

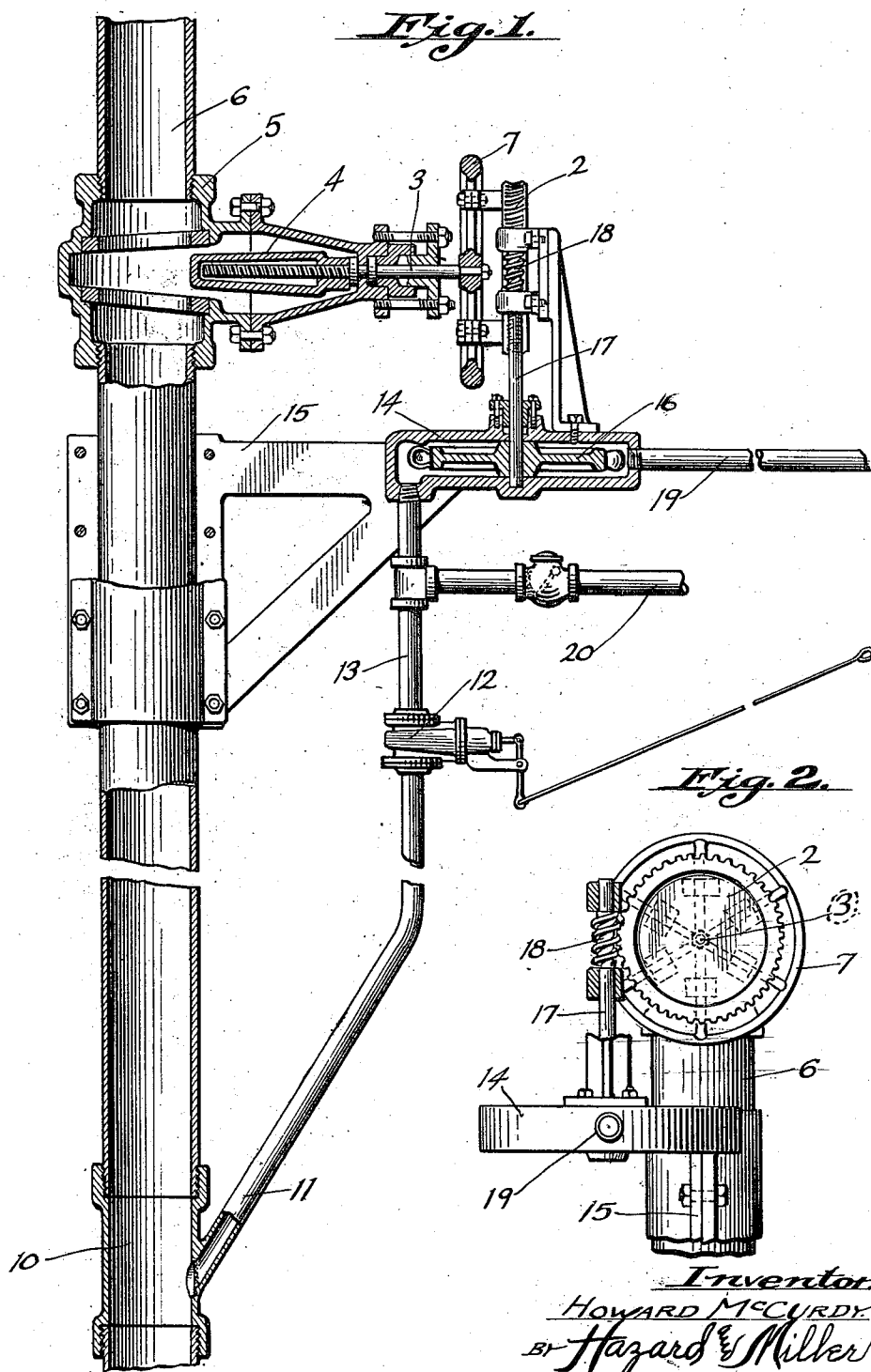
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**H. McCURDY**

# OIL WELL GATE CONTROL

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## UNITED STATES PATENT OFFICE.

HOWARD McCURDY, OF HUNTINGTON PARK, CALIFORNIA.

## OIL-Well-GATE CONTROL.

Application filed March 24, 1922. Serial No. 546,317.

*To all whom it may concern:*

Be it known that I, HOWARD McCURDY, a citizen of the United States, residing at Huntington Park, in the county of Los Angeles and State of California, have invented new and useful Improvements in Oil-Well-Gate Controls, of which the following is a specification.

This invention relates to deep well apparatus.

As is well known high pressure oil and gas strata are encountered in deep wells during various stages of operations and the high pressures frequently result in the blowing out of the string of tools or pump apparatus in the well with serious damage to the well structure and to the surrounding property and with great danger to the operatives.

In ordinary well constructions there is employed a well casing consisting of metal pipe of considerable diameter within which the drilling tools or the pumping apparatus is suspended.

At the head of the well there is a derrick and a platform beneath which is arranged a cellar, and in the part of the casing as exposed in the cellar there is usually provided a substantial valve of the gate variety adapted to be opened and closed during operations and in emergencies.

In the event of the blowing of a well, the operatives as soon as they are warned by the sound in the well usually flee from the vicinity for safety and do not take time to close the main gate valve in the casing head.

An object of the present invention is to provide means for automatically closing this gate and which means is preferably operated directly by the pressure of the oil or gas rising in the well. This insures the closing of the main gate valve without the presence of the operatives.

One embodiment of the invention is herein described and illustrated in the accompanying drawings, in which

Figure 1 is a side elevation and partial section of a portion of the well head casing showing the improved valve closing means attached thereto.

Fig. 2 is a side elevation in detail of the worm and gear for closing the gate valve.

By my invention I provide a method for closing the gate valve which consists in utilizing the pressure of the oil or gas in the

well for automatically closing the gate valve.

In a preferred embodiment of the invention there is shown a worm wheel 2 which is secured suitably to the stem 3 of a gate valve 4, the casing 5 of which is mounted in the head casing 6. The valve stem 2 is provided with a hand wheel 7 by which the valve may be closed manually.

For the purpose of utilizing the pressure of the oil or gas rising in the well to operate the valve, I provide a suitable connection or collar 10 in the well casing 6 at any point below the valve casing 5, and in this connection 10 there is arranged an outlet 11 preferably disposed at an acute angle with respect to the axis of the well casing so that the flowing gas or oil may pass into the outlet 11 without materially reduced velocity. The outlet connection 11 leads upwardly and may be provided with a suitable quick opening valve 12. From this valve a pipe 13 is continued to and connects with the pressure intake side of a turbine casing 14 which may be mounted suitably in a convenient position with respect to the main valve casing 5. As here shown the turbine casing 14 is carried by brackets 15 applied to the well casing 6. Within the turbine casing 14 is a turbine wheel 16 and having a shaft 17, and this is provided with a worm or screw 18 meshing with the worm wheel 2. For safety purposes, the vent pipe 19 from the exhaust side of the turbine casing is carried to a remote point so that the turbine will not be rendered inoperative by the choking of this exhaust.

From the above it will be seen that during drilling or pumping operations the main valve closure 4 is normally open and the quick opening valve 12 is closed. In the event of a blow of the well the attendant quickly trips the quick opening valve 12 and this permits the passage of the rising oil or gas under pressure into the outlet pipe 11 from the casing and into the turbine 14 with the result that the wheel 16 is rotated, and this in turn, driving the screw 18, turns the worm wheel 2 and the valve closure 4 is then moved to closing position and thus effectually cuts off the discharge of fluid from the well head.

In the event that it is impossible to open the quick opening valve 12 under the exi-

gency, I provide for the operation of the turbine wheel 16 by an auxiliary means including a supply connection 20 consisting of a pipe leading to a source of steam, water, gas or other fluid under pressure which may be turned into the auxiliary pressure pipe 20, and this being connected to the turbine supply pipe 13 at a point above the closed valve 12 insures the operation of the turbine wheel 16 to drive the worm 2 and thus close the valve 4 independently of the pressure in the outlet pipe 11 from the well casing.

It is understood that my automatic apparatus may be attached to existing well head structures including the usual main valve or may be embodied in any new structure.

The above described apparatus illustrates a simple and practicable form in which the invention is embodied, and it is understood that the parts may be rearranged and made of different combinations and organizations still embodying the broad idea of utilizing a portion of the fluid under pressure in the well for hermetically closing the main gate valve under certain conditions.

The quick opening valve 12 may be left open when using the standard drilling rigs, but when using rotary apparatus, the valve 12 will be left closed during operations.

It is understood that the quick opening valve 12 will be manipulated entirely according to the conditions obtaining in the drilling of any particular well, that is it may be left open or it may be left closed during the operations as desired or necessary.

Various changes and modifications may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. The combination with the main valve in a well head casing, of fluid motor and a mechanism for closing the valve, and a valved connection between said motor and the casing at a point below the valve.

2. The combination with the main valve in a well head casing, of motor operated mechanism for closing the valve, and a connection between the motor or said mechanism

and the well casing at a point below the valve where by pressure in the well casing is utilized to drive said mechanism.

3. The combination with a well casing and a main valve in the well head casing, of motor operated mechanism for closing the valve, a connection between the motor of said mechanism and the well casing whereby pressure in the well casing is utilized to drive said mechanism, and an auxiliary means for supplying pressure independently of the well pressure for operating said mechanism.

4. Means for closing the main valve in a well head casing comprising power apparatus having a conduit connected to the well casing to supply a portion of the fluid under pressure in the well to said apparatus from a point below the valve.

5. Means for closing the main valve in a well head casing comprising power apparatus having a conduit connected to the well casing to supply a portion of the fluid under pressure in the well to said apparatus from a point below the valve, and an auxiliary pressure supply connection to supply said apparatus with pressure independently of the pressure in the well.

6. The combination with the main valve in a well head casing, of means for operating the valve, including a fluid motor having a supply connection to derive pressure from the well from a point below the valve to operate said means.

7. The combination with the main valve in a well head casing, of means for operating the valve including a fluid motor having a supply connection to derive pressure from the well to operate said means, and a quick opening valve in said connection.

8. A well closing system comprising a valve arranged in the head of the well casing, a motor operatively connected to the valve closure, and a supply connection between the motor and the casing at a point below the valve.

In testimony whereof I have signed my name to this specification.

HOWARD McCURDY.