

No. 711,721.

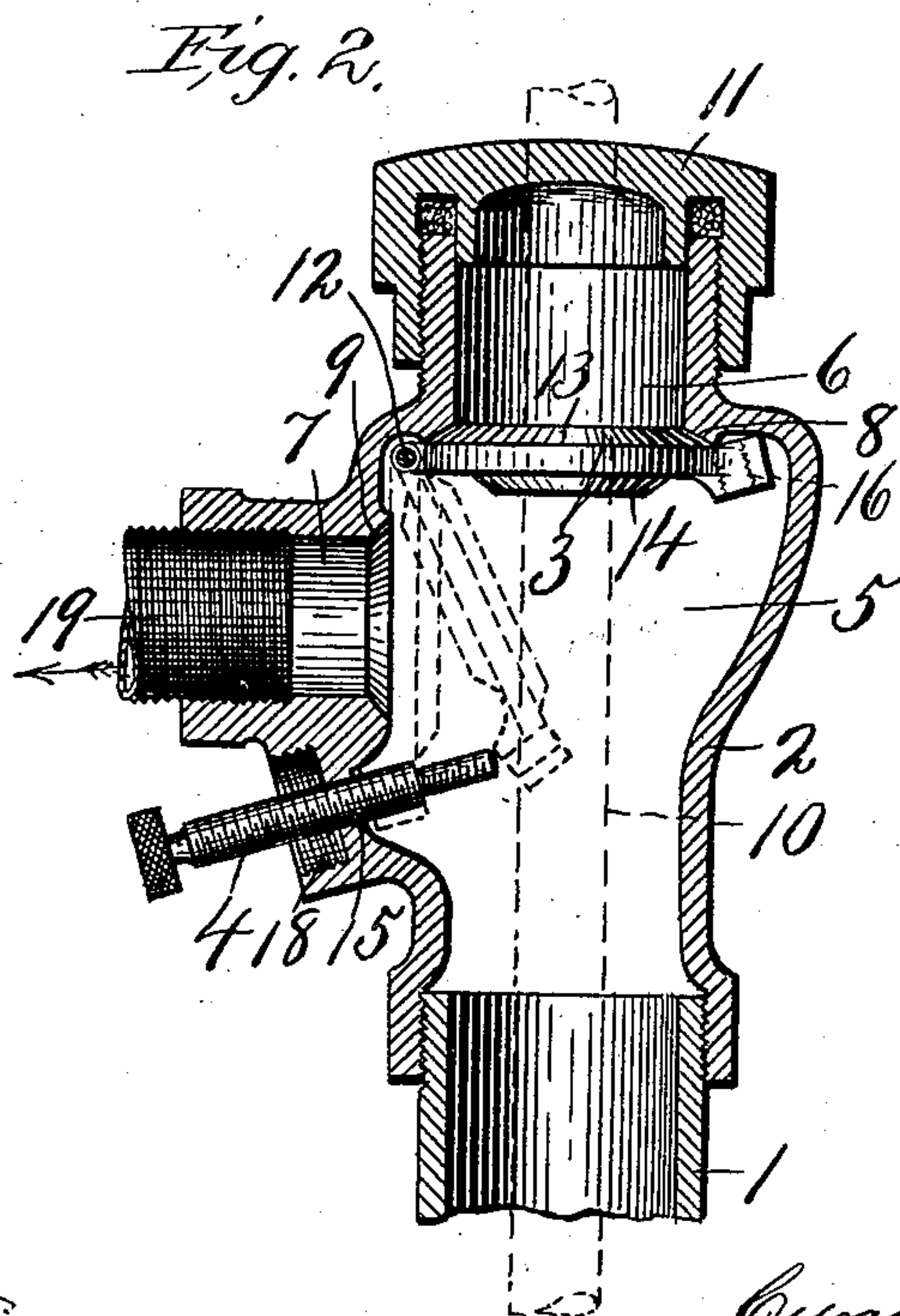
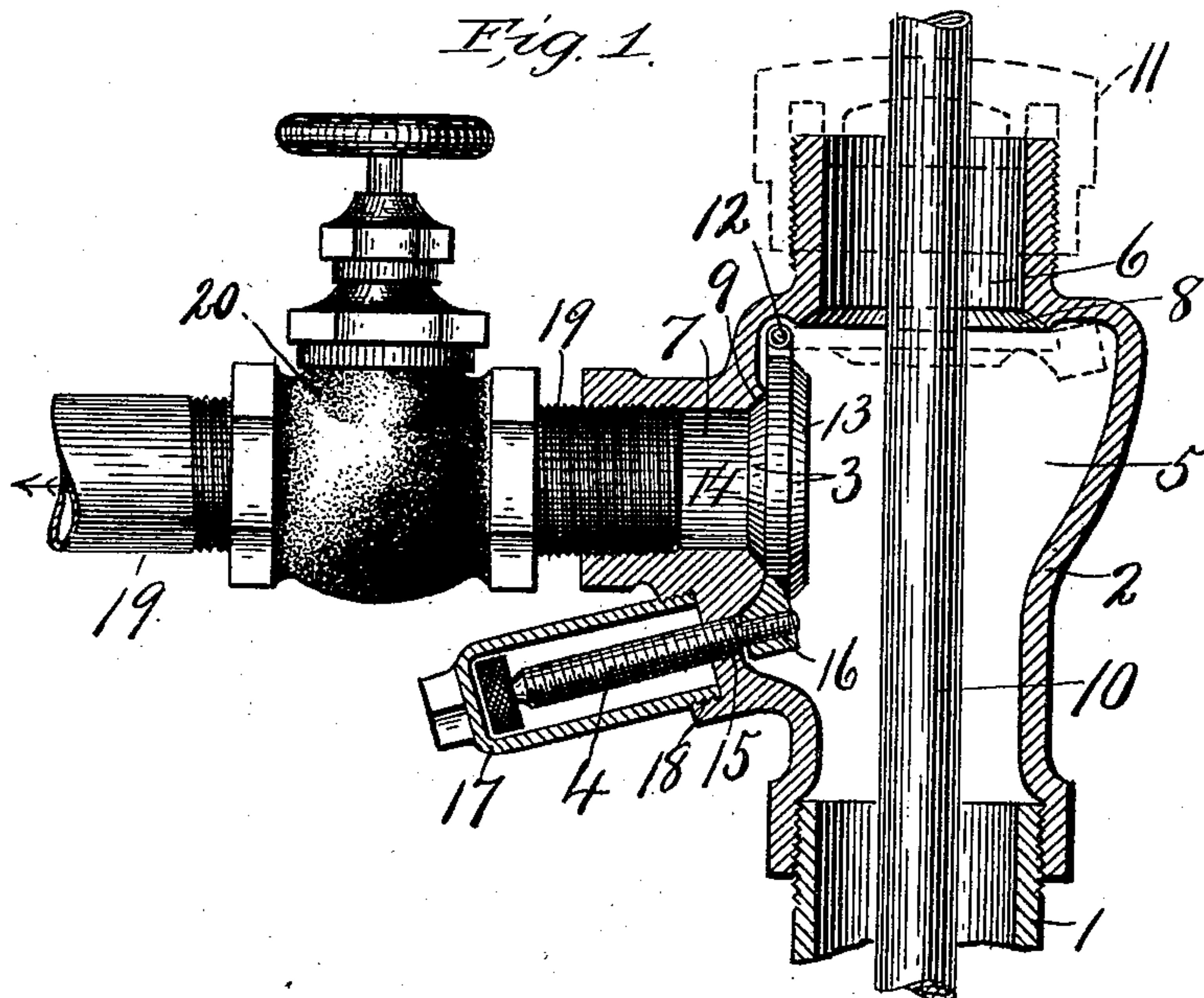
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C. P. ESTES.

AUTOMATIC CONTROLLER FOR FLOWING WELLS OF OIL OR GAS.

(Application filed Dec. 14, 1901.)

(No Model.)



WITNESSES:

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AUTOMATIC CONTROLLER FOR FLOWING WELLS OF OIL OR GAS.

SPECIFICATION forming part of Letters Patent No. 711,721, dated October 21, 1902.

Application filed December 14, 1901. Serial No. 85,899. (No model.)

To all whom it may concern:

Be it known that I, CYRUS P. ESTES, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful
5 Improvements in Automatic Controllers for Flowing Wells of Oil or Gas, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 My invention relates to improvements in controllers for flowing wells of oil or gas.

It is well known that in the operation of drilling, boring, or otherwise sinking oil and gas wells and the casings or conduits there-
15 for it frequently happens that a vein of oil or a pocket of gas is unexpectedly "struck," in which the pressure of gas is sufficient to force the oil and gas, or both, to the surface and sometimes far above the surface of the ground,
20 and that considerable difficulty is experienced in controlling the flow of oil or gas, depending upon the pressure, and that owing to this difficulty large quantities of the oil or gas are wasted beyond recovery before the flow can
25 be properly controlled or entirely shut off.

This invention is designed to obviate this difficulty and to prevent the loss of material by placing within the control of the operator means for regulating or entirely checking the
30 flow of the product of the well under all conditions or varying pressures without liability of impairing in any way the casings or conduits and its anchorage.

Another purpose of my invention is to so
35 construct and combine the parts that when the well is flowing the mouth of the main passage may be permanently closed and the oil or gas may be drawn off in such quantities as desired through a branch conduit leading from
40 the main passage, and when the pressure is insufficient to cause the automatic flow of the oil or gas the main passage may be readily opened and suitable pump or drill rods inserted therein for the purpose of either draw-
45 ing the oil or gas from the well or for continuing the drilling or sinking of the well.

To this end the invention consists in the combination, construction, and arrangement of the parts of a controlling device, as here-
50 inafter fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a ver-

tical sectional view of a portion of the conduit or casing, showing the various features of my invention the main passage being shown as 55 open and the portion of the drill or pump rod being shown in operative position therein and the branch passage being closed. Fig. 2 is a similar vertical section showing the drill-rod as withdrawn and the main passage as 60 closed, the branch passage being opened and the valve-operating member being shown as moved inwardly and detached from the valve for forming a stop to prevent the full return movement of the valve to its normal posi- 65 tion and the valve in the branch conduit being omitted.

Similar reference characters indicate corresponding parts in both views.

In the drawings I have shown a main con- 70 duit or casing 1, having a suitable valve head or casing 2, in which is movable a valve 3 and a controlling member 4 for controlling the operation of the valve 3. The casing 2 may be of any desired form or construction for re- 75 ceiving the valve 3 or its equivalent, is usually detachably secured to the upper end of the casing 1, and is provided with a valve-chamber 5 and main and branch passages 6 and 7, the main and branch passages 6 and 7 80 being provided with suitable valve-seats 8 and 9. The main passage 6 preferably extends through the upper end of the casing 2 and is adapted to receive a drill-rod or other well-sinking device 10, which may be operated in 85 the usual manner for sinking the well.

The upper end of the casing 2 is preferably screw-threaded and adapted to receive a suitable cap or closure 11, which is placed in position when the well is flowing, in which case 90 the oil is permitted to flow outwardly through the branch passage 9. The valve 3 may also be of any desired form, size, or construction for closing the main and branch passages 6 and 7 and is here shown as a swing-valve, 95 pivoted at 12 to the casing 2 at one side of the main passage 6 in such manner as to normally engage the seat 9 for closing the branch passage 7, and is also adapted to be automatically operated by the pressure of the 100 outflowing oil or gas for engaging the seat 8 and closing the main passage 6 at a point above the branch passage 7.

In order to alternately close the main and

branch passages, the opposite faces of the valve are provided with bearings 13 and 14, which are adapted to engage, respectively, the seats 8 and 9 of the main and branch passages 6 and 7. This valve is arranged to normally close the branch passage 7 by gravity and is held in its normal position by the member 4, which preferably consists of a screw moving in a threaded aperture 15 in the casing 2 and having its inner end threaded in an opposite direction from the portion engaged with the threaded aperture 15 and engaged with a threaded opening 16 in the valve 3, this latter opening being at the opposite side of the branch passage 7 from the pivot 12. It is evident, however, that this screw and the threaded openings therefor both in the valve and casing may be arranged in other relations to the pivot, if desired.

The purpose of providing the screw with threads of opposite pitch is that when the screw is rotated to withdraw the same from the casing the valve is simultaneously drawn into engagement with the seat 9, and when desired to unseat the valve from the seat 9 the screw is rotated in the opposite directions, thereby moving the same inwardly into the valve-chamber 5 and at the same time detaching the inner threaded portion of the screw 4 with the threaded aperture 16, this latter operation of the screw serving to form a stop for preventing the full return movement of the valve 3 to the seat 9.

In order to protect the screw 4 from injury or malicious interference, I provide a cap or guard 17, the inner end of which is engaged with a threaded socket 18 in the casing surrounding the aperture 15 and the outer end extends beyond the outer end of the screw and is preferably closed.

The branch passage 7 is provided with a branch conduit 19, having a valve 20 for regulating the flow of oil therethrough when the valve 3 is open or disengaged with the seat 9 during the flowing of the well. This valve 20 may be of any ordinary construction for the purpose described and is preferably arranged in proximity to the casing 2.

In the operation of my invention assume that the main passage is open and the operator is drilling or sinking the well in the usual manner with the rod 10. During this operation if the well-sinking apparatus happens to tap a vein of oil or a pocket of gas and the pressure is sufficient to force the oil or gas upwardly and outwardly through the mouth of the main passage 6 the operator immediately withdraws the rod 10 from the well if it has not already been forced therefrom by the oil or gas pressure, and when the rod is removed the cap 17 is then removed and the screw 4 is operated to release the valve 3, it being understood that owing to the different pitch of the threads upon the screw 4 the operation of releasing the valve forces said valve into the path of the outwardly-flowing oil or gas through the main passage and said valve is

immediately caught by the outflowing oil or gas, and thereby forced into engagement with the seat 8, thus closing the main passage 6 and opening the branch passage 7. The valve 20 may then be operated to entirely check the flow of oil or gas through the branch passage 7 or may be open and the oil or gas drawn off in such quantities as may be desired into receptacles provided therefor. When the flow of the oil or gas is continuous, the cap 11 is placed upon the casing 2 for closing the mouth of the passage 6, thereby doubly insuring the closure of the main passage. It sometimes happens that the pressure of the gas fluctuates and is sometimes insufficient to hold the valve in engagement with the seat 8, in which case the valve 3 would automatically drop into engagement with the seat 9 were it not for the fact that the inner end of the screw 4, which has been previously moved into the chamber 5 in the act of releasing the valve from its normal position, forms a stop for preventing the return movement of the valve into engagement with the seat 9. When the pressure in the well has spent its force and the valve 3 remains down and it becomes necessary to pump the oil or gas from the well, the screw is again operated to draw the valve into engagement with the seat 9, the cap 11 is removed, and the drilling or pump rods, whichever may be desired to use, are then inserted into the casing or conduit 1 and operated in the usual manner.

It is apparent from the foregoing description that the operation of controlling the flow of oil is largely automatic, and that the flow of oil or gas is always under the control of the operator, and that the usual loss of the product of the well resulting from the unexpected tapping of a vein of oil or pocket of gas in which the pressure is excessive is prevented.

The operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be noted that some changes may be made in the detail construction and arrangement of the parts without departing from the spirit thereof. Therefore I do not limit myself to the precise construction shown and described.

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

1. A casing or conduit for oil or gas wells having main and branch passages, a valve normally closing the branch passage and adapted to be automatically operated to close the main passage by the pressure of oil or gas flowing from the well through the conduit.

2. A casing or conduit having a main passage and a branch conduit leading from said passage and provided with a valve, a second valve normally closing the branch passage and adapted to be automatically operated to close the main passage by the outward flow of oil or gas from the well.

3. A casing or conduit for oil or gas wells having a valve adapted to be automatically closed by the pressure of gas or oil from the well when the valve is released, a screw
5 tapped in the casing and detachably engaged with the valve for controlling the operation of said valve.

4. In combination with a casing or conduit for oil or gas wells, a valve in the casing or
10 conduit adapted to be closed by the gas or oil flowing through the conduit from the well for the purpose described, and a screw having threads of opposite pitch, one thread being tapped in the casing and the other in the
15 valve for the purpose set forth.

5. A casing or conduit for oil or gas wells having separate passages and seats, a hinged valve adapted to swing from one set to the other to close either passage and open the
other, a screw tapped in the casing and de- 20 tachably engaged with the valve for holding or releasing said valve, and a cap or cover enclosing the exposed portion of the screw.

In witness whereof I have hereunto set my hand this 29th day of November, 1901.

CYRUS P. ESTES.

Witnesses:

H. E. CHASE,
MILDRED M. NOTT.