To all whom it may concern:

Be it known that we, James S. Abercrombie and Harry S. Cameron, citizens of the United States, residing at Houston, Harris County, Texas, have invented a certain new and useful Improvement in Blow-Out Preventers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to blow-out preventers for use in the process of drilling deep wells for oil, gas, sulfur, etc. The object of our invention is to provide a device designed to be secured to the top of the casing while the drilling is being done and which will be adapted to be closed tightly about the drill stem when necessary, in such manner as to shut off all outlet of fluid from the casing to the air when so desired.

Another object is to provide a blow-out preventer of the kind described, which will be composed of a minimum number of parts of simple and rugged construction.

Other objects and advantages of this construction will appear more clearly in the more detailed description thereof which follows:

Referring to the drawings herewith, wherein like numerals of reference are applied to like parts in each of the views, Fig. 1 is a side elevation of our invention showing part of the same in central vertical section. Figure 2 is a top plan view thereof showing one half in central horizontal section, and also showing the addition of valve in the side outlet.

Our invention is adapted for use in preventing gas blow-outs during the drilling operations. It is customary in drilling to provide the well with casing to sustain the side walls of the hole. The drill stem and bit are rotated in the bottom of the hole through the upper end of the casing. The drill stem is materially smaller than the casing through which it works, and it sometimes happens during the drilling that the pressure of the gas in the hole becomes so great that it starts up through the rising current of mud used to flush out the cuttings from the well, and when once started, will blow the mud from the hole with great violence and will very often result in ruining the well.

Our device comprises a T-shaped coupling or housing which is adapted to screw on the upper end of the casing 1, shown particularly in Fig. 1, and for this purpose the lower end 2 of the coupling is threaded internally at 3. A passage 4 is thus provided upwardly through the coupling for the working of the drill stem. The upper end of this passage is threaded at 5 for attachment for a stuffing box or such other device as may be necessary in pumping the well when the same is completed. In the drilling of the well however, a flared nipple 6 may be seated therein to protect the coupling or housing and to guide the drill into the casing.

The passage 4 through the coupling comprising the housing for our blow-out preventer, may be closed by two opposite gates or valves—one on each side of the said housing. Each of these valves, shown at 7, comprises a cylindrical plungers adapted to work in a horizontal chamber 8 extending laterally at right angles to the axis of the central passage 4. The housing 9 for the said plungers or valves 7 is cylindrical and is closed at its outer ends by means of nuts 10. Each nut 10 is threaded into the end of the said housing and has a central passage 11 there through for a valve stem 12 adapted to rotate in said passage. The valve stem 12 is squared at 13 to provide attachment for a wrench or crank in the rotation thereof. Midway of the ends of this valve stem we have a laterally extending flange 14 adapted to fit within a countersunk recess 16 in the inner face of the nut. A retaining ring or nut 16 is secured within the said recess behind the flange and holds the same against longitudinal movement in its seat. The inner end 17 of the valve stem is threaded for engagement at 18 within the plunger valve. The interior of the said plunger is hollowed at 19 to allow movement of the plunger on the valve stem or shaft 12 as will be obvious. The inner face of the valve nut 10 is recessed or countersunk at 20 to allow movement of the plunger outwardly. The shaft or valve stem 12 maintains a tight fit with the nut 10 by means of a stuffing box 21 of ordinary construction. Thus the stem may be rotated within the nut 10 and no lateral escape of fluid around the said valve stem will be possible.

The inner face of each plunger portion of...
the valve is provided with a semi-cylindrical recess 22 arranged vertically relative to the said plunger so as to fit about the sides of the drill stem. The said valve is held against rotation, slidably in said housing, through the key 26 in the plunger fitting in the keyway 27 in the inner face of the housing. It will be obvious that the plunger portion of the valve will be recessed on its face to fit the particular size of drill stem that is being used and any kind of packing or other well known means may be used to preserve a tight fit between the plunger and the walls of the housing and also between the plunger and the drill stem as may be desired. A ground joint is usually adopted, however. At each side of the said recess the flat faces of the plungers contact at 24 to complete the closure of the passage 4.

As shown in the drawing, the valves are adapted to close the passage about the drill stem and each is identical with the other. When it is desired to close the passage about the drill stem due to apprehension as to escape of gas, the drill stem will be stopped from rotating and the two valves will be advanced tightly against the drill stem by rotating the valve stem or shaft 12 in such manner as to advance the plunger portion 7 thereon against the drill stem.

We have also shown on the side of the coupling 2, below the valves 7, a lateral outlet 23. This outlet is fitted with an outlet pipe leading to some container, not shown. It may be closed by a hand valve 25 therein in an obvious manner. When danger of blowout arises the plunger valves will be closed about the drill stem and the valve 25 also set in closed position. The escape of gas or mud under pressure from the well outside the drill stem will be thus prevented. The mud pumps may then be worked to force mud down the drill stem until the danger of blowout is overcome due to mud pressure. The drilling may then proceed as before.

The advantages of our invention lie in its simplicity and strength. There are only a few, strong parts and these are quickly and positively operated. The escape of gas from the casing may be quickly and easily prevented by the simple manipulation of the plunger valves. The cylindrical valves 7 are under pressure forced to fit most tightly thus providing against leakage.

Having thus described our invention, what we claim is new and desire to protect by Letters Patent is:

In a blow-out preventer for oil wells, a housing adapted for attachment at the upper end of the well casing, laterally extending opposite cylinders on said housing, cylindrical valves therein, nuts closing the outer ends of said cylinders, valve stems held against axial movement in said nuts and having a threaded engagement with said valves, means to prevent rotation of said valves, said valves being formed with semi-cylindrical forward faces, to fit about the drill stem and close the passage between said drill stem and the inner walls of said housing.

In testimony whereof, we hereunto affix our signatures this the 5th day of April, A. D. 1922.

JAMES S. ABERCROMBIE.
HARRY S. CAMERON.