Oct. 6, 1931. C. J. SMITH 1,826,097

VALVE MECHANISM

Filed April 5, 1927

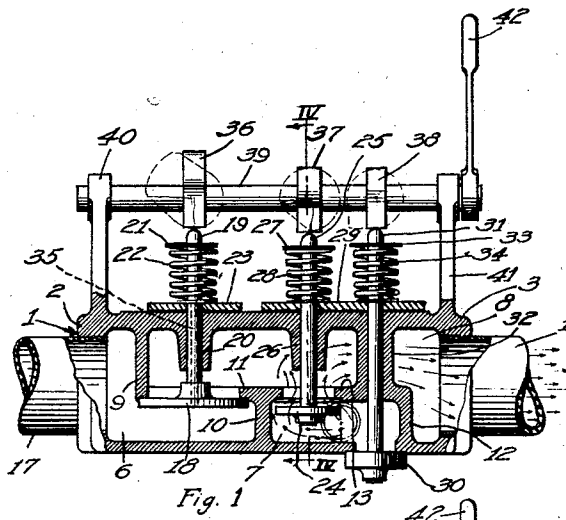


Fig. 1

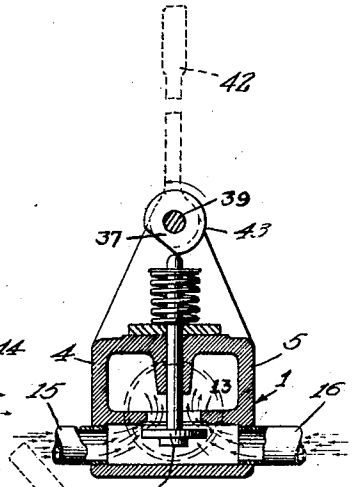


Fig 4.

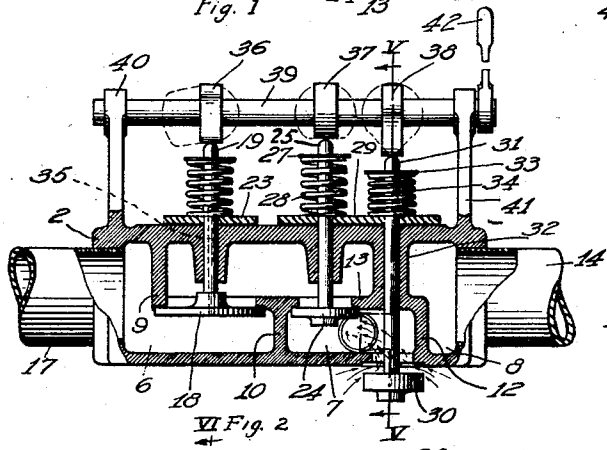


Fig. 2

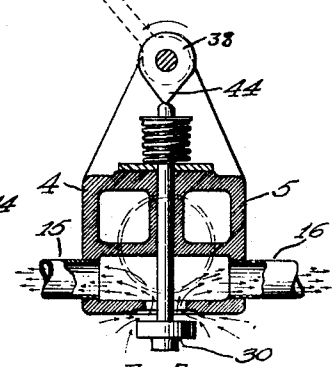


Fig. 5.

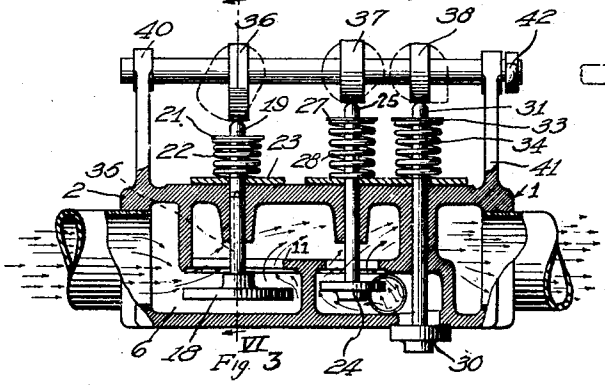


Fig. 3

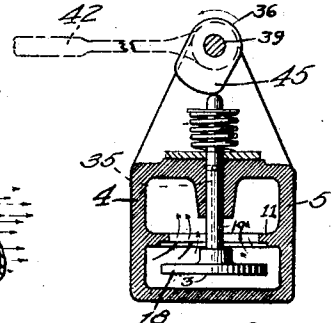


Fig. 6.

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1,826,097

UNITED STATES PATENT OFFICE

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VALVE MECHANISM

Application filed April 5, 1927. Serial No. 181,046.

This invention relates to an improvement in valve mechanisms and more particularly to an improved valve control mechanism for regulating passage of fluid through a plurality of conduits.

It is an object of this invention to provide improved mechanism for opening and closing fluid communication of a plurality of connecting conduits and for opening and closing fluid communication of the conduits with the atmosphere.

Further objects of this invention will appear from a consideration of the following specification taken in connection with the accompanying drawings, in which:

Fig. 1 is a part longitudinal section of the device showing one of the valves in its open position;

Fig. 2 is a part longitudinal section showing a second valve open, the previously opened valve being closed;

Fig. 3 is a part longitudinal section showing the first and third valve open, the second being closed;

Fig. 4 is a transverse section through the open valve shown in Fig. 1 taken along the section line IV—IV of Fig. 1;

Fig. 5 is a transverse section through the second open valve shown in Fig. 2 taken along the section line V—V of Fig. 2; and

Fig. 6 is a transverse section through the last open valve shown in Fig. 3, taken along the section line VI—VI of Fig. 3.

This device is primarily intended for use in connection with the vacuous shaping of flat built casings and the arrangement thereof suitable for such use as disclosed in Patent No. 1,635,243, issued July 12, 1927.

Referring particularly to the drawings, the device comprises a box 1 having top and bottom walls, end walls 2 and 3, and side walls 4 and 5. The interior of the box is divided into three compartments 6, 7 and 8. Compartment 6 is formed by the end wall 2, by a portion of the top and bottom walls and by a partition extending laterally across the box which comprises a wall 9 depending from the top wall of the box, a wall 10 projecting from the bottom wall of the box and a wall 11 extending between the walls 9 and 10, as shown in Figs. 1 to 3 and 6. The chamber 7 is formed by the bottom wall of the box, the wall 10, a wall 12 projecting upwardly from the bottom wall of the box and a wall 13 which is connected to the walls 10 and 12. The chamber 8 constitutes the remainder of the interior of the box 1. A pipe 14 is secured to the end wall 3 of the box and opens into the chamber 8 forming a primary conduit. This pipe, in the preferred use of the valve control mechanism, is designed to be connected to a source of suction. Pipes 15 and 16 are secured to the side walls 4 and 5 respectively of the box and open into the chamber 7 forming a secondary conduit. Pipes 15 and 16, in the preferred use to which the device is to be put, are each designed to be connected to a closed fluid system. A pipe 17 is secured to the end wall 2 of the box and opens into the chamber 6 forming a secondary conduit. This pipe, also in the preferred use of the device, is designed to be connected to a closed fluid system.

Communication between chambers 6 and 8 is established by a hole in the wall 11. This hole is opened and closed by a valve comprising a valve disc 18 which is adapted to seat against the wall 11 and is carried by a valve stem 19, as particularly shown in Fig. 6. A projection 20 extending downwardly from the top wall of the box functions with the wall to provide a bearing through which the valve stem passes to the exterior of the box. A disc 21 is secured to the valve stem in spaced relation to the top wall of the box and is adapted to be engaged by one end of a coiled spring 22, the opposite end of which bears against a wear plate 23 which is fixed to the top wall of the box. The pressure of the spring 22 normally maintains the valve disc seated. Communication between chambers 7 and 8 is provided by a hole through the wall 13. A valve is provided to open and close communication through this hole, said valve comprising a valve disc 24 which is designed to seat against the wall 13 and is carried by a valve stem 25. A thickened guide portion 26 projects downwardly from the top wall of the box and is provided with an opening through which the valve stem protrudes ex-

teriorly of the box, as shown in Figs. 1 to 3 and 5. A disc 27 is secured upon the valve stem and is engaged by one end of a coiled spring 28, the other end of which seats against a wear plate 29 positioned upon the top wall of the box. The spring 28 normally maintains the valve disc in seated position.

Communication of the chamber 7 with the atmosphere is effected through an opening in the bottom wall of the box. This opening is opened and closed by a valve comprising the valve disc 30 which is carried by a valve stem 31, said valve stem extending through a guide consisting of the wall 13, a support 32 and the top wall of the box. A disc 33 is secured to the valve stem and is engaged by one end of a coiled spring 34, the other end of which engages the wear plate 29 and functions to normally maintain the valve disc seated against the bottom wall of the box. Communication of the chamber 6 with the atmosphere is obtained when the valve disc 18 is seated and is accomplished by means of a passageway 35 which extends through the disc 18 and stem 19 and opens to the atmosphere just above wear plate 23. When the valve disc 18 is unseated the outer opening of the passageway is closed by the top wall of the box.

Opening and closing of the valves is effected by means of cams 36, 37 and 38 which engage the valve stems 19, 25 and 31 respectively. These cams are rigidly mounted upon a spindle 39 which latter is rotatably mounted in supports 40 and 41 which project upwardly from the top wall of the box. A handle 42 is rigidly secured to the spindle 39. A diagrammatic showing of what constitutes a side view of the cams is shown in dotted lines in each of Figs. 1, 2 and 3. The cam 37 is provided with a high spot 43 and is so positioned upon the spindle 39 that as the handle 42 is moved from the position shown in Fig. 5, through the positions shown in Figs. 4, 5, 6 and 5 respectively, the valve 24 will be alternately opened and closed. The cam 38 is provided with a high spot 44 and is so positioned upon the spindle 39 that as the valve 24 opens, the valve 30 will close and as the valve 24 closes, the valve 30 will open. The cam 36 is provided with a high spot 45 and is so positioned upon the spindle 39 that the valve 18 will open and close while the valve 24 is opening and closing the second time, during the cycle of movements illustrated, as the handle passes respectively from the position shown in Fig. 5 through the positions shown in Figs. 4, 5, 6 and 5.

In the preferred operation of the device, with the pipe 14 connected to a source of suction, pipes 15 and 16 connected to a closed fluid system and pipe 17 connected to a second closed fluid system, the position of rest is that shown in Figs. 2 and 5. In this position valve 18 is closed, cutting off chamber 6 from communication with the source of suction and permitting communication of the chamber with the atmosphere through the passageway 35. Valve 24 is closed, cutting off communication of chamber 7 with the source of suction and valve 30 is opened exposing the chamber 7 to the atmosphere. The handle 42 is next moved to the position shown in Figs. 1 and 4, thereby closing communication of the chamber 7 with the atmosphere and placing the chamber in communication with the source of suction. The handle 42 is then moved back to the position shown in Figs. 2 and 5, closing the chamber 7 from the source of suction and opening it to the atmosphere. Further movement of the handle 42 to the position shown in Figs. 3 and 6 opens valves 18 and 24, placing chambers 6 and 7 in communication with the source of suction and at the same time the chambers are closed from the atmosphere. Upon moving the handle 42 back to the position shown in Figs. 2 and 5, chambers 6 and 7 are closed from the source of suction and are opened to the atmosphere.

While the invention has been particularly described as applied to a mechanism for opening and closing fluid communication of a plurality of conduits with a source of suction, it will be apparent that the apparatus can be used for opening or closing fluid communication either liquid or gaseous whether exposed to suction or pressure of a plurality of conduits and the claims are to be so understood.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A valve control mechanism comprising a casing having a main and a first and second auxiliary chamber, independently operable valves for connecting the main chamber to the first auxiliary chamber and for opening the first auxiliary chamber to the atmosphere, a single valve means for alternately opening the second auxiliary chamber to the main chamber and to the atmosphere.

2. A valve control mechanism comprising a casing having a main and a first and second auxiliary chamber, independently operable valves for connecting the main chamber to the first auxiliary chamber and for opening the first auxiliary chamber to the atmosphere, said valves normally being in closed position, a single valve for controlling communication between the second auxiliary chamber and the main chamber and having a passageway communicating between the second auxiliary chamber and the atmosphere when communication between the second auxiliary chamber and the main chamber is interrupted, and a cam means adjustable to a plurality of positions for co-operating with said valves in a manner such that in one position of the cam the main chamber and the first auxiliary chamber only are inter-

connected, in a second position the auxiliary chambers are open to the atmosphere, and in a third position both of the auxiliary chambers are interconnected with the main chamber.

Signed at Detroit, county of Wayne, State of Michigan, this 1st day of April, 1927.

CLYDE J. SMITH.