April 30, 1940. L. S. SMITH 2,199,085

OIL WELL SHUT-OFF

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Fig. 1.

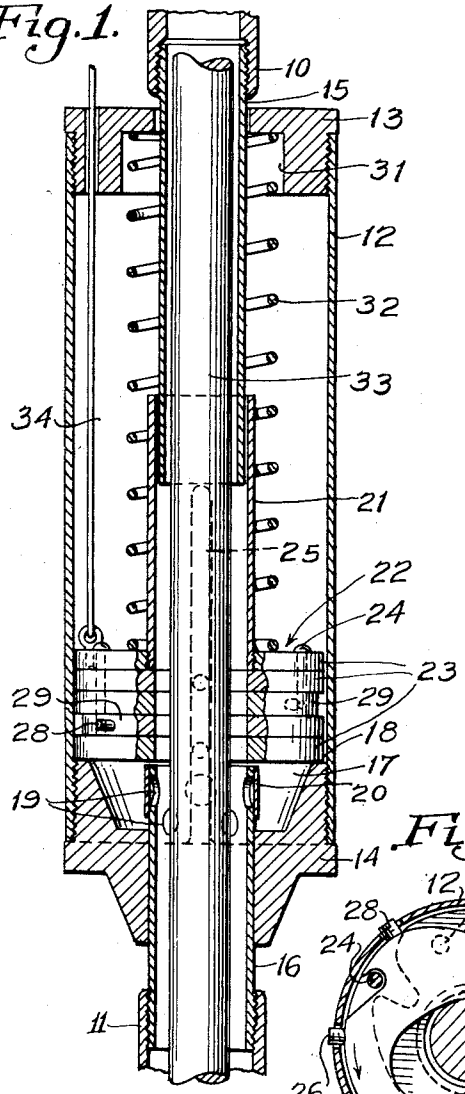


Fig. 3.

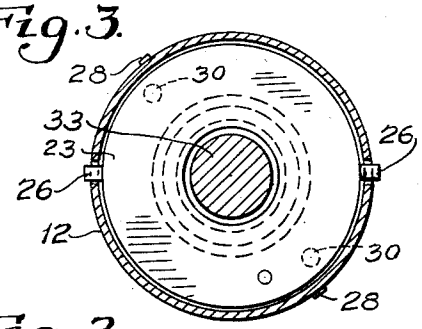


Fig. 2.

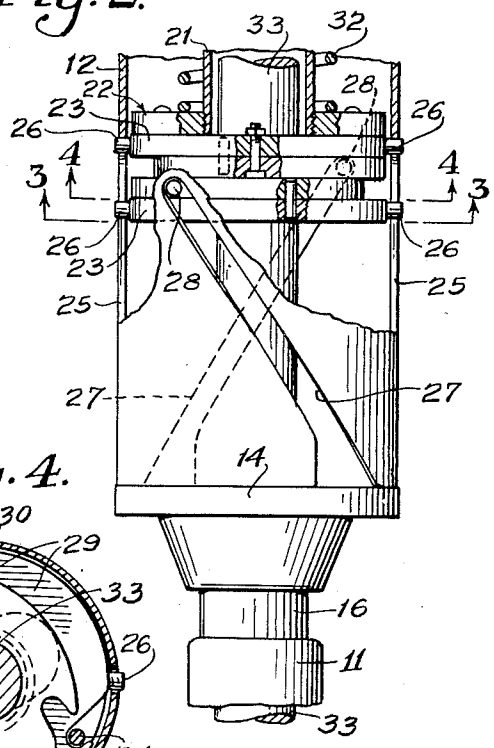


Fig. 4.

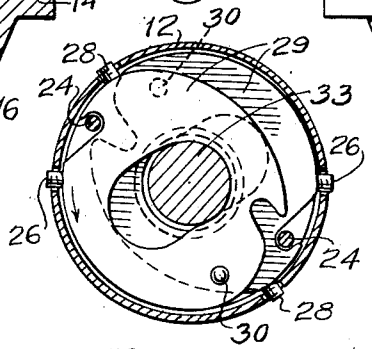
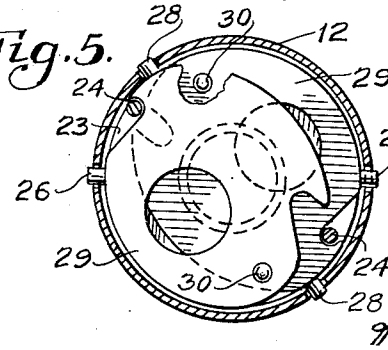


Fig. 5.



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Fig. 6.

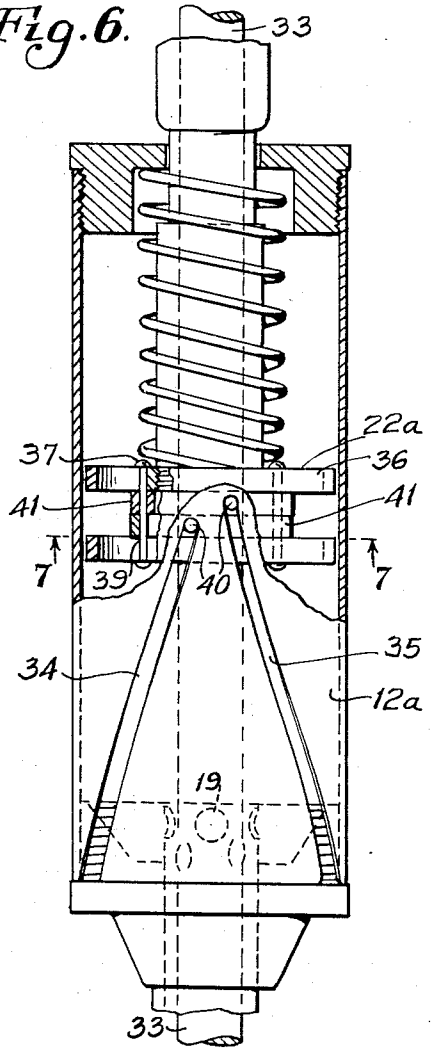


Fig. 8.

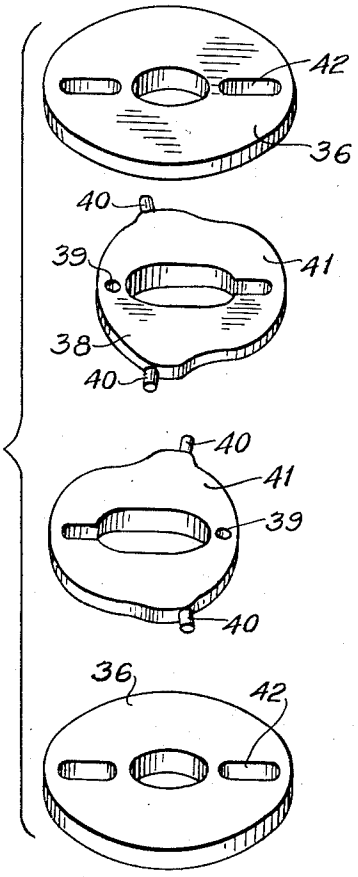
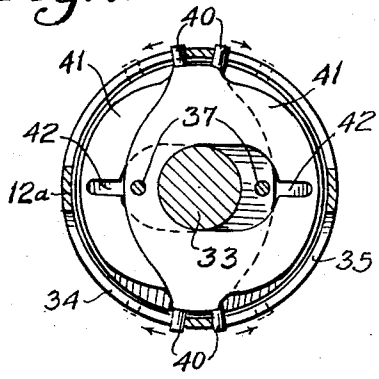


Fig. 7.



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Patented Apr. 30, 1940 2,199,085

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2,199,085

OIL WELL SHUT-OFF

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Application April 5, 1939, Serial No. 266,176

6 Claims. (Cl. 137—139)

This invention relates to oil well drilling and the like and more particularly to means for automatically shutting off the pipe line in case of an excessive upward surge of gas or oil.

An object of the invention is to provide simple, practical and efficient means for shutting off oil well pipes when subjected to an upward surge of gas or oil.

Another object is to provide manually operated means for opening and closing the shut-off device hereinafter described.

Other objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawings, wherein:

Fig. 1 is a view in central sectional elevation of an embodiment of my invention;

Fig. 2 is a partial view of the same in elevation partly broken away;

Fig. 3 is a cross section view taken along the line 3—3 of Fig. 2;

Fig. 4 is a cross section view taken along the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 4 showing a modified construction;

Fig. 6 is a view similar to Fig. 1 showing a modified form of my invention;

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 6; and

Fig. 8 is an exploded view of parts shown in Figs. 6 and 7.

Referring more particularly to the drawings, I show oil well drill pipe sections 10 and 11 and a casing 12 of substantially greater diameter than pipes 10 and 11, casing 12 being provided with flanges 13 and 14 suitably secured thereto as by screw threads, welding or the like, flange 13 being secured to a pipe section 15 which in turn is secured to pipe 10; similarly flange 14 is secured on a pipe section 16 in turn secured to pipe section 11.

Flange 14 has a recessed portion 17 and a shoulder 18 and pipe 16 extends into and terminates within recess 17 and is provided with a plurality of apertures 19 which may be covered with a membrane 20 or the like adapted to withstand normal pressure within pipe 16 but which will break if excessive pressure is applied thereto.

A tubular member 21 is slidable over pipe 15 and carries a valve carriage 22 comprising a plurality of apertured discs 23 secured together by a plurality of rivets 24 or the like.

Casing 12 has a pair of vertical guide slots 25 for ears 26 secured to discs 23 and is further provided with a pair of inclined slots 27 for ears 28 on a pair of valve discs 29 pivotally secured to pivots 30 secured between discs 23. Flange 13 is provided with a recess 31 between which and the upper disc 23 a spring 32 is positioned and which normally contains carriage 22 in the lowermost position as seen in Fig. 1. A drill rod or tool is shown at 33 extending through the pipes and discs 23 and 29.

In operation upon an upward surge of gas or oil in pipes 11 and 16, a membrane 20 if used will be broken and the upward pressure on bottom of carriage 22 will elevate the same to the position shown in Fig. 2, and by this movement the ears 28 on discs 29 will cause the same to be pivoted laterally, causing a closure of the effective aperture constituted thereby, thus shutting off the excessive pressure and preventing escape of the oil or gas. The apertures and discs 29 may be such as to conform to the shape and dimensions of the drilling tool or rod 33 in order to effect a complete shut-off. Whenever as shown in Fig. 5 there is no drill tool in the drill pipe, the discs 29 will completely overlap and shut off the opening in the adjacent discs 23.

If it is desired to open the valve means described mechanically while the pressure is on, one or more rods 34 may be secured to carriage 22 and extend upwardly through flange 13 and by downward pressure on this rod, the carriage 22 may be lowered, and by reverse action of the ears 28 valve discs 29 will be shifted to the outer position and the aperture thereof opened.

In Figs. 6 to 8 I show a modified form of my invention in which a casing 12*a* is provided with four inclined slots 35 ranged in opposite pairs and a carriage 22*a* consists of a pair of discs 36 secured by rivets 37 between which discs a pair of plate members 38 are secured, plates 38 having apertures 39 for mounting on rivets 37 and ears 40 adapted to ride in slots 35.

Having described my invention, what I claim is:

1. A device of the character described comprising a cylindrical casing, a carriage slidably mounted in said casing, said carriage having valve means adapted to close a valve aperture formed thereby when said carriage is shifted by fluid pressure in said casing, said means including a plurality of superimposed radially disposed independently movable plate members adapted to engage cam surfaces on said casing.

2. A device of the character described comprising a cylindrical casing, a carriage slidably mounted in said casing, said carriage having valve means adapted to close a valve aperture formed thereby when said carriage is shifted by fluid pressure in

said casing, said means including a plurality of superimposed independently movable plate members adapted for radial movement when said carriage is shifted longitudinally in said casing.

3. A device of the character described comprising an elongated cylindrical casing, a carriage slidably mounted in said casing, said carriage comprising a plurality of superimposed plate members each having an aperture therein, a portion of said plate members adapted for lateral movement in said carriage, said movable plate members having ears, and a plurality of cam surfaces on said casing for engagement with said ears adapted to effect said lateral movement when the carriage is shifted by fluid pressure.

4. A device of the character described comprising an elongated cylindrical casing, a pipe extending into said casing, a carriage having a tubular portion adapted for slidable movement on said pipe, a spring between said carriage and an end of said casing, means to prevent rotational movement of said carriage in said casing, a plurality of superimposed valve plates pivotally mounted in said carriage, the pivot axis thereof being parallel to the length of said casing, a plurality of spiral slots in said casing, extending in opposite directions, each plate having ears extending into one set of slots whereby longitudinal movement of said carriage effects lateral movement of said plates to close the valve aperture thereof.

5. A device of the character described comprising an elongated cylindrical casing, a pipe extending into said casing, a carriage having a tubular portion adapted for slidable movement on said pipe, a spring between said carriage and an end of said casing, means to prevent rotational movement of said carriage in said casing, a pair of superimposed valve plates slidably mounted in said carriage to form a valve aperture and adapted for overlapping lateral movement in said carriage, a plurality of angularly disposed slots in said casing extending in opposite directions, said valve plates each having a pair of ears extending into a pair of said slots extending in the same direction whereby longitudinal movement of said carriage in said casing effects lateral movement of said valve plates to close and open the valve aperture thereof.

6. A device of the character described, comprising an elongated cylindrical casing, a carriage slidably mounted in said casing, said carriage comprising a plurality of superimposed independently movable plate members, each having an aperture therein, a portion of said plate members adapted for lateral movement in said carriage, and a plurality of cam surfaces on said casing for engaging the superimposed plate members to effect said lateral movement when the carriage is shifted by fluid pressure.

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