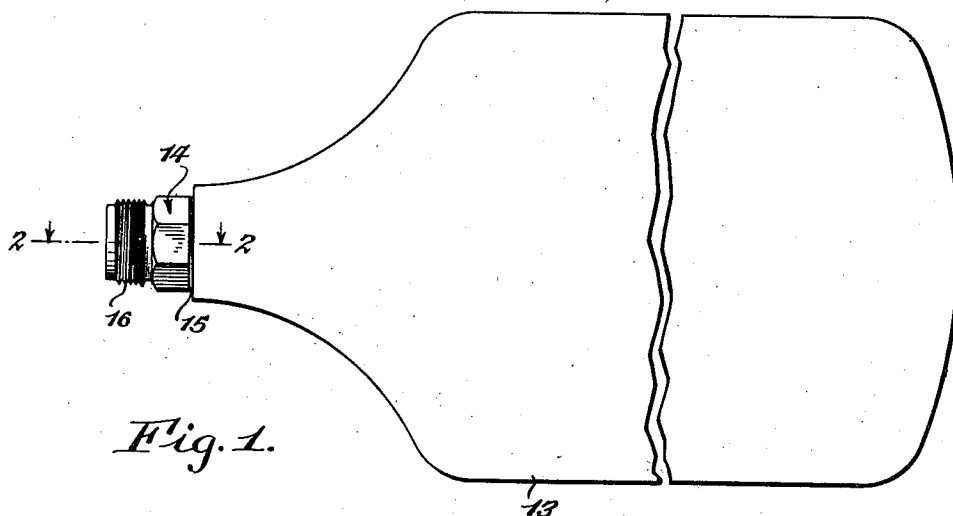
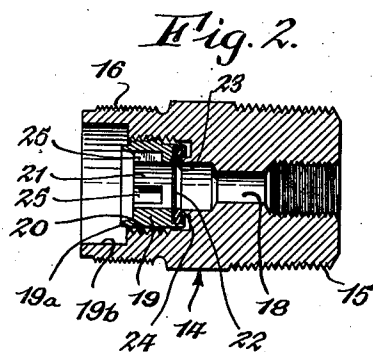
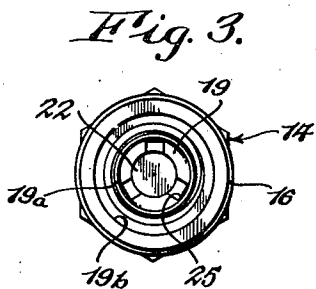
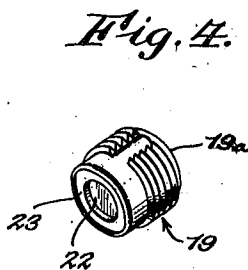
C. R. PHILLIPS

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DEVICE FOR RELEASING CONTENTS OF PRESSURE CONTAINERS

Filed March 26, 1934

2 Sheets-Sheet 1



INVENTOR
Cecil Roy Phillips
BY
Pope and Powers
ATTORNEYS

April 2, 1935.

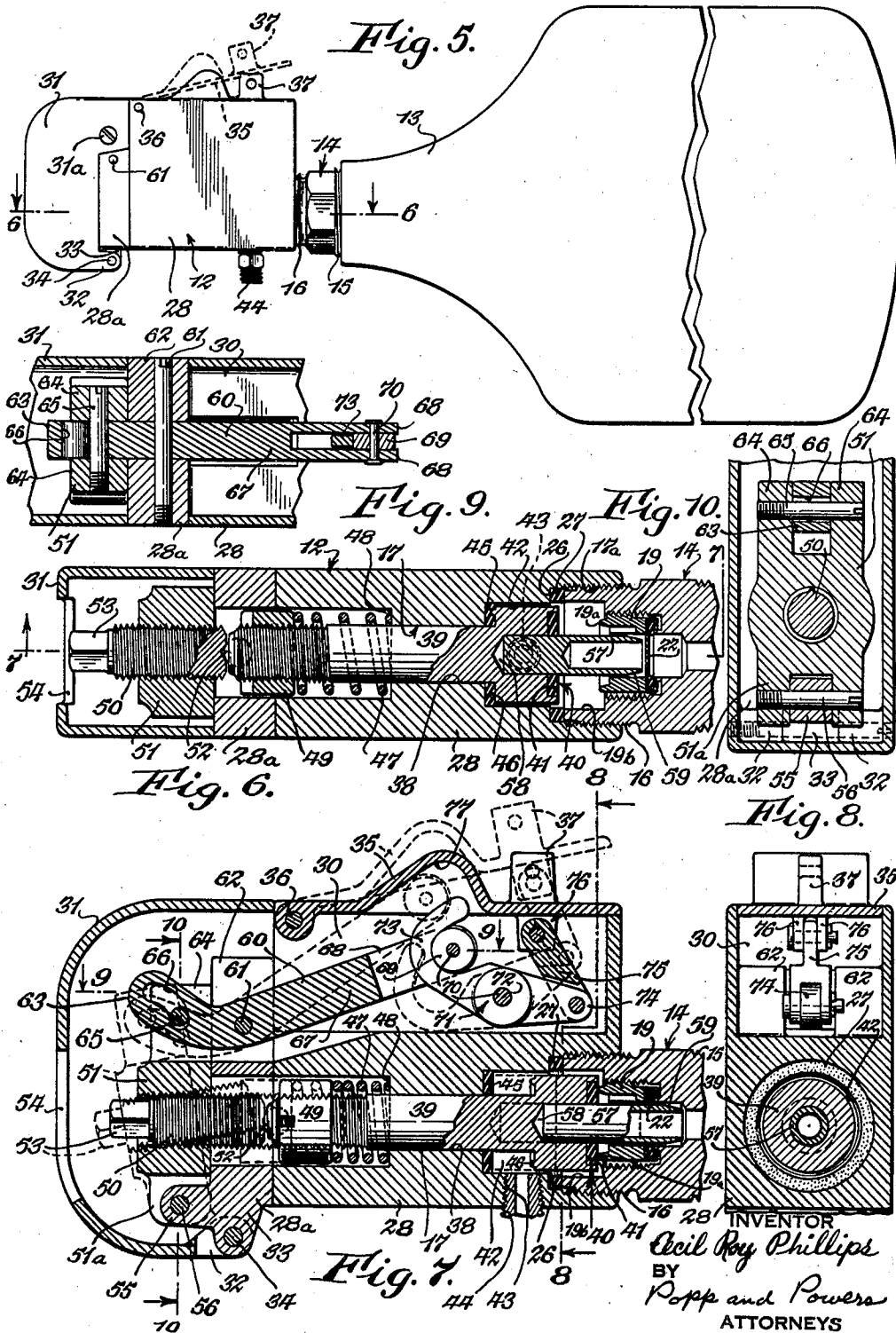
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UNITED STATES PATENT OFFICE

1,996,489

DEVICE FOR RELEASING CONTENTS OF
PRESSURE CONTAINERS

Cecil Roy Phillips, North Tonawanda, N. Y.

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11 Claims. (Cl. 221—73.5)

This invention relates to a device for controlling the release or discharge of the contents of pressure containers, that is to say containers which are filled with a compressed gaseous medium such as, for example, carbon dioxide.

Pressure containers of the character described are employed for a wide variety of uses. For example, they are employed in connection with the safety equipment of aircraft, in which case they are available in an emergency to inflate rafts or other life saving equipment of a pneumatic character.

One object of the invention is a device which is manually operable and quick acting to render immediately available the contents of the container with which the device is associated.

A further object is a device which is operable, after the release of a portion of the contents of the container, to prevent the further discharge of the contents when such discharge is unnecessary.

A still further object is a device in which the parts are so designed that when operated to release the gas from the container the said parts automatically assume and maintain a position which will indicate that the container is at least partially exhausted.

A still further object is to provide a device which is operative as it is applied to a container to cut away the seal which is employed to prevent the escape of the gaseous medium until the container is placed in service, whereby to condition the container so that upon operation of the device the gaseous medium will be discharged.

A still further object is to provide a device which is so designed that it is applicable to containers of standard construction.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of a container of the kind to which a device embodying features of the invention is adapted to be applied.

Figure 2 is an enlarged sectional view of the closure member of the container and is taken along line 2—2 of Figure 1.

Figure 3 is an end view of the closure member.

Figure 4 is a perspective view of the sealing element of the closure member.

Figure 5 is a view in elevation of the container showing the device applied thereto.

Figure 6 is an enlarged section taken along line 6—6 of Figure 5.

Figure 7 is a section taken along line 7—7 of Figure 6.

Figure 8 is a transverse section taken along line 8—8 of Figure 7.

Figure 9 is a fragmentary section taken along line 9—9 of Figure 7.

Figure 10 is a fragmentary section taken along line 10—10 of Figure 7.

The parts of the device are arranged in a suitable casing 12 (Figure 5), the said device being illustrated in connection with a pressure container 13 of standard construction. The casing 12 is connected to the container 13 by a union 14, the said union being suitably threaded at one end as at 15 for engagement with the internally threaded neck of the container and at its opposite end as at 16 for engagement with the threaded end 17a of a passage 17 (Figure 6) which extends longitudinally of the casing 12.

The union 14 (Figure 2) is adapted to provide a closure for the container 13 until such time as the device is applied thereto, it being understood in this connection that the said device, to the end of economy, is applied to a container only when the latter is placed in service. In other words, until such time as the container is conditioned for use, the discharge outlet thereof is closed by the union 14. The said union includes a passage 18. When serving the purpose described, therefore, the passage 18 is sealed by a threaded element 19 which is located in an enlarged part 20 of the passage, this part of the passage being suitably threaded for the greater part of its extent to accommodate the said element. The element 19 is formed with a central passage 21 which is closed by a metal disc 22, the said disc and an annular sealing member 23 fitting in the enlarged end of the passage 21 and being secured therein by the turned-over end of the element. The member 23 may be of any suitable material such as, for example, mica. It cooperates with an annular rib 24 formed in the bottom of the enlarged part 20 of the passage 18. When the element 19 is screwed into position the sealing member 23 is forced tightly against the rib 24, thereby sealing the passage 18 and preventing the escape of gas from the container. The element 19, as illustrated, is formed with a series of longitudinally extending slots 25 which are adapted to accommodate a suitable tool during assembling or replacement of the parts. In this connection it is understood, of course, that the container may be filled in accordance with conventional practice. The outer end 19a of the element 19 extends into a chamber 19b which is an enlargement of the central passage 18, the said end providing

a valve seat which is adapted to cooperate with the device as will be more fully described hereinafter.

From the foregoing it will be apparent that until the container is to be placed in service the element 19 seals the passage 18 through the union 14 and prevents the escape of the gas with which the container is filled. When the container is to be placed in service the device is applied, this being accomplished by screwing the end 16 of the union 14 into the threaded end of the passage 17 in the casing 12. Beyond the threaded portion the passage 17 is reduced to provide a shoulder 26. A sealing or packing member 27 is arranged in the passage 17 against the shoulder 26, the said member being compressed between the shoulder 26 and the end of the union as the latter is screwed into the passage.

The casing 12 includes a body preferably of cast metal and consisting of sections 28 and 28^a which are suitably secured together, the longitudinally extending passage 17, as best shown in Figure 7, being located at one side of the body while a chamber 30 is located in the opposite side. The casing also includes a cover 31, the latter having ears 32 which are located at opposite sides of a boss 33 formed upon the body section 28^a. A pin 34 cooperates with the ears 32 and the boss 33 to pivotally connect the cover to the body. The cover 31 may, if desired, be secured in its closed position by a suitable set screw 31^a. The outer side wall of the chamber 30 is provided by a panel 35 which is pivotally connected at one end between the front and back walls of the body by a pin 36. The panel is formed or provided at its opposite end with a projection 37 which may be grasped and pulled to pivot the panel 35 outwardly to the dotted line position shown in Figures 5 and 7.

The passage 17 is of reduced diameter at its central portion 38 to provide a guideway for the stem 39 of a valve 40, the said valve having a face provided by a sealing member 41 which is in the form of an insert. In its full open position the valve 40 is located in a chamber 42, the latter being an enlargement of the passage 17 and being in alignment with the chamber 19^b formed in the inner end of the union 14. An opening 43 (Figure 7) which is formed in the casing 12 communicates with the chamber 42, suitable clearance being provided between the valve 40 and the walls of the chamber so that the opening 43 is in communication with the chamber 19^b when the valve 40 is open. The opening 43 is threaded to accommodate a union 44 which is threaded at its outer end for connection to the conduit (not shown) through which the contents of the container 13 are conducted to the apparatus which is to be inflated. It will be apparent, therefore, that when the valve 40 is open and the passage 18 through the union 14 is also open, the contents of the container 13 will be discharged through the union 44 and conduit connected thereto. A sealing member 45, preferably of soft rubber or similar material, is arranged at the end of the chamber 42, the back of the valve 40 being formed with an annular rib 46 which embeds itself in the sealing member 45 as the valve approaches its full open position.

The valve 40 is moved to its open position and held in sealing relation with respect to the sealing member 45 by a spring 47. The said spring is arranged around the valve stem 39 in an enlarged part of the passage 17. It is held under com-

pression between a shoulder 48 and a nut 49 which is carried by the stem 39, the said stem being suitably threaded to permit adjustment of the nut to compress the spring 47 to the desired extent.

Means is provided for closing the valve 40, that is to say seat it against the rib 19^a formed on the element 19. The said means includes a threaded element 50 which is mounted for axial adjustment in a member 51. The inner end of the threaded element engages a ball 52 which is carried by the end of the valve stem 39 while the outer end of the said element is squared as at 53 for cooperation with the tool which is employed to adjust it. In this connection it will be noted that an opening 54 is formed in the cover 31 opposite the squared end of the element in order to enable access to the element without the necessity of removing the set screw 31^a or opening the cover 31. The member 51 is formed with ears 51^a which are located at opposite sides of an outwardly extending part 55 of the boss 33, the said member being pivotally connected to the boss by a pin 56 which passes through the ears 51^a and the upwardly extending part 55. The member 51 is normally held against the body section 28^a by mechanism to be described hereinafter. When held in such position the threaded element 50 may be adjusted axially to move the valve 40 out of the chamber 42 against the action of the spring 47 and into the chamber 19^b so that the face 41 of the valve seats upon the rib 19^a of the element 19 and seals the passage 21 through the said element.

In accordance with the invention means is provided for forming an opening in the disc 22 as the valve 40 is moved toward its closed position, whereby when subsequently the valve is opened the contents of the container will discharge through the opening thus formed into the conduit connected to the union 44. To this end the valve 40 carries a punch 57, the shank of the punch being suitably secured in a socket 58 formed in the valve head 40 and being hollow at its outer end. Preferably the said outer end is beveled as at 59 to provide a knife-like cutting edge. It will be apparent that as the valve 40 moves toward its closed position the end of the punch 57 will pass through the disc 22 and cut away the central portion thereof as best shown in Figure 7. After the punch 57 passes through the disc 22 the valve 40 seats against the end 19^a of the element 19. There is only a short interval between the punching of the disc 22 and the seating of the valve. The amount of the compressed gaseous medium which escapes from the container 13 around the punch 57 is, therefore, negligible. Moreover as the punch passes through the disc a marginal flange is formed thereon which fits closely around the punch to reduce to a minimum escape of the gaseous medium between the punch and the disc.

The mechanism for holding the member 51 against the body section 28^a includes a lever 60 which is pivotally mounted upon a pin 61 between two arms 62 of the said body section. One end 63 of the lever extends between a pair of arms 64 of the member 51, the said arms carrying a pin 65 which passes through an arcuate slot 66 formed in the end 63 of the lever. When the lever 60 is in the full-line or retracted position shown, the pin 65 is located adjacent the inner end of the slot 66. The outer end 67 of the lever 60 is bifurcated (see Figure 9) to provide two legs 68. A roller 69 is mounted between the

ends of said legs upon a pin 70. A latch 71 is pivotally mounted in the chamber 30 upon a pin 72. One end of the latch is formed to provide a finger 73 which is movable between the legs 68 of the lever 60 to fit around the roller 69. The latch is provided with a tailpiece 74 which is pivotally connected to one end of a link 75, the opposite end of the said link being pivotally connected between ears 76 formed or provided upon the inner side of the panel 35.

When the valve 40 is seated, as shown in Figure 7, the spring 47 is compressed. Outward movement of the free end of the member 51 is prevented by the pin 65 acting against the wall of the slot 66. Owing to the curvature of the said wall the outer end 67 of the lever 60 would, unless provision were made to prevent it, be moved outwardly by the action of the spring 47. The latch 71, however, prevents such movement of the lever. Preferably the finger 73 of the latch is so formed that the resistance by the latch to the outward movement of the outer end 67 of the lever 60 tends to pivot the latch slightly upon the pin 72. This action of the latch 71 is transmitted through the link 75 to the panel 35. The panel, therefore, offers a slight resistance when an attempt is made to open it. Accidental opening of the panel is thus prevented.

It will be apparent that upon moving the panel 35 to its extended position, that is to say to the dotted-line position shown in Figures 5 and 7, the latch 71 is pivoted upon the pin 72 to release the lever 60. The lever, therefore, is permitted to pivot upon the pin 61, the pin 65 moving to the opposite end of the slot 66 during such movement of the lever and permitting the member 51 to pivot upon the pin 56 to the dotted-line position shown. The valve 40, therefore, opens to permit the discharge of the compressed gaseous medium in the manner described, the panel 35 being formed with a depression 77 to accommodate the end of the lever 60 when it is in its extended position.

When once the panel is moved to its extended position to release the valve 40 the latter cannot be closed by the panel nor can the panel be returned to its original position. Any attempt to close the panel 35 after release of the valve 40 in the manner described results in the application of the force to the pin 65 at right angles to the direction in which it must be applied in order to return the member 51 to its original position against the body section 28^a. The construction described, therefore, has the advantage that when the valve 40 has been once released to permit discharge of the contents of the container 13 the panel 35 will thereafter remain in its extended position and serve as an indication or warning of this fact. The condition of the container, therefore, can be readily determined by an inspection of the panel 35.

While the panel 35 cannot be returned to its original position when once it has been operated to release the valve 40, the latter may be closed, if desired, by further adjustment of the threaded element 50. In other words, after the member 51 moves to the dotted-line position shown in Figure 7 to permit the valve 40 to open, the element 50 may be further adjusted to seat the said valve again and prevent further discharge of the gaseous medium. In order to enable the return of the panel 35 to its normal position, the threaded element 50 must be unscrewed to such an extent with relation to the stem of the valve 40 that the member 51 can be returned to its position

against the body member 28^a without compression of the spring 47.

From the foregoing it will be apparent that the device is available for use in connection with containers of standard design, the device being attached to a container when the latter is placed in service and being removed when the container is taken out of service. In attaching the device, the threaded element 50 is adjusted to the position shown in Figure 6 and the panel 35 is fully closed. In this position the valve 40 is fully open. The end 16 of the union 14 is then screwed into the threaded end of the passage 17 so that the sealing element 27 is compressed between the shoulder 26 and the end of the union. When the device is thus secured upon the container 13 the end of the punch 57 terminates in the vicinity of the sealing disc 22. The element 50 is then adjusted to move the valve 40 to its closed position, the punch 57 cutting away the central portion of the disc 22 during the initial part of the closing movement of the valve. When the panel 35 is operated to release the valve 40 in the manner described, the gaseous medium from the container passes through the opening formed in the disc 22, around the valve 40 and through the union and conduit connected thereto to the equipment to be inflated. As the valve opens the rib 46 imbeds itself in the sealing element 45 and prevents the escape of the gaseous medium around the stem of the valve. Thereafter the valve 40 can only be closed by further adjustment of the threaded element 50 in the manner described, the panel 35 being locked in its extended position to indicate that at least a part of the gaseous medium with which the container 13 is filled has been discharged.

Having fully described my invention, I claim:

1. The combination with a pressure container having a member for sealing the discharge outlet thereof and a valve seat, of a device for effecting the release of the contents of the container, said device including a valve, resilient means for holding said valve open, a punch carried by said valve, means for moving said valve into cooperating relation with said valve seat, said punch being operative during the initial part of the movement of said valve to form an opening in said member, means for securing said valve against said seat, quick acting mechanism for releasing said valve, whereby to permit discharge of the contents of the container through said opening, said mechanism including a member which is movable to a position which will indicate that said valve has been released and means whereby said member is locked in said position when said valve is released.

2. A device for controlling the release of the contents of a pressure container, said device including a valve, resilient means for moving said valve to an open position, means for closing said valve against the action of said resilient means, means for releasing said valve, whereby to permit discharge of the contents of the container, a member which is movable upon operation of said last named means to a position which will indicate that said valve has been released and means for closing said valve after it has been released without moving said member from said position.

3. A device for controlling the release of the contents of a pressure container, said device including a valve, resilient means for moving said valve to an open position, means for closing said valve against the action of said resilient means, means for releasing said valve, whereby to permit

discharge of the contents of the container, a member which is movable upon operation of said last named means to a position which will indicate that said valve has been released and means for locking said member in said position.

4. A device for controlling the release of the contents of a pressure container, said device including a valve, resilient means for moving said valve to an open position, means for closing said valve against the action of said resilient means, mechanism for releasing said valve, whereby to permit discharge of the contents of the container, said mechanism including a manually operable actuating member which when operated assumes a position which indicates that said valve has been released and means for closing said valve after it has been released without moving said member from said position.

5. A device for controlling the discharge of the contents of a pressure container, said device including a valve, resilient means for opening said valve, means for closing said valve against the action of said resilient means, mechanism for releasing said valve, whereby to permit discharge of the contents of the container, said mechanism including a manually operable actuating member which, when operated, assumes a position that indicates that said valve has been released and means for locking said member in such position.

6. A device for controlling the discharge of the contents of a pressure container, said device including a valve, resilient means for opening said valve, means for closing said valve against the action of said resilient means, mechanism for releasing said valve, whereby to permit discharge of the contents of the container, said mechanism including a manually operable actuating member which, when operated, assumes a position that indicates that said valve has been released and means for locking said member in such position, said second named means being operable after operation of said mechanism to again close said valve and prevent further discharge of said contents.

7. A device for controlling the discharge of the contents of a pressure container, said device including a valve, resilient means for moving said valve to an open position, a threaded element, a pivotally mounted member by which said element is carried, means for securing said member against movement at one limit of its range of movement, said threaded element being adjustable when said member is so secured to close said valve and means for releasing said securing means, whereby said member moves to the other limit of its range of movement to permit said valve to open, said threaded element being further adjustable while said member is at said other limit to again close said valve.

8. A device for controlling the discharge of the contents of a pressure container, said device including a valve having a stem, resilient means for moving said valve to an open position, a threaded element, a pivotally mounted member for carrying said element, means for holding said member against movement at one limit of its range of movement, said threaded element cooperating with said stem and being adjustable when said member is held at said limit to close said valve and means for releasing said securing means, whereby said member moves to the other limit

of its range of movement to permit said valve to open.

9. A device for controlling the discharge of the contents of a pressure container, said device including a valve provided with a stem, resilient means for moving said valve to an open position, a threaded element, a pivotally mounted member for carrying said element, means for holding said member against movement at one limit of its range of movement, said threaded element cooperating with said stem and being adjustable when said member is held at said limit to close said valve, said holding means including a pivotally mounted lever, an arcuate slot formed in one end of said lever, said member being connected to said lever by a pin which extends through said slot, a latch for holding the opposite end of said lever against movement and means for releasing said latch, whereby to permit said member to pivot to the other limit of its range of movement and thereby release said valve and permit it to open.

10. A device for controlling the discharge of the contents of a pressure container, said device including a valve having a stem, resilient means for moving said valve to an open position, a threaded element, a pivotally mounted member for carrying said element, means for holding said member against movement at one limit of its range of movement, said threaded element cooperating with said stem and being adjustable when said member is held at said limit to close said valve, said holding means including a pivotally mounted lever, an arcuate slot formed in one end of said lever, said member being connected to said lever by a pin which passes through said slot, a latch for holding the opposite end of said lever against movement and means for releasing said latch, whereby to permit said member to pivot to the other limit of its range of movement and thereby release said valve and permit it to open, said pin moving to such a point in said slot as to lock said lever against return to its original position.

11. A device for controlling the discharge of the contents of a pressure container, said device including a casing, a valve having a stem, resilient means for moving said valve to an open position, a threaded element, a pivotally mounted member for carrying said element, means for holding said member against movement at one limit of its range of movement, said threaded element cooperating with said stem and being adjustable when said member is held at said limit to close said valve, said holding means including a pivotally mounted lever, an arcuate slot formed in one end of said lever, said member being connected to said lever by a pin which passes through said slot, a latch for holding the opposite end of said lever against movement and an actuating element carried by said casing and to which said latch is connected, said actuating element being movable to release said latch, whereby to permit said member to pivot to the other limit of its range of movement and thereby release said valve and permit it to open, said pin moving to such a position in said slot as to lock said lever against return to its original position, said lever serving, when locked in this position, to hold said actuating element extended to indicate that at least a part of the contents of the container have been discharged.

CECIL ROY PHILLIPS.