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METHOD AND APPARATUS FOR INTERCEPTING OIL WELL
CASING GASES DURING A WELDING OPERATION
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FIG. 1.

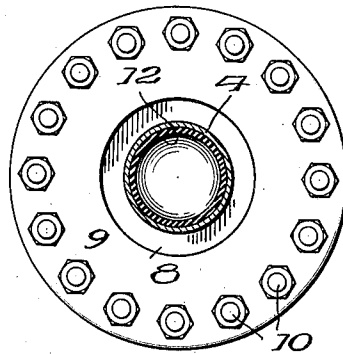
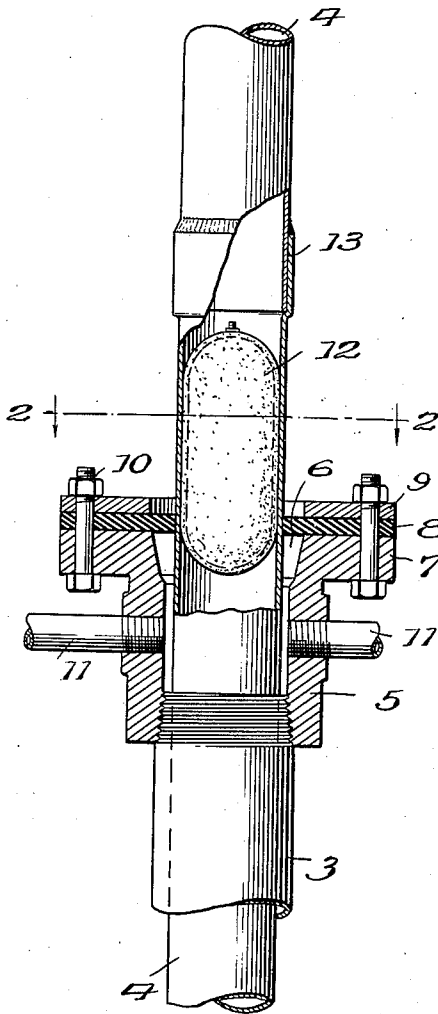


FIG. 2.

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METHOD AND APPARATUS FOR INTERCEPTING OIL WELL CASING GASES DURING A WELDING OPERATION

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8 Claims. (Cl. 166—15)

The present invention consists of a method and apparatus for intercepting casing gases for oil and gas wells during a welding operation, an object of which is to prevent the rising gases of the well from reaching the area where the joints of the inner casing pipes are being welded.

In modern well drilling it is preferred to unite, on the job, adjacent ends of the inner casing pipes by a welding operation but, because of the fire hazard, this has heretofore been impractical. I have, after some experiment, found that the present well drilling apparatus, with slight modification, may be employed to effectively intercept gases rising from the well, both inside and outside of said casing and to bypass said gases to a point remote from the well.

It is an important object of the invention to provide a method which is simple in operation yet effective to control the inflammable gases rising from the well, the apparatus used for carrying out this method being likewise characterized by simplicity, but positive in its operation to perform in accordance with the teachings of the invention.

In carrying out my invention I have found that a preferred form consists of a method and apparatus which will prevent the casing gases from rising above a predetermined point, means employed for this purpose being positioned intermediate the joint of the pipes being welded and outlets in the casing through which the casing gases are vented.

Other objects will be apparent from the following description of the present preferred form of the invention, taken in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevational view of apparatus employed for carrying out the present invention, parts thereof being broken away to disclose details of the specific internal and external sealing means employed, and

Fig. 2 is a plan view taken on the line 2—2 of Fig. 1, looking in the direction of the arrows.

To illustrate the application of my invention, I have in the drawing, shown an outer oil well casing 3 and an inner casing 4 which may be of standard construction. The outer casing is equipped with a head or frame 5 which is detachably engaged with the outer casing. The internal diameter of the outer casing is in excess of the external diameter of the casing 4 to permit the inner casing to pass freely therethrough in a manner well known in the art. Likewise the inner diameter of the head 5 is of larger diameter than the external diameter of the casing 4

and is dished out, as indicated at 6. The head 5 is provided with an annulus 7 which circumscribes the dished out portion 6 and has mounted on the free face thereof an elastic gasket 8. The gasket 8 is provided with a central opening through which the inner casing extends, the wall of the opening snugly embracing the outer periphery of the casing 4. The gasket is secured from displacement by a metal ring 9, the latter being superimposed on the gasket and provided with an opening of a diameter co-extensive with the diameter of the dished out portion 6 of the bore of the head 5, at the upper terminal of the latter. The ring 9 is clamped to the gasket 8 and flange 7 by nuts and bolts 10. It will, of course, be manifest that the gasket may be replaced at the option of the user.

The head 5 is provided with conduits or tubes 11, extending laterally therefrom through which gases intercepted by the gasket 8 are vented at a point remote from the wall.

In order to prevent internal passage of gases through the casing 4, I provide a seal 12, which in the present instance is shown to consist of an inflated tube or bag which engages the inner wall of the casing. Preferably the seal 12 is of appreciable length so as to provide an internal seal of sufficient magnitude to positively prevent any possibility of gas passing between the seal and the wall of the casing. I prefer also that the inner seal 12 project below and above the outer seal or gasket 8 during the welding operation of the first joint. Said inner seal remains in the first joint of the pipe. Of course, gases rising in the pipe 4 are intercepted by the seal 12 and compelled to return to the bottom of the casing 4 and pass upwardly between the casings 4 and 3 for ultimate expulsion from the casing head into the conduits 11. It is, of course, to be understood that although an inflated tube 12 is shown and described, I may employ other kinds of seals or plugs.

The first joint of the inner casing, which is to be welded, is indicated at 13, it being located just above the top of the inner seal 12. This joint is at a point sufficiently above the gases to prevent possibility of the latter igniting during the welding operation. Upon completion of the weld, the sections of pipe going to make up the casing 4 are lowered into the well in a manifest manner, in conjunction with the seal 12. Consequently the seal 12 travels downwardly in the well with the first two pipe sections. Said seal remains in this position until the first pipe section reaches the bottom of the well and correspondingly until

the last section of pipe has been welded to its sub-adjacent section.

With the apparatus of the present invention, it is manifest that the pipes can be lowered without breaking the seal notwithstanding the fact that the diameter of the joints 13 are in excess of the diameter of the casing 4. This is due to the fact that the gaskets 8, being made of elastic material, will yield, under pressure of the joints, the inner wall of the gasket dipping downwardly into the dishd out portion 6 of the head 5. As soon as a joint clears the gasket the latter will flex into engagement with the outer periphery of the casing immediately above the joint, in an apparent manner.

Various changes may be made in the details of description proportion and arrangement of parts within the scope of the claims hereto appended. What is claimed is:

- 20 1. A method of intercepting gas in the casing of an oil or gas well while welding the proximate terminals of the inner casing pipes, which comprises internally sealing the inner casing of the well and sealing the space between the inner and outer casings, both seals being below the zone of the welding operation.
- 25 2. A method of intercepting gas in the casing of an oil or gas well while welding the proximate terminals of the inner casing pipes, which comprises internally sealing said casing and also sealing the space between the inner and outer well casings, the seals being initially positioned above gas by pass conduits in the outer casing and below the welding zone of the inner casing.
- 30 3. A method of intercepting gas in the casing of an oil or gas well during a welding operation on the casing pipes comprising the employment of means to prevent gases from rising in the well above a predetermined point, which point is below the welding zone of the pipes.
- 40 4. Means to seal oil and gas well casings against the rise of gas while welding the inner casing pipes, including, in combination with a pair of concentric casings, sealing means remov-

ably mounted within the inner casing, and sealing means on the outer casing and spanning the space therebetween and the inner casing, said sealing means being located at a point below the zone of welding operation.

5 5. Same as claim 4 in addition to which the second said sealing means is yieldable to flex under pressure of the welded joints of the inner pipe passing therethrough.

6. In combination with concentric oil and gas well casings the inner of which consists of a series of jointed pipes, means to seal the casings against the rise of gas above a predetermined point in the casings, during a welding operation on the casings, comprising a seal within the inner casing, and a seal carried by the outer casing and extending into engagement with the inner casing at the zone of the inner seal, the seal of the outer casing being flexible to yield under pressure of the pipe joints passing there- 10 through. 15

7. A step in the method of intercepting gas in the casing of an oil or gas well while welding the proximate terminals of the pipe sections going to make up the inner casing of the well which comprises internally sealing the first section at a point appreciably below its upper terminal and also sealing the space between the inner and outer well casings, the outer seal circumscribing the inner seal. 20 25

8. A method of sealing the casings of oil and gas wells, while welding the proximate terminals of the inner casing pipes, against the rise or gas from the well comprising internally sealing the first section of the inner casing preparatory to lowering said section into the outer well casing, the seal being located at a point remote from the upper terminal of the section, the space between the inner and outer casings being also sealed, said latter seal being flexible to yield under pressure of the enlarged joints of the inner casing sections while the latter are being lowered into the well through the outer casing. 30 35 40

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