Feb. 7, 1939. R. B. GRANTHAM ET AL 2,146,470

VALVE

Filed Aug. 6, 1937

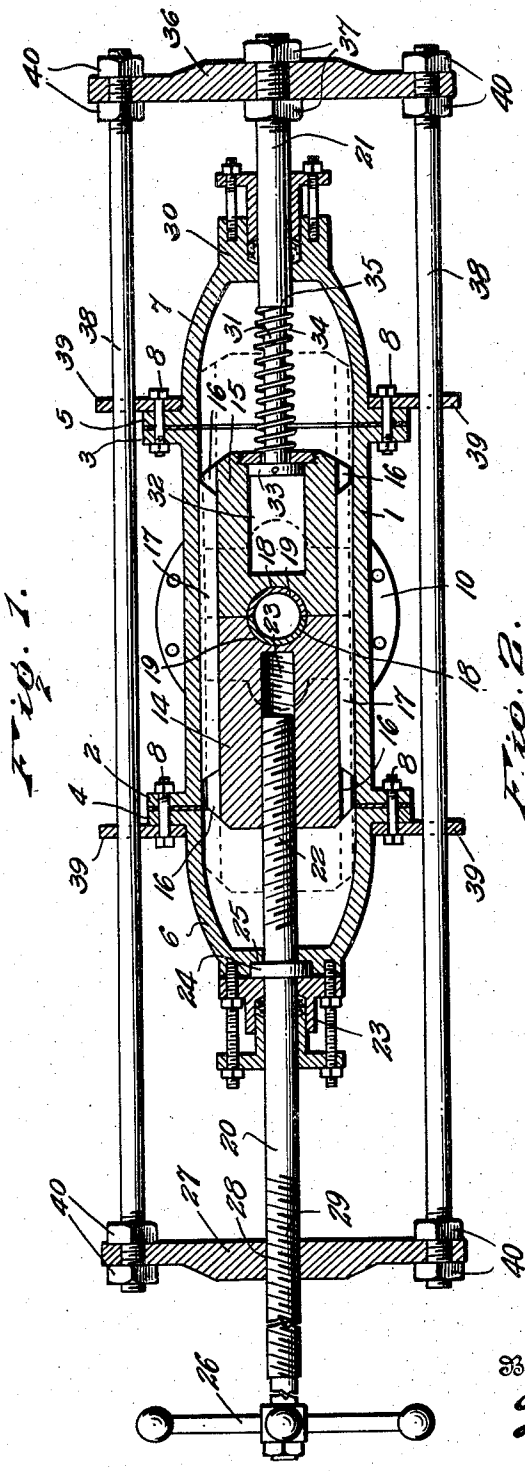


Fig. 1.

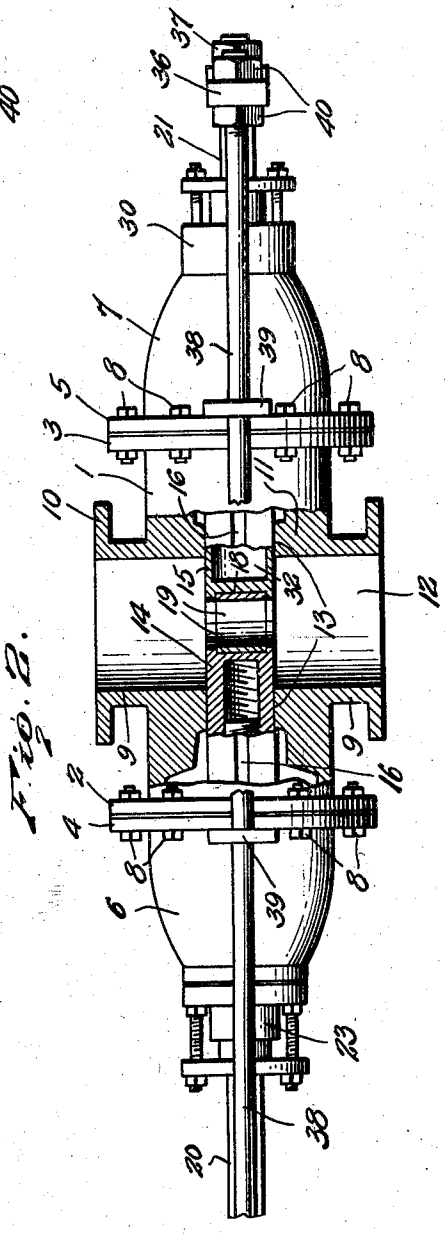


Fig. 2.

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Patented Feb. 7, 1939 2,146,470

# UNITED STATES PATENT OFFICE

2,146,470

## VALVE

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Application August 6, 1937, Serial No. 157,801

3 Claims. (Cl. 137—139)

This invention relates to valves and more particularly to a valve adapted for use upon the tube or casing of a well whereby flow of oil, gas or other fluid from the well may be shut off.

One object of the invention is to provide a valve of such construction that when it is connected with the upper end of the well tube or casing, it will extend horizontally and may have an actuating stem of such length that the valve may be opened or closed at quite a distance from the well and thus permit the valve to be closed in case of fire without endangering the life of the person operating the valve.

Another object of the invention is to provide the valve with companion gates so mounted that they may have movement toward and away from each other and when in contact shifted as a unit and thus one of the gates moved into position to completely shut off flow of fluid from the well.

Another object of the invention is to so form the gates that when they are moved to a closed position, they may engage about a pump rod or drill stem extending longitudinally through the valve tube or casing and thus permit flow of oil or gas to be cut off even with a pump rod or drill stem extending into the well.

Another object of the invention is to so construct the valve that it will be very strong and durable and capable of being subjected to rough usage without damage to its mechanism.

The invention is illustrated in the accompanying drawing, wherein

Figure 1 is a sectional view taken longitudinally through the improved valve upon a horizontal plane.

Figure 2 is a view showing the valve partially in side elevation and partially in vertical section.

This improved valve has a casing 1 formed of strong metal and at its ends carrying flanges 2 and 3 to which the flanges 4 and 5 of bonnets 6 and 7 are secured by bolts 8. Necks 9 extend from the intermediate portion of the body in opposed relation to each other in order that the flange 10 of one neck may be bolted or otherwise secured to the upper end of a well tube or casing and the valve thus mounted at the upper end of the well and attention is called to the fact that about the necks the casing is inwardly thickened, as shown at 11, to confine a passage 12 extending vertically through the valve casing. The thickened portions terminate in spaced relation to each other intermediate the depth of the passage 12 and provide guide ways or seats 13 to slidably receive gates 14 and 15. These gates are formed of strong metal and are rectangular in cross section, and by referring to Figure 1 it will be seen that the gates are of such width that when they have their inner ends in engagement with each other they may extend across the passage 12 in blocking relation thereto. These gates are to have sliding movement into and out of position across the passage 12 and, therefore, each gate has opposed side portions formed with grooves 16 to slidably receive ribs 17 formed longitudinally of the valve casing at opposite sides thereof. Therefore, the two gates will be slidably mounted for movement longitudinally in the valve casing and sliding movement of the gates will be guided. The inner end faces of the two gates are grooved, as shown at 18, and in these grooves are seated packing 19 and as the grooved portions of the inner end faces of the gates are formed with arcuate recesses, the two gates when moved into abutting engagement with each other, as shown in the drawing, may fit about a pump rod or drill stem extending axially through a well and through the passage 12 and form a tight closure about the rod or stem so that flow of oil, gas or other fluid from the well may be shut off. This construction also permits the valve to serve as a reducing valve which may be adjusted to move the gates to the position shown in the drawing and thus shut off the major portion of the flow of fluid from the well while at the same time permitting continuance of a reduced flow.

The stems 20 and 21 of the gates extend longitudinally of the valve casing, and referring to Figure 1 it will be seen that the stem 20 has a threaded inner end portion 22 engaged in a threaded socket 23 extending longitudinally of the gate 14 in axial relation thereto. This stem extends through a packing gland 23 mounted at the outer end of the hood 6 and carries a collar 24 rotatably received in a recess or seat 25 formed in the hood about its stem receiving passage. The packing gland holds the collar in the seat and, therefore, longitudinal movement of the stem will be prevented while rotation of the stem will not be interfered with. When the stem is rotated the threaded connection between the stem and the gate 14 will cause the gate to be shifted longitudinally in the valve casing according to the direction in which the stem is turned. The stem may be of any length desired according to the distance the operator should be standing from the well in order to prevent injury to the operator closing the valve during an emergency and may have its outer end provided with a turning handle 26 or equivalent means for imparting rotation to the valve stem. A cross head 27 extends

transversely of the valve stem 20 and is formed with a threaded opening 28 through which passes the threaded portion 29 of the valve stem. Therefore, when the stem is turned, the cross head will be moved longitudinally of the stem as well as the gate 14 but since threads of the threaded portion 29 are pitched to an opposite direction to threads of the threaded inner end portion 22, the cross head and gate will move in opposite directions when the stem is turned.

The stem 21 of the gate 15 slides through the packing gland 30 at the outer end of the hood 7 and has a reduced inner end portion 31 extending into a cylindrical chamber 32 formed axially of the gate 15. A head 33 at the inner end of the valve stem 21 prevents the gate from becoming disconnected from the valve stem and a spring 34 coiled about the reduced end portion 31 of the valve stem with its ends bearing against the gate and the shoulder 35 of the stem yieldably maintains the gate in the position upon the stem shown in Figure 1 but permits the gate to be shifted along the reduced end portion of the valve stem. A cross head 36 is mounted upon the outer end portion of the valve stem 21 where it is firmly secured by nuts 37. This cross head corresponds in length to the cross head 27 and in order to connect the two cross heads, there have been provided rods 38 slidably mounted through perforated ears or brackets 39 secured at opposite sides of the bonnets 6 and 7 by certain of the bolts 8. These rods extend longitudinally of the valve casing and have threaded end portions which pass through openings formed near ends of the yokes and carry nuts 40 which, when tightened, firmly secure the yokes to the rods.

When this valve is in use, one of the flanges 10 is secured to a companion flange at the upper end of the well tube or casing to aline the passage 12 with the same, or the valve may be connected with the well tube or casing in any other desired manner, such as by a threaded connection. The stem 20 is rotated in a direction to move the gate 14 outwardly and shift the cross head 27 along the stem toward the valve casing and draw the stem 21 outward, together with the gate 15. It will thus be seen that the two gates will be shifted away from each other to a position in which they are spaced from each other at opposite sides of the passage 12. When it is desired to close the valve, the stem 20 is turned in an opposite direction and the cross head 27 will be moved toward the outer end of the stem and the gate 15 shifted inwardly. As the gate 14 also moves inwardly, the inner ends of the gates will move into engagement with each other across the passage 12. If a pump rod or drill stem is extending longitudinally through the well and passage 12, the gates will close about the pump rod or drill stem with the packings 19 in close contacting engagement therewith and flow of fluid from the well will be entirely shut off. If there should be no pump rod or drill stem extending through the passage 12, the gates and the packings will define a circular opening between abutting ends of the gates and a restricted flow of fluid will be permitted. Under such conditions, flow of fluid from the well will not be entirely shut off and it is then necessary to continue rotation of the stem 20 in the closing direction and the gate 14 will continue its movement across the passage 12. As the gate 15 is slidably mounted upon the reduced end portion 31 of the stem 21, this gate can be moved along its stem in opposition to action of the spring 34 and eventually it will be backed away from the passage 12 by the advancing gate 14 and the gate 14 moved into a position in which it extends entirely across the passage 12 and completely blocks the same. Therefore, flow of fluid from the well can be entirely shut off. Upon reversing the rotation of the stem 20 in order to move the gate 14 toward an open position, the spring 34 will cause the gate 15 to follow the gate 14 until the gates reach the position shown in Figure 1 with the head 33 at the outer end of the chamber 32 and from continued rotation of the valve stem 20, the two gates will be moved to an open position at the opposite sides of the passage 12. It will thus be seen that flow of fluid from the well through the passage 12 can be very effectively controlled either with a pump rod or drill stem extending through the passage 12 or with such an element lacking.

Having thus described the invention, what is claimed as new is:

1. In a valve, a casing having a passage formed therethrough and at opposite sides of the passage being formed with guideways extending longitudinally of the casing, hoods at opposite ends of the casing, gates slidable along the guideways for movement longitudinally of the casing into and out of position to extend across the passage, a stem extending into the casing through one hood and rotatably mounted and held against longitudinal movement, the inner end portion of said stem being threaded and engaged in a threaded socket formed in one gate, a second stem slidably mounted through the hood at the other end of the casing and extending longitudinally of the casing with its inner end slidably received in a chamber formed longitudinally in the second gate, a spring yieldably resisting sliding movement of the second gate upon the second stem, and means actuated by rotation of the first stem for sliding the second stem longitudinally and shifting the second gate longitudinally in the casing in a direction opposite to the direction in which the first gate moves, the second gate being slidable along its stem with the first gate when confronting inner ends of the gates are in engagement with each other.

2. In a valve, a casing, hoods at opposite ends of said casing, opposed necks projecting from the casing intermediate the length thereof, the casing being inwardly thickened about the necks with the thickened portions terminating in spaced relation to each other and together with the necks defining a passage extending transversely through the casing and guideways at opposite sides of the passage intermediate the length thereof, gates slidable through the guideways into and out of position to extend across the passage, stems for said gates extending longitudinally of the casing through said hoods, one stem being rotatably mounted and having threaded engagement with its companion gate and the other stem being slidably mounted and the companion gate being shiftable longitudinally upon the stem and yieldably held against said shifting movement along the stem, and means carried by the stems externally of the casing and adapted to be actuated by rotation of the first stem for imparting sliding movement to the second stem and shifting the gate carried by the second stem in a direction opposite to the direction in which the gate of the first stem moves.

3. In a valve, a casing having a transverse passage intermediate its length and guideways at opposite sides of the passage extending longi-

tudinally of the casing, hoods at opposite ends of the casing, gates slidable along the guideways for movement into and out of position across said passage, a stem rotatably carried by one hood and extending longitudinally thereof into said casing and having a threaded inner end portion engaged in a threaded socket formed longitudinally of one gate, a second stem slidable longitudinally through the hood at the other end of the casing and extending into the casing and terminating in a head received in a chamber formed longitudinally in the second gate whereby the second gate may be shifted longitudinally upon its stem, a spring yieldably resisting shifting of the second gate upon its stem in one direction, a cross head carried by the outer end portion of the second stem, a second cross head having a threaded opening formed therein, the first stem having its outer end portion threaded in an opposite direction to the threading of its inner end portion and engaged through the threaded opening of the second cross head to shift the second cross head in a direction opposite to movement of the first gate when the first stem is rotated, rods extending longitudinally of the casing with their ends anchored to ends of the cross heads, and guides for said rods projecting from the casing.

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