

Sept. 15, 1936.

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2,054,337

BLOW-OUT PREVENTER

Filed Feb. 25, 1935

2 Sheets-Sheet 1

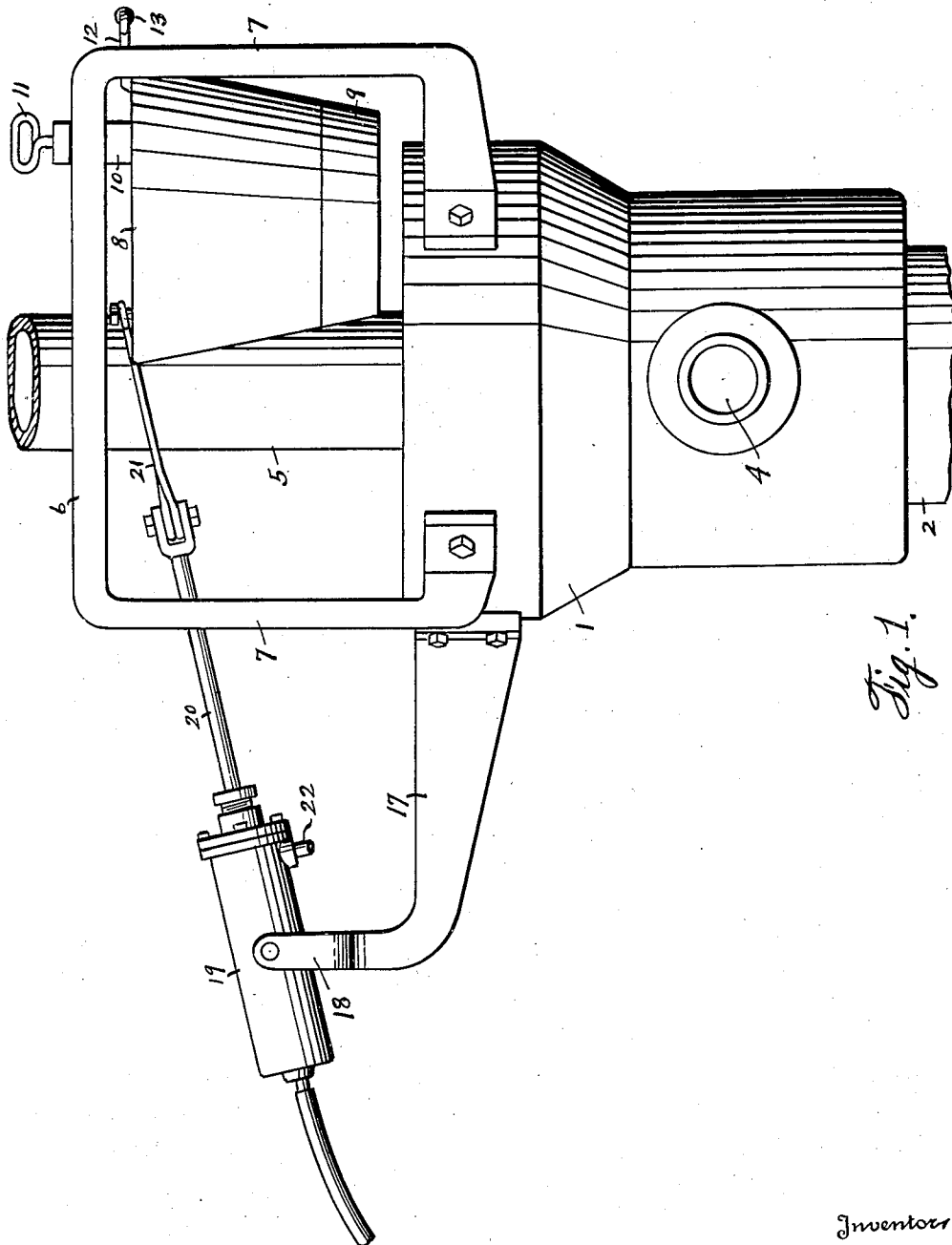


Fig. 1.

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2 Sheets-Sheet 2

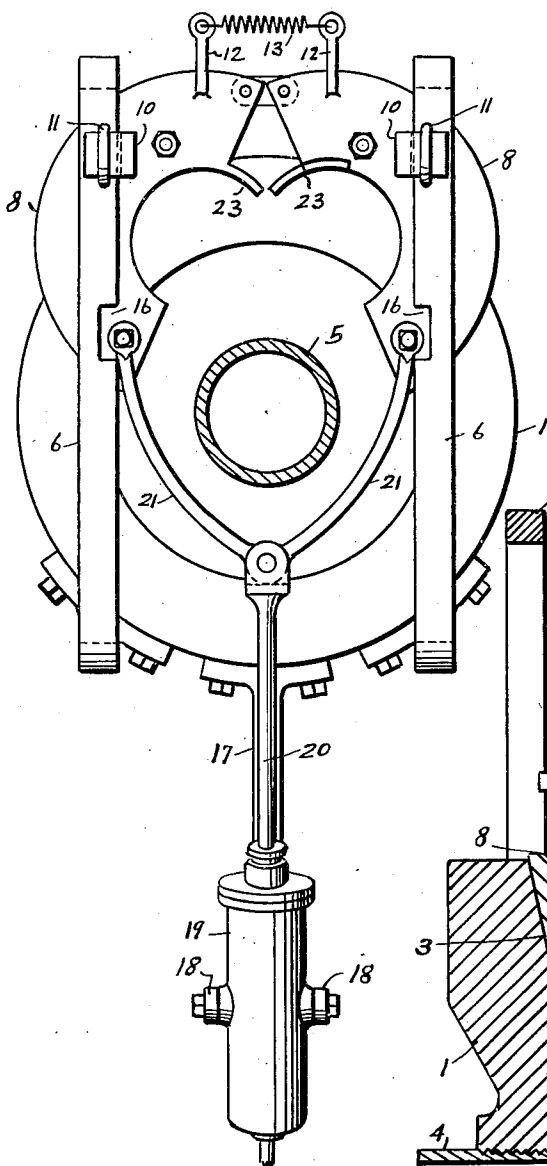


Fig. 2.

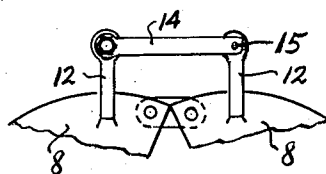


Fig. 4.

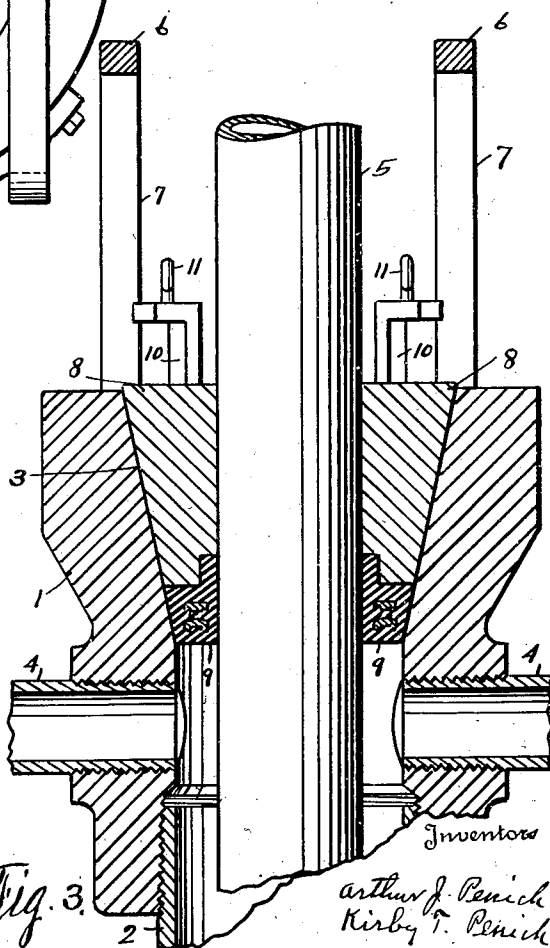


Fig. 3.

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UNITED STATES PATENT OFFICE

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BLOW-OUT PREVENTER

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4 Claims. (Cl. 166—14)

This invention relates to a blowout preventer.

An object of the invention is to provide means for supporting the pressure head of the preventer in inactive position during ordinary drilling operations, and out of the way so that normal operations will not be interfered with, in combination with means for moving the pressure head into position to drop by gravity into active position within the casing head and around the drill stem to completely close the space between the casing head and drill stem in case a blowout is threatened.

Another object is to provide novel means for maintaining the pressure head in inactive position.

A further object is to provide novel means for moving the pressure head into position released from the holding means whereby the pressure head is permitted to drop by gravity into active position.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation, and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1 shows a side elevation of the apparatus.

Figure 2 shows a plan view showing the drill stem in section.

Figure 3 shows a vertical sectional view, and

Figure 4 shows a fragmentary plan view of the pressure head illustrating a modification thereof.

In the drawings, the numeral 1 designates a casing head shown connected to the upper end of the well casing 2, said casing head having a downwardly converging internal seat 3 and the outlets 4, 4, beneath said seat.

During normal drilling operations the drill stem 5 works through the casing head and casing in the usual way.

There are the horizontal parallel tracks 6, 6, spaced apart, one on each side of the drill stem, and these tracks are supported by the end legs 7, 7, which are secured at their lower ends to the casing head.

A pressure head has been provided for use to close the space between the casing head and drill stem in case internal pressure is encountered in the well, and a blowout is threatened. This pressure head may be of any conventional form. As shown, it is formed of two arcuate sections 8, 8, hinged together at one side to open and close. These sections are shaped to fit closely around the drill stem 5 when closed, and their outer sides

tapered downwardly to fit closely within the casing head when seated on the seat 3. Their lower ends are preferably formed of suitable packing 9 which forms a close fit with the seat 3 and the drill stem.

Upstanding from the sections 8 are the hangers 10 whose upper ends are outwardly turned to engage over the tracks 6 and to move therealong as hereinafter explained. The upper ends of the hangers have the hand grips 11 attached thereto by means of which the pressure head may be manually handled. The hinged sides of the sections 8, 8, have the outwardly extended arms 12, 12, connected by a coil spring 13, as illustrated in Figures 1 and 2. As illustrated in Figure 4, the arms 12, 12, are connected by a link 14 whose ends are pinned to the free ends of the arms, one of the pins, as 15, being readily frangible.

The inner sides of the tracks 6 have the notches 16, 16.

When the pressure head is inactive, that is, during normal drilling operations when the pressure head is not needed, it is suspended from one end of the tracks 6, 6, as shown in Figures 1 and 2, the overturned ends of the hangers 10 resting on said tracks. The spring 13, or the link 14, will hold the pressure head open when in this position.

Extending outwardly from the opposite side of the casing head and attached thereto, there is a bracket 17 whose outer end is upturned and formed into a yoke having the spaced arms 18, 18, and a cylinder 19 is mounted to pivot between these arms. This cylinder is equipped with the usual piston therein, to which the piston rod 20 is connected. Links 21, 21, are pivoted at one end to the free end of the piston rod and at their other ends to the respective sections 8, 8.

In case a blowout is threatened, steam or other pressure fluid may be admitted, through the inlet line 22, into the cylinder 19 in front of the piston therein, and said piston thus moved outwardly operating through the rod 20 and links 21 to pull the pressure head forwardly toward the drill stem. The sections of the pressure head, however, will be held against premature closing by the pull-spring 13, or the link 14, depending upon which is used, until the arcuate fingers 23, 23, extending inwardly from the hinged ends of the sections 8, strike the drill stem, and this will cause the sections 8 to close about the pipe, the spring 13 yielding, or the pin 15 shearing, to permit this. When the sections are in position to close about the drill stem, the overturned ends of the hanger

10 will be in position to register with the notches 16, and the pressure head will thereupon be released from the tracks and will be dropped down into the seat 3, and close the space between the casing head and drill stem. It is to be understood, of course, that the pressure head, when in active position, as shown in Figure 3, should be latched or secured in such position so that it cannot be blown out by the internal pressure in the well. Suitable latch means now in use may be employed for that purpose. We may prefer to use that type of latch means disclosed in our co-pending application, Serial No. 4,258, filed the 31st day of January, 1935.

15 When the danger of a blowout has passed, the pressure head may be manually lifted by the grips 11 until the overturned ends of the hanger 10 are above the tracks 6 and then opened to engage said overturned ends on the tracks, and the pressure head may then be moved back to its original, or inactive, position in preparation for further use.

The drawings and description disclose what is now considered to be a preferred form of the invention by way of illustration only, while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. The combination with a casing head having an opening for an inner pipe therethrough and having a seat, of a stationary track above, and extending horizontally across, the seat, a pressure head formed of sections and shaped to surround the inner pipe and to fit the seat, means for suspending the pressure head from the track, said suspending means being releasable from the track, means for moving the pressure head and suspending means into position to release the suspending means from the track to allow the pressure head to drop, by gravity, onto the seat about the inner pipe.

2. The combination with a casing head adapted to be supported on the outer casing in a well and having an opening for an inner pipe therethrough and also having an inside seat, a pressure head formed of sections adapted to open and close and shaped to fit the seat when closed to surround the inner pipe, horizontal parallel tracks spaced apart, one on each side of said seat and secured in fixed position above the seat, releasable means

movable along the tracks and connected to the respective sections of the pressure head and effective to suspend said sections from the tracks in open position and spaced from the pipe, means for moving the pressure head along the tracks into position above the seat, said tracks being shaped to release the suspending means when the latter are in position above the seat to allow the pressure head sections to descend by gravity on to the seat and into position around the inner pipe.

3. The combination with a casing head adapted to be supported on a casing in a well and having an opening for an inner pipe therethrough and also having an inside seat, a pressure head formed of sections adapted to open and close and shaped to fit the seat when closed to surround the inner pipe, horizontal tracks spaced apart, one on each side of said seat and secured in fixed position above the seat, releasable means movable along the tracks and connected to the respective sections of the pressure head and effective to suspend said sections from the tracks in open position and spaced from the pipe, means for moving the pressure head along the tracks into position above the seat, said tracks being shaped to release the suspending means when the pressure head is in position above the seat to allow the pressure head sections to descend by gravity on to the seat and into position around the inner pipe.

4. The combination with a casing head having an inside seat, of an approximately horizontal track above the seat, a pressure head shaped to fit the seat and formed of sections pivotally connected together at one side, arms extending outwardly from the sections on opposite sides of the joint connecting the sections, a link connecting the free ends of the arms and normally holding the sections in open position, frangible means for connecting the link to one of said arms, means for suspending the pressure head from the track out of alignment with the seat, means for moving the suspending means and pressure head into position to permit the pressure head to drop, by gravity, onto the seat, said track and suspending means being arranged to cause the release of the suspending means from the track upon such movement of the suspending means.

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