

Nov. 10, 1942.

W. F. HURLBURT

2,301,876

OPERATING HEAD FOR MANUAL-RESET VALVES

Filed Jan. 10, 1941

6 Sheets-Sheet 1

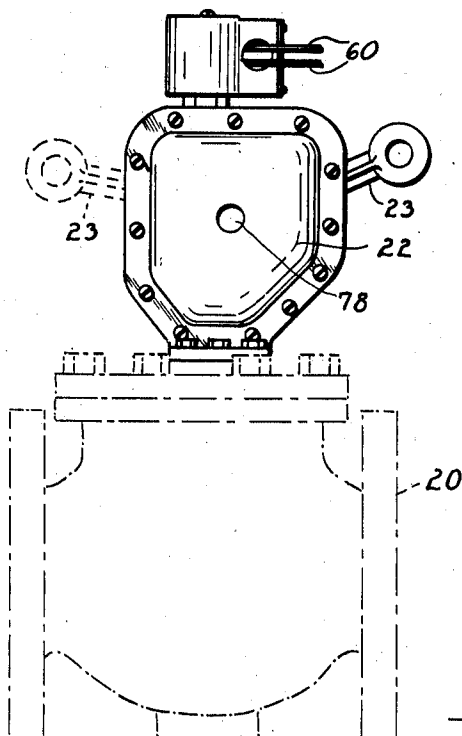


Fig. 1.

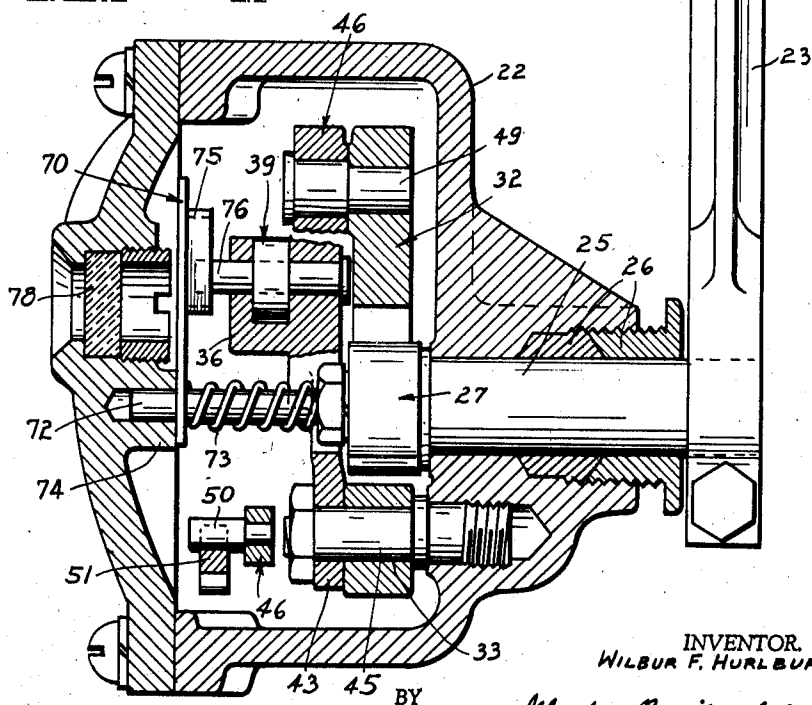


Fig. 3.

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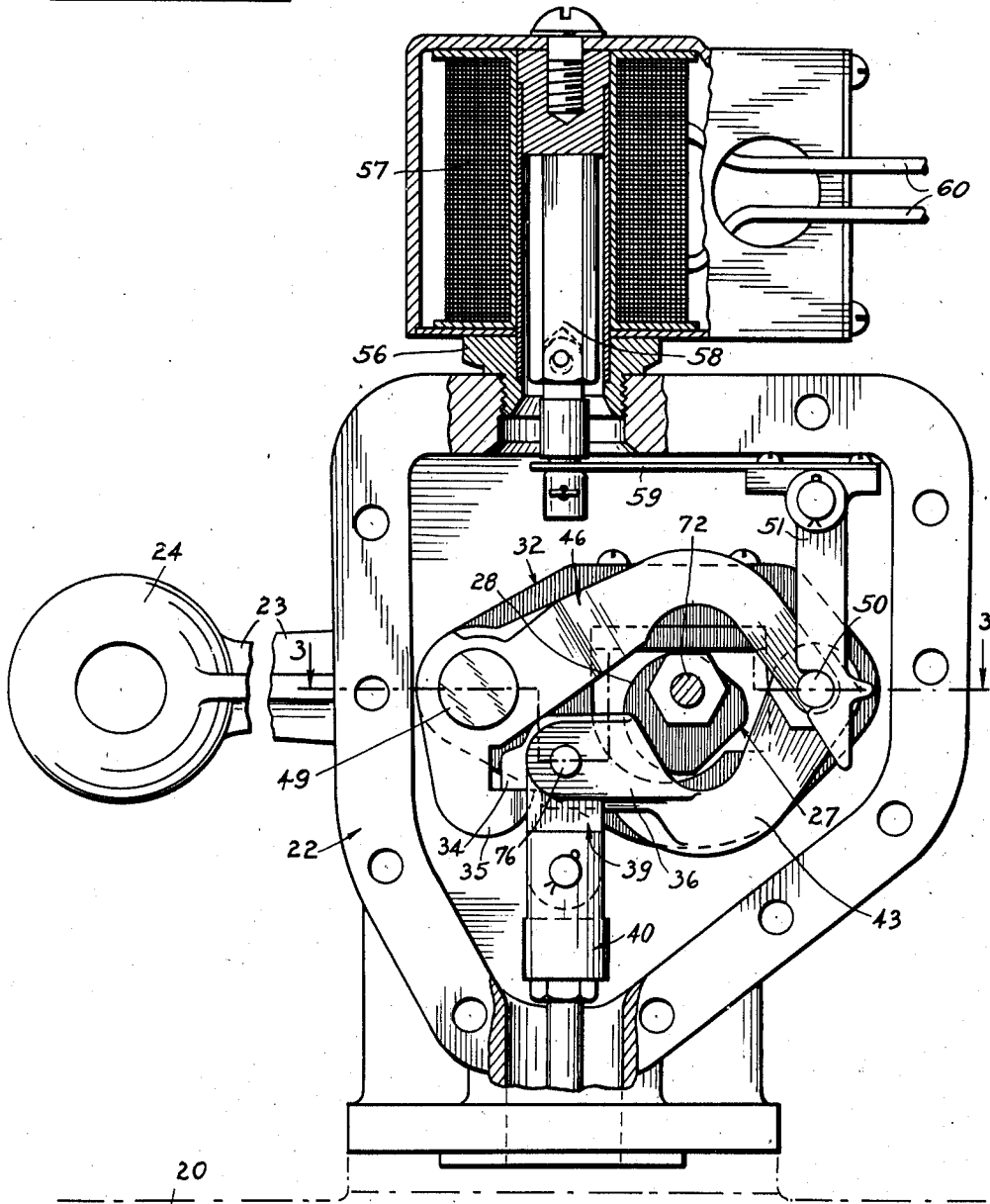
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Fig. 2.



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OPERATING HEAD FOR MANUAL-RESET VALVES

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6 Sheets-Sheet 3

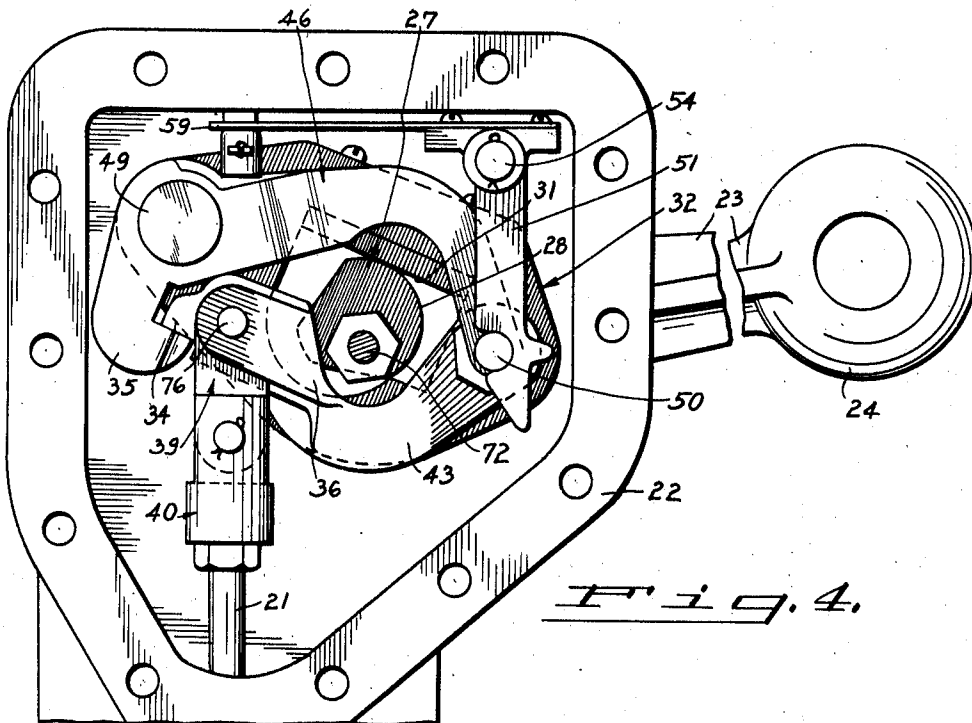


Fig. 4.

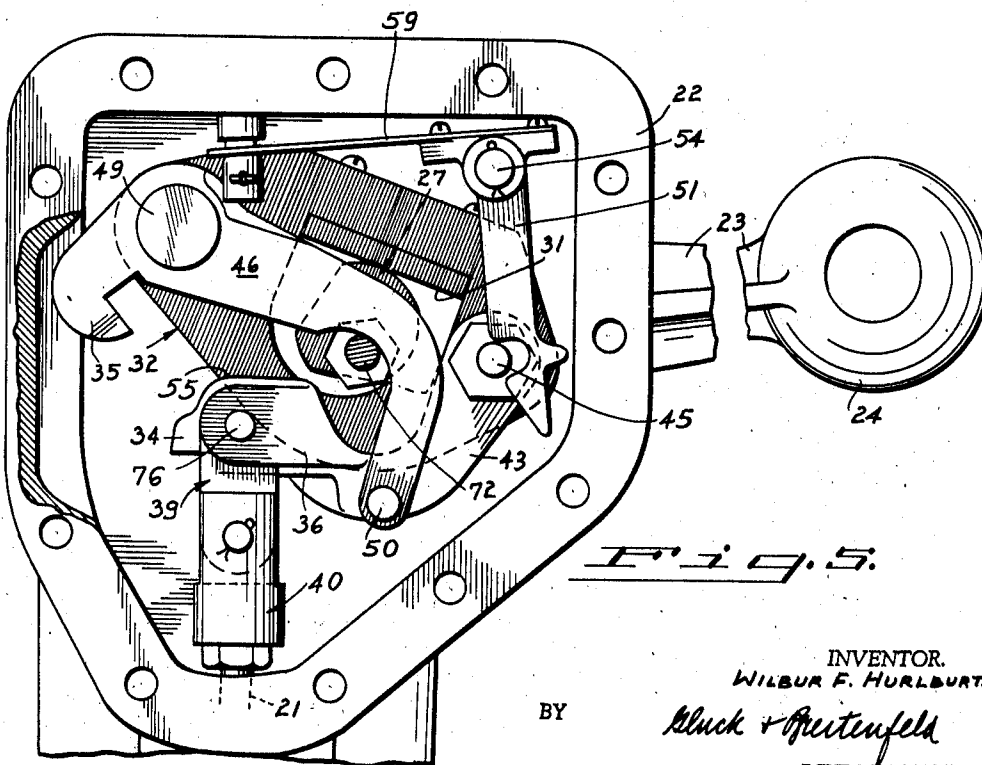


Fig. 5.

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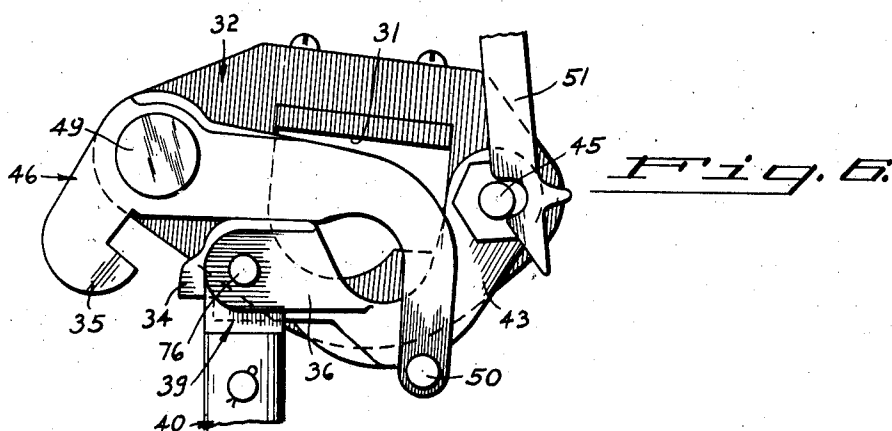
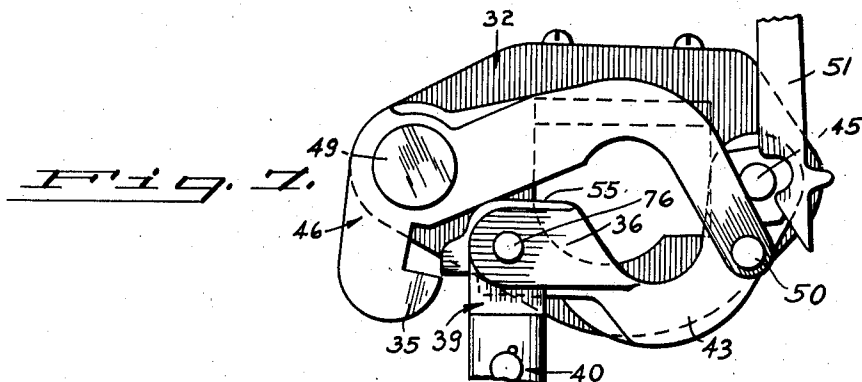
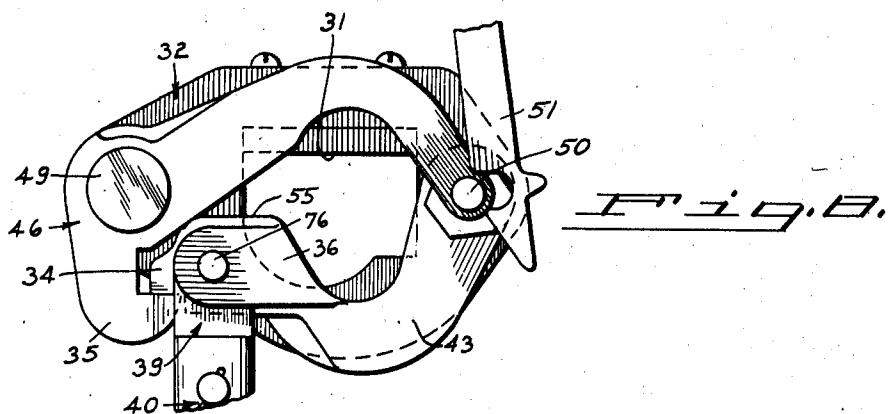
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OPERATING HEAD FOR MANUAL-RESET VALVES

Filed Jan. 10, 1941

6 Sheets-Sheet 4



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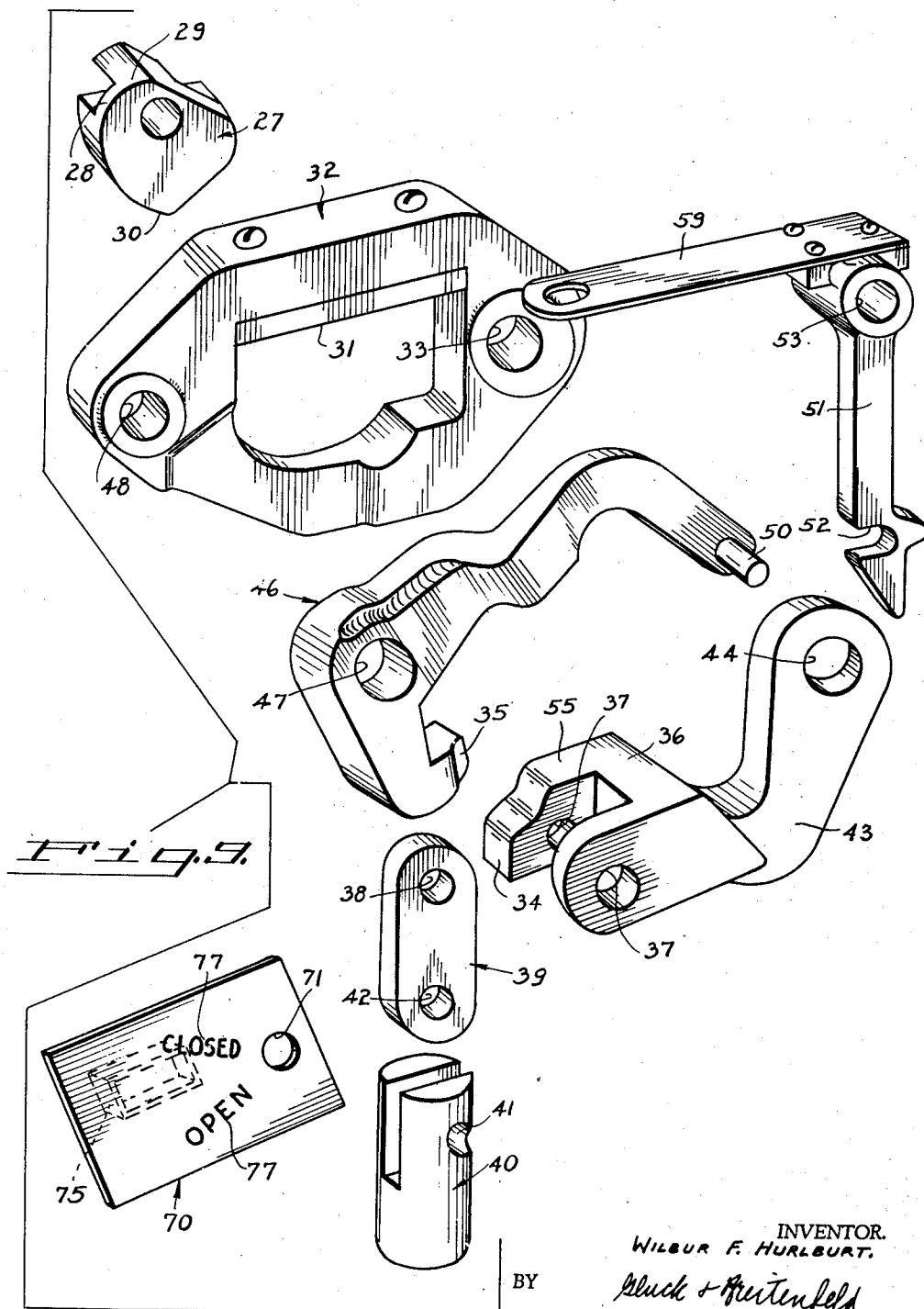
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OPERATING HEAD FOR MANUAL-RESET VALVES

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Nov. 10, 1942.

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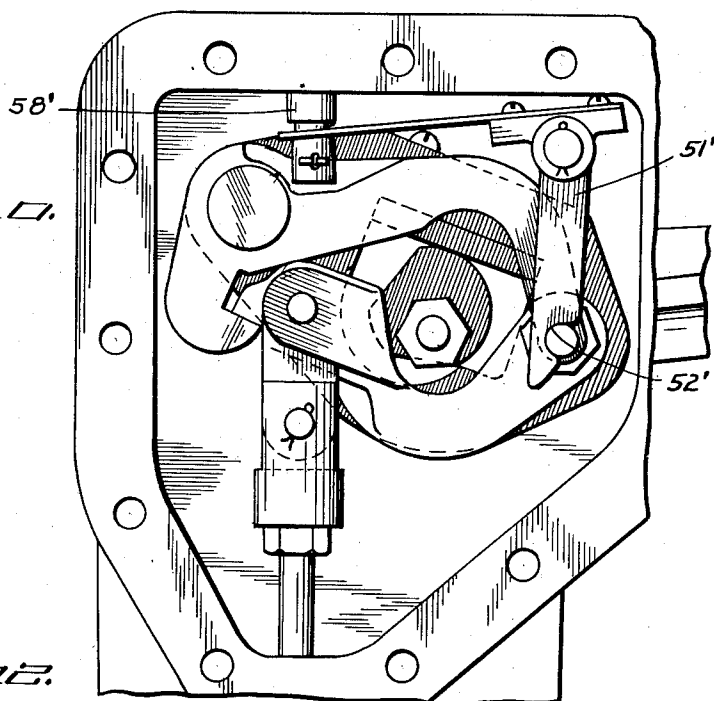
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OPERATING HEAD FOR MANUAL-RESET VALVES

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6 Sheets-Sheet 6

Fig. 10.



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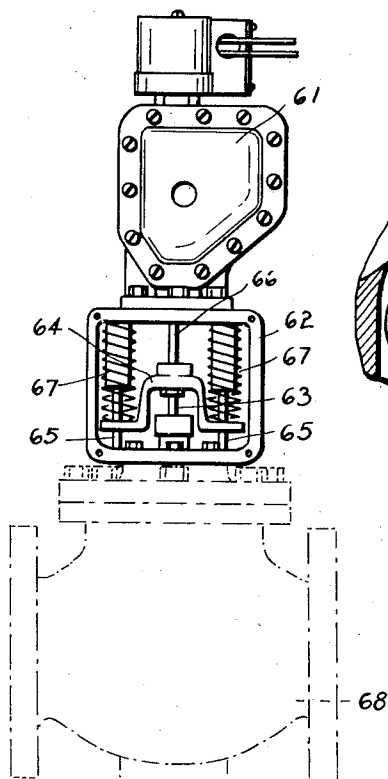
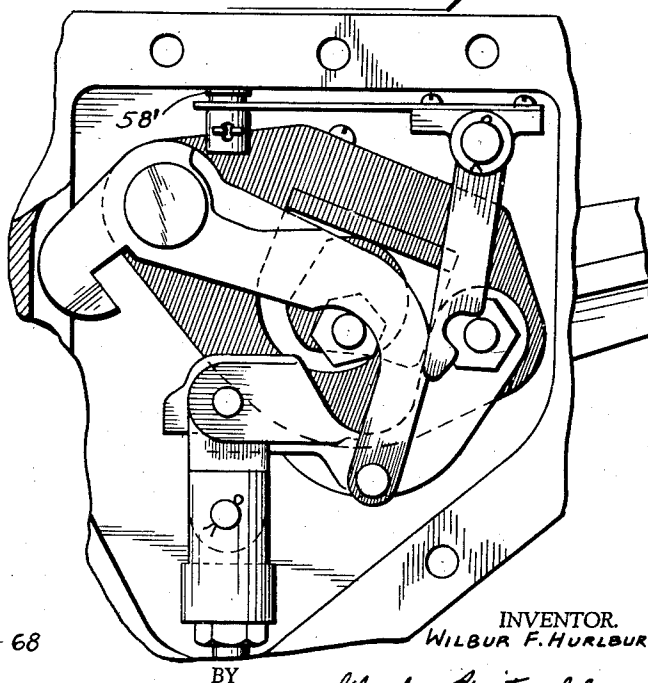


Fig. 11.



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UNITED STATES PATENT OFFICE

2,301,876

OPERATING HEAD FOR MANUAL-RESET VALVES

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Application January 10, 1941, Serial No. 373,918

14 Claims. (Cl. 137—139)

My present invention relates generally to valve-controlling apparatus, and has particular reference to an operating head of the so-called "manual-reset" type.

A manual-reset valve assembly is one in which the valve is adapted to be manually adjusted to a predetermined setting, and to be automatically returned to its original condition by some independent means. The object of such a valve assembly is to allow the valve to be set, and to remain set, only under certain predetermined conditions respecting the installation as a whole with which the valve is associated. An example is afforded by the so-called "safety shut-off" valve, which is a specific type of manual-reset valve. Such a valve might be used, for example, to control the flow of fuel to a burner, so that, for purposes of safety, the flow of fuel is permitted only under certain conditions, and is promptly discontinued under certain other conditions. To accomplish this mode of operation, the valve would be provided with a manually-controllable means for setting it into open state, and it would be provided with an independent means, controllable by factors respecting the burner installation as a whole, for automatically closing the valve, and preventing its re-opening.

It is a general object of the present invention to provide certain improvements in the operating head or device forming part of a manual-reset valve assembly. The invention is not restricted, in its applicability, by the particular purpose for which the valve is intended to be used, nor is it limited to any specific structure or mode of operation of the valve itself. It may be applied, for example, to globe valves, gate valves, or other types of valves; and the assembly may be designed to permit manual opening and automatic closing, or manual closing and automatic opening (as in the case of a sprinkler system, for example), or any other desired functioning.

A more particular object of the invention is to provide a device which affords an opportunity to apply to the valve an unusually great force through the instrumentality of a manually-controlled element of relatively compact nature. For example, by means of the present invention a force as high as five hundred or six hundred pounds may be applied to a valve stem by manual swing, through a small arc, of a handle that may be no more than six inches or so in length.

Another object of the invention is to provide a device in which the parts are so designed that maximum mechanical advantage is produced at the commencement of the manual adjustment.

This is of particular advantage where the valve is intended to be manually set from a closed condition into an opened condition.

A further object of the invention is to provide a device which is of unusual reliability in returning the valve to its original condition when the automatic control means is called upon to function. More particularly, the present improved structure allows the valve-operating mechanism to be associated with the valve without any intervening stuffing-box that might become the source of frictional impairment of smooth reliable operation at all times.

Briefly, the present operating device is of the type which comprises a manually-operable handle or similar instrumentality mounted for movement into and out of a setting position, a normally ineffective mechanism actuated by the handle and operable, when effective, to set the valve, a releasable holding means for rendering the mechanism effective, and a means independent of the handle for releasing the holding means. It is a particular feature of my invention to provide a specially-designed cam which is controlled by the manually-operable handle, and which serves to transmit movements of the handle, in a highly efficient manner, to the valve itself when the latter is to be set. A further feature of the invention lies in mounting the mechanism within a fluid-tight casing which is so designed that, if desired, it may be attached to the valve with the interior of the casing in direct communication with the interior of the valve.

I achieve the foregoing objects and advantages, and such other objects and advantages as may hereinafter appear or be pointed out, in the manner illustratively exemplified in the accompanying drawings, in which:

Figure 1 is an elevational view of an operating head constructed in accordance with the present invention, showing one illustrative manner in which it may be associated with a valve;

Figure 2 is an enlarged view, taken in substantially the same direction as Figure 1, with the cover removed and with certain parts omitted for the sake of clearness, and with other parts shown in cross-section;

Figure 3 is a cross-sectional view taken substantially along the line 3—3 of Figure 2;

Figure 4 is a view similar to Figure 2 showing the parts in the positions they assume when the valve is manually set;

Figure 5 is a view similar to Figure 4 showing the parts in the positions they assume when the

automatic means has become operative to return the valve to original condition;

Figures 6, 7, and 8 are fragmentary views, similar to Figures 2, 4, and 5, showing the manner in which the parts are restored from the condition of Figure 5 to that of Figure 2;

Figure 9 is an exploded view of certain of the elements of the mechanism;

Figure 10 is a view similar to Figure 4 illustrating a slight modification;

Figure 11 is a view similar to Figure 5, showing the parts of Figure 10 after the automatic means has functioned; and

Figure 12 is a view similar to Figure 1, illustrating an alternative mode of attaching the operating head to a valve.

In Figure 1 I have shown, in dot-and-dash lines, a typical valve 20 with which the present improved operating head may be associated. I have chosen to show the general contours of a globe valve and it will be understood that such a valve includes a valve stem 21 (see Figure 2) which projects upwardly through the top wall of the valve body. Usually, this valve stem passes through a stuffing-box, but the present invention permits the stuffing-box to be dispensed with, and allows the valve stem 21 to extend freely into the fluid-tight casing 22 forming part of the operating head. This casing may be of any suitable construction or shape, and it is provided with an attachment flange or similar means for securing it directly to the valve body 20 so that the interior of the casing 22 is in direct communication with the interior of the valve body 20. The details of this attachment have not been illustrated, but will be readily understood by those skilled in the art. The casing 22 is preferably in the form of a hollow box-like body to which a cover plate (shown at the left of Figure 3) is removably secured. It will be understood that gaskets and similar well-known instrumentalities are employed, wherever necessary, to make the casing 22 fluid-tight, and to secure it in fluid-tight relation to the valve body.

Mounted in the casing 22, for swinging movement into and out of a setting position, is a manually-operable member which I have shown in the form of a handle 23 having a knob-like grip 24 at its free end. This handle is secured at its opposite end to a pivot shaft 25 that extends into the casing 22. The shaft 25 passes through a gland or stuffing-box 26, but since the handle 23 is always under manual control, no frictional resistance of this stuffing-box can ever impair any of the automatic operations.

The handle 23 is mounted for movement from the inoperative position shown in Figure 2 (and shown in dot-and-dash lines in Figure 1) to the setting position shown in Figures 4 and 5 (and shown in full lines in Figure 1).

On the interior end of the shaft 25 I provide a cam 27. The contour of this cam is shown most clearly in Figures 2, 4, 5, and 9. Its operative surface 28 follows an approximately spiral path with respect to the axis of rotation of the cam. As a result, the end portion 29 of this operative surface is relatively close to the axis of rotation while the end portion 30 is relatively remote.

The cam 27 engages with a cam-following surface 31 provided on a rocker 32. This rocker is provided with a bearing 33 adjacent to one end, to engage over a fixed pivot 45 (see Figure 3) secured to the interior of the casing 22. In its midportion the rocker 32 is provided with a recess within which the cam 27 is accommodated. The

cam-following surface 31 forms the uppermost wall of this recess.

When the handle is in the inoperative position of Figure 2, the cam surface portion 29 is in contact with the surface 31, and the free end of the rocker 32 is in the relatively depressed position shown in Figures 2 and 8. When the handle 23 is swung into the setting position, the cam surface 28 bears upwardly against the surface 31 and causes the rocker to swing into the position shown in Figures 4 and 5. As a result of this relationship of parts, and of the contour of the cam surface 28, it will be observed that maximum mechanical advantage is produced at the commencing of movement of the handle 23 toward setting position. This is of unusual advantage where the setting of the valve is intended to lift or move the valve from a closed condition to an open one, because maximum force is required at the very commencement of such a procedure.

The rocker 32 forms one element of a mechanism by means of which the movement of the handle to its setting position is transmitted to the valve stem 21, whenever certain conditions respecting the valve installation as a whole have been complied with and are maintained. This mechanism includes interengaging fingers, one of which is articulated to the valve stem, while the other is carried by the rocker 32.

These fingers, designated 34 and 35, are formed on elements which are most clearly shown in Figure 9. The finger 34 constitutes one arm of a U-shaped yoke 36 having aligned openings 37 adapted to receive the pivot pin 76. This pin passes also through an opening 38 at the upper end of a link 39. The lower end of this link fits into the slotted member 40 that is formed or provided on the upper end of the valve stem 21, and a second pivot pin (not shown) passes through aligned openings 41 in the member 40 and through the opening 42 in the link 39. In this way, the finger 34 is articulated to the upper end of the valve stem 21.

Extending rearwardly from the yoke 36 is an arm 43 which may be considered as a rearward extension of the finger 34. At its end the extension 43 is provided with an opening 44 adapted to fit over the pivot 45. As a result, during the up and down movements of the finger 34, it swings about a pivot axis coincident with the pivot axis of the rocker 32.

The finger 35 is adapted to engage beneath the finger 34 for the purpose of lifting it, and hence the valve stem, when the handle is thrown into the setting position. The finger 35 is formed at the end of an angular element 46 that is pivoted at its midportion to the rocker 32. For this purpose, the element 46 is provided with an opening 47, the rocker 32 is provided with an opening 48, and a pivot pin 49 (see Figure 3) extends through these openings.

The rear portion of the element 46 is shaped in an offset manner so as to clear the extension 43. At its end, the element 46 is provided with the pin 50. This pin is so positioned that when the element 46 is pivoted, the pin 50 can be brought into alignment with the axis of the pivot 45.

It will be observed that the finger 35 is thus mounted for pivotal movement into and out of cooperation relation to the finger 34. For example, in Figure 2 the finger 35 is positioned directly beneath the finger 34 whereby the fingers are interengaged; while in Figures 5, 6, and 7,

the finger 35 is out of interengaging relation to the finger 34.

In accordance with my invention, these fingers are held in interengaging relationship by means of a releasable holding means. I have shown this holding means in the form of a pivoted keeper 51 having a notch 52 adapted to engage the pin 50 when the latter is in alignment with the pivot 45. The upper end of the keeper 51 is provided with an opening 53 adapted to fit over a fixed pivot 54 (see Figures 2-5) provided on the interior of the casing 22.

When the keeper 51 is in operative position, it engages the pin 50 as shown in Figures 2 and 4. When the keeper is released, in a manner presently to be described, it swings into the position shown in Figures 5-8, whereby the finger 35 swings into the free position of Figure 5.

Unless the pin 50 is held by the keeper 51, the fingers 34 and 35 are either out of engagement, or ineffectively cooperable. This will become apparent upon a consideration of the manner in which the mechanism functions, and attention is now directed to Figures 2-8.

In Figure 2, the valve stem is in its low position, and it may be assumed, for the purpose of this explanation, that the valve carried by the valve stem 21 is in a seated or closed position with respect to its valve seat. The handle 23 is in its inoperative position. The fingers 34 and 35 are in cooperable relation to each other, and the pin 50 is held by the keeper 51. If the handle 23 be now swung into the setting position of Figure 4, it will be observed that both the rocker 32 and the interengaging fingers swing as a unit around the pivot 45. This lifts the valve stem 21 into the position of Figure 4. On the assumption that the valve was previously closed, this lifting of the valve stem serves to open the valve.

The valve will remain in its set condition so long as the holding means, i. e., the keeper 51, is operative to hold the pin 50 and thereby render the mechanism effective. In other words, so long as the keeper 51 holds the pin 50, as shown in Figures 2 and 4, the movements of the valve stem are under the control of the manually-operable handle.

If the holding means be now released, i. e., if the keeper 51 is swung into the position of Figure 5, the element 46 drops to the position of Figure 5. This swinging movement is brought about by the downward pressure of the finger 34 upon the finger 35 by virtue of the weight of the valve stem and valve, or under the influence of a spring or springs (not shown) that may be provided in the valve body for exerting yieldable pressure upon the valve. As will be obvious from an inspection of Figure 5, the swinging of the element 46 disengages the fingers 34 and 35 and allows the valve to return to its original position. This is effected independently of the handle 23 which still remains in the setting position.

Before the valve can be reset, the handle 23 must first be swung back to its inoperative position. During this return movement of the handle, the parts adjust themselves, successively, into the relationships shown in Figures 6-8. It will be observed that as the rocker 32 returns to its original position the undersurface of the element 46 encounters the upper surface 55 of the yoke 36, this encounter serving to swing the element 46 into the position of Figure 8, in which the fingers 34 and 35 are again interengaged.

However, so long as the keeper 51 remains in the released position of Figures 5-8, the mecha-

nism actuated by the handle 23 is ineffective to reset the valve. Should any resetting be attempted, the finger 35 will merely slide away from beneath the finger 34, and the parts would successively assume the relationships shown in Figures 8, 7, and 6. In other words, the handle 23 could be freely moved in either direction, but to no avail.

In order for the mechanism to be again effective in transmitting the movement of the handle to the valve stem, the holding means has to be rendered operative. This means that the keeper 51 has to be moved from the release position of Figure 8 to the holding position of Figure 2.

This holding means is actuated by an instrumentality entirely independent of the manually-operable handle 23, and controlled solely by extraneous factors. Preferably, this instrumentality is electrical in nature, such as a solenoid. The solenoid may be attached directly to the casing 22, and I have shown an illustrative construction in Figure 2 in which the solenoid is provided with a screw-threaded fitting 56 adapted to be mounted in a suitably threaded bore in the top wall of the casing 22. Needless to say, this engagement is made fluid-tight by any known means. The solenoid which I have chosen to illustrate has a winding 57 and a movable core 58. The lower end of the core is suitably articulated to an arm 59 secured to the keeper 51 in the region above the pivot 54.

The lead wires 60, which control the solenoid, are connected to a suitable circuit or circuits which either control or reflect the extraneous conditions that have to be complied with before the valve may be set.

In the embodiment illustrated in Figures 2-8, the upward movement of the core 58, i. e., an energization of the solenoid, results from a compliance with the predetermined extraneous factors. This draws the keeper 51 into the operative holding position shown in Figures 2 and 4. Should the solenoid core 58 drop at any time, either before, during, or after the setting of the valve by means of the handle 23, the present mechanism becomes immediately ineffective to set the valve.

As a convenient expedient for indicating, on the exterior of the device, whether the valve stem is in raised or lowered position at any instant of time, an indicator plate 70 may be associated with the parts, if desired, as shown most clearly in Figures 3 and 9. This plate has an opening 71 mounted on a pivot pin 72 coincident with the axis of the cam 27. A spring 73 may serve to press the plate 70 against the inner face of a boss 74 within which the pivot pin 72 is mounted. On its rear face, the plate 70 is provided with an elongated guide 75 positioned to receive the end of the pivot pin 76. As a result of this arrangement of parts, the plate 70 swings around the pin 72 in correlation with the upward and downward movement of the finger 34, i. e., of the valve stem. By providing suitable markings 77 on the front face of the plate 70 in suitable relation to a window 78 formed in the casing, the operator can determine whether the valve stem is in its raised or lowered position.

Obviously, it makes no difference from the standpoint of the present invention whether the upward movement of the solenoid core 58 is brought about by an energization of the solenoid or by a deenergization.

Similarly, it may be desirable, under certain circumstances, that the release of the holding

means be brought about, not by a dropping of the solenoid core, but by an upward movement of this core.

Such a modification is illustrated in Figures 10 and 11. In these figures, the parts are substantially the same as those which have been hereinbefore described, except that the keeper 51' is provided with a notch 52' on the opposite side from that of the keeper 51. This means that the keeper 51' is mounted for swinging movement between the holding position of Figure 10 and the release position of Figure 11. It is moved into the holding position when the solenoid core mechanism 58' drops to the position of Figure 10, and it is swung into the released position when this solenoid core rises to the position of Figure 11. Whether the up and down movements of the solenoid core are brought about by the passage of electric current into the solenoid, or by a discontinuance of such current is of course immaterial.

In the device illustrated in Figures 1-11, all of the elements within the casing 22, including the solenoid core and the wall of the chamber within which it moves, are submerged within the liquid or gas that is present in the valve body. This liquid or gas may under certain circumstances be of a character which would be deleterious to the material of which the parts are made. In such a case, it may not be possible to dispense with the valve stuffing-box, but the other advantages of the present invention may nevertheless be enjoyed. That is to say, the present device is of such a character that it need not necessarily be associated with the valve body in the manner hereinbefore described.

By way of example, I have shown an installation in Figure 12 in which a valve body 68 is assumed to contain a liquid or gas which must be shielded from contact with the elements of the present mechanism. The casing 61 of the operating head, corresponding to the casing 22 hereinbefore described, is mounted upon an intermediate casing 62, while the latter is mounted in association with the valve body 68. Projecting into the casing 62, through a suitable stuffing-box, is the valve stem 63. It is connected to a yoke 64 slidably mounted for guided up and down movement upon guide rods 65. Carried by the yoke 64, and extending upwardly into the casing 61 is the rod 66. This rod corresponds to the valve stem 21 hereinbefore described, and the mechanism within the casing 61 is exactly the same as that which has been shown and described in detail in the other figures of the drawings.

Compression springs 67 may be advantageously mounted within the casing 62 to bear downwardly upon the yoke 64 and thereby yieldably urge the valve stem 63 in a downward direction, i. e., in a direction opposite to that in which it would be moved upon manual setting of the valve. The springs 67 fulfill the same function as the spring or springs that may be mounted within the valve body itself, where the liquid or gas within the valve body is innocuous.

It will be thus observed that I have provided a manual reset valve assembly which embodies numerous outstanding advantages. Not only is the structure compact and of workmanlike design, but also highly efficient and reliable in service. Notwithstanding the fact that the handle is of relatively small size, and has a relatively small throw, the mechanism is such that unusually large forces may be transmitted to the valve

which is to be set. Moreover, the unit embodies what is known as a "free" handle, i. e., a handle which is at all times under the absolute control of the automatic means which guards against a setting of the valve under faulty extraneous conditions.

By virtue of the fact that, when the mechanism is associated with the valve, the usual stuffing-box can be dispensed with, the device is most reliable in its automatic operation. This automatic control, being capable of embodiment in the form of an electrically-operated device, permits it to be conveniently interlocked with motor supply circuits, liquid and gas meters, tank level controls, photo-electric devices, temperature and pressure limiting controls, and many other devices of similar character. The valve may thus be efficiently used for a large variety of purposes, such as the stopping or starting of pumps, turbines, stokers, or engines, the release of water, chemicals, or gases for fire protection purposes, the feeding or cutting off of fuel or air in connection with burners of various types, and in process installations generally, involving some sort of manual starting or stopping and corresponding automatic discontinuance or commencement of operations, as the case may be.

In general, it will be understood that changes in the details herein described and illustrated for the purpose of explaining the nature of my invention, may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims. It is therefore intended that these details be interpreted as illustrative, and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam mounted on a pivot and controlled in its pivoting movement by said handle, normally ineffective mechanism actuated by the pivotal movement of said cam and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means.

2. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam mounted on a pivot and controlled in its pivoting movement by said handle, normally ineffective mechanism actuated by the pivotal movement of said cam and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means; said mechanism comprising a rocker provided with a cam-following surface engaged by said cam, and said cam being designed to produce maximum mechanical advantage at the commencement of movement of said handle toward setting position.

3. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam mounted on a pivot and controlled in its pivoting movement by said handle, normally ineffective mechanism actuated by the pivotal movement of said cam and operable, when effective, to set the valve, releasable holding means for

rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means; said handle being mounted on said cam pivot for pivotal movement of the handle about one end thereof.

4. In a valve-operating head of the character described, a fluid-tight casing adapted to be attached to the valve with the interior of the casing in direct communication with the interior of the valve, a manually-operable handle mounted in said casing for movement into and out of a setting position, normally ineffective mechanism within said casing and controlled by said handle and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle for releasing said holding means.

5. In a valve-operating head of the character described, a fluid-tight casing adapted to be attached to the valve with the interior of the casing in direct communication with the interior of the valve, a manually-operable handle mounted in said casing for movement into and out of a setting position, normally ineffective mechanism within said casing and controlled by said handle and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle for releasing said holding means; said valve including a valve stem extending into said casing, and said mechanism comprising interengageable fingers one of which is articulated to said valve stem.

6. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam controlled by said handle, normally ineffective mechanism actuated by said cam and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means; said valve including a valve stem, and said mechanism comprising a rocker engaged by said cam, and interengageable fingers one of which is articulated to said valve stem while the other is pivoted to the rocker.

7. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam controlled by said handle, normally ineffective mechanism actuated by said cam and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means; said valve including a valve stem, and said mechanism comprising a rocker engaged by said cam, and interengageable fingers one of which is articulated to said valve stem while the other is pivoted to the rocker, said last-named finger being pivotable into and out of cooperable relation to the other.

8. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a cam controlled by said handle, normally ineffective mechanism actuated by said cam and operable, when effective, to set the valve, releasable holding means for rendering said mechanism effective, and means independent of the handle and cam for releasing said holding means; said valve including a valve stem, and said mechanism comprising a rocker engaged by said cam, and interengageable fingers one of which is articulated to

said valve stem while the other is pivoted to the rocker, said last-named finger being pivotable into and out of cooperable relation to the other, and provided with an extension adapted to be engaged by said holding means.

9. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a rocker controlled by said handle, a finger articulated to the stem of the valve to be operated, a second finger carried by the rocker and mounted for pivotal movement into and out of interengaging relation to the other finger, releasable means for holding said second finger in said interengaging relation to the other, and means independent of said handle for releasing said holding means, whereby movements of the handle are transmitted to said valve stem so long as the holding means remains unreleased.

10. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a rocker controlled by said handle, a finger articulated to the stem of the valve to be operated, a second finger carried by the rocker and mounted for pivotal movement into and out of interengaging relation to the other finger, releasable means for holding said second finger in said interengaging relation to the other, and means independent of said handle for releasing said holding means, whereby movements of the handle are transmitted to said valve stem so long as the holding means remains unreleased; said holding means comprising a pivoted keeper, and said second finger being provided with an extension adapted to be pivotally engaged by said keeper.

11. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a rocker controlled by said handle, a finger articulated to the stem of the valve to be operated, a second finger carried by the rocker and mounted for pivotal movement into and out of interengaging relation to the other finger, releasable means for holding said second finger in said interengaging relation to the other, and means independent of said handle for releasing said holding means, whereby movements of the handle are transmitted to said valve stem so long as the holding means remains unreleased; said holding means comprising a pivoted keeper, and said second finger being provided with an extension adapted to be pivotally engaged by said keeper, said extension and keeper being so arranged that the engagement between them occurs along an axis coincident with the pivot axis of said rocker.

12. In a valve-operating head of the character described, a manually-operable handle mounted for movement into and out of a setting position, a rocker controlled by said handle, a finger articulated to the stem of the valve to be operated, an extension carried by said finger and pivoted along an axis coincident with the pivot axis of the rocker, a second finger carried by said rocker and mounted for pivotal movement into and out of interengaging relation to the other finger, releasable means for holding said second finger in said interengaging relation to the other, said holding means comprising a pivoted keeper, said second finger being provided with an extension adapted to be pivotally engaged by said keeper along an axis coincident with the pivot axis of said rocker, whereby said rocker and fingers, during interengagement of the latter, move as a

unit under the influence of said handle, and means independent of said handle for releasing said keeper.

13. In a valve-operating head of the character described, a fluid-tight casing adapted to be attached to the valve with the interior of the casing in direct communication with the interior of the valve, a manually-operable handle mounted in said casing for movement into and out of a setting position, a cam mounted on a pivot within said casing and controlled in its pivoting movement by said handle, normally ineffective mechanism within said casing actuated by the pivotal movement of said cam and operable, when effective, to set the valve, releasable holding means in said casing for rendering said mechanism effective, and means independent of the handle for releasing said holding means.

14. In a valve-operating head of the character

described, a fluid-tight casing adapted to be attached to the valve with the interior of the casing in direct communication with the interior of the valve, a manually-operable handle mounted in said casing for movement into and out of a setting position, a cam mounted on a pivot within said casing and controlled in its pivoting movement by said handle, normally ineffective mechanism within said casing actuated by the pivotal movement of said cam and operable, when effective, to set the valve, releasable holding means in said casing for rendering said mechanism effective, and means independent of the handle for releasing said holding means, said valve including a valve stem extending into said casing, and said mechanism comprising interengageable fingers one of which is articulated to said valve stem.

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