

July 22, 1924.

1,502,106

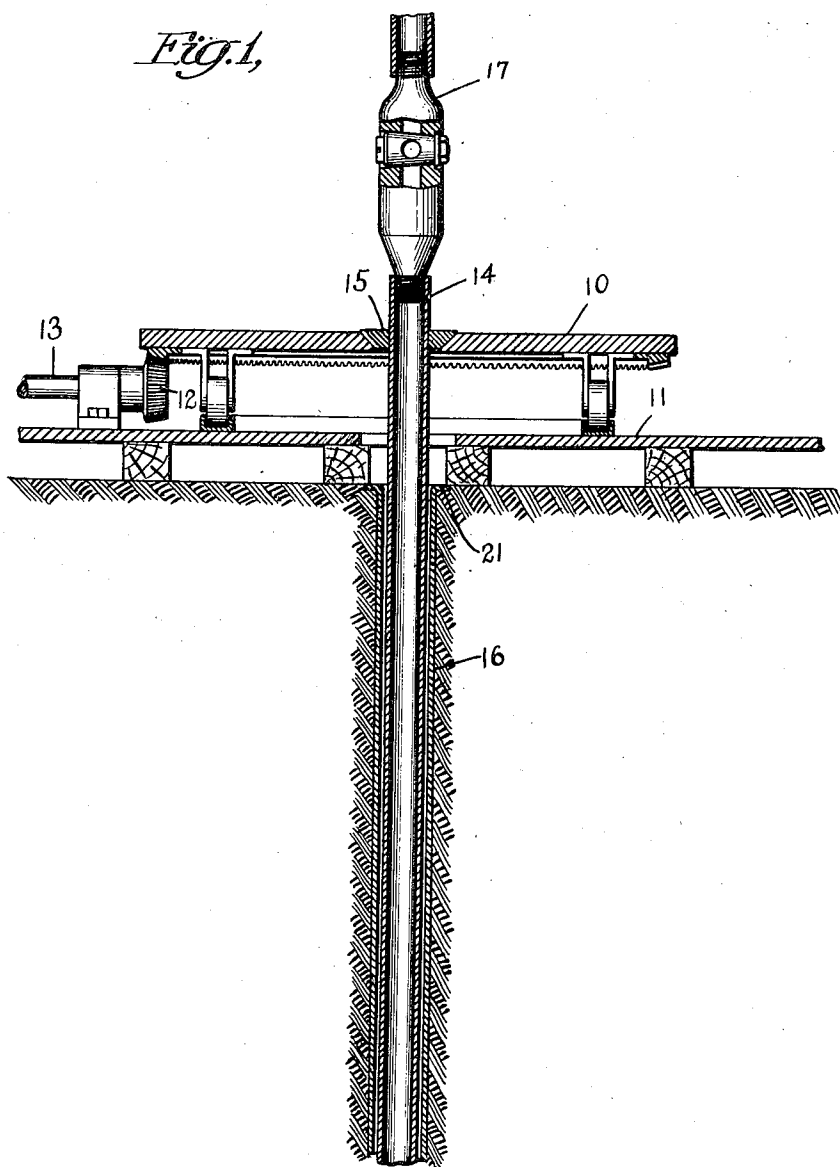
W. H. LYNE

DEVICE FOR OIL AND GAS WELLS

Filed June 10, 1922

2 Sheets-Sheet 1

Fig. 1,



Inventor
William H. Lyne
By his Attorney
R. H. Carlson

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W. H. LYNE

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Fig. 2,

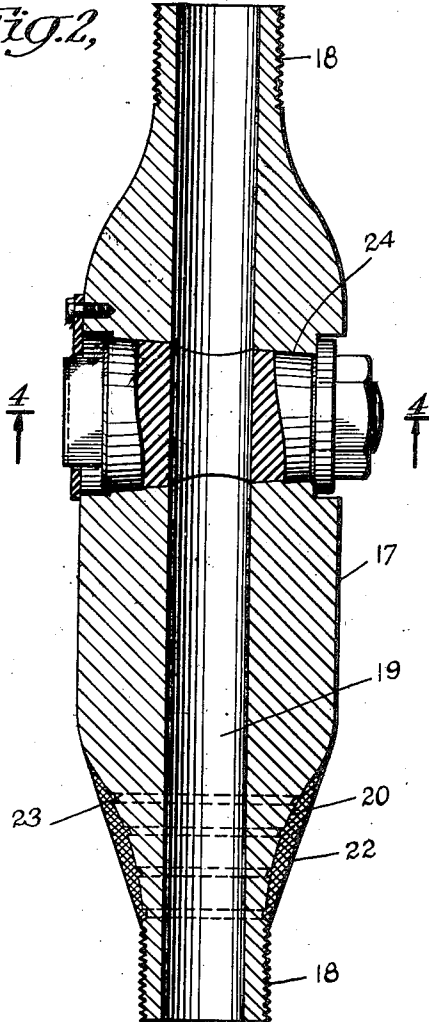


Fig. 3,

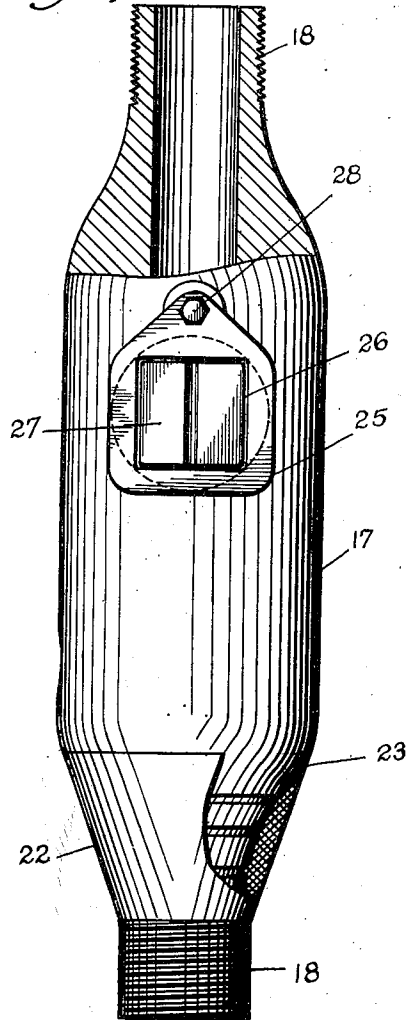
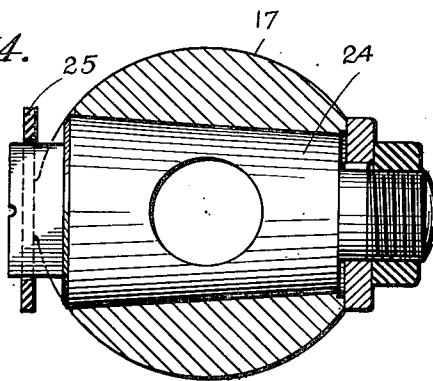


Fig. 4.



INVENTOR.
William H. Lyne
by *[Signature]* Earls
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM H. LYNE, OF HOUSTON, TEXAS.

DEVICE FOR OIL AND GAS WELLS.

Application filed June 10, 1922. Serial No. 567,382.

To all whom it may concern:

Be it known that I, WILLIAM H. LYNE, a citizen of the United States, residing in the city of Houston, county of Harris, and State of Texas, have invented certain new and useful Improvements in Devices for Oil and Gas Wells, of which the following is a specification.

This invention relates to apparatus adapted to be used in drilling and operating deep wells such as oil and gas wells and has particular reference to means for prevention of blow-outs in such wells.

In drilling wells it often happens that strata of such high pressures are encountered that the drilling apparatus is blown out of the well or otherwise injured. The primary object of my invention is to provide means for preventing such disastrous occurrences. Accordingly, therefore, I provide means for effectually closing or sealing the well when such high pressures are encountered, such means preferably embodying an arrangement by which an inner string of pipe may be suspended on the upper end of an outer string of pipe, suitable sealing means being provided on the seat between the two strings of pipe and the weight of the inner string of pipe being relied on to prevent the outflow of the pressure fluids.

A further object of the invention is to provide means for controllably releasing the fluids thus held in the well under pressure and discharging these fluids until the excess pressure is relieved.

The invention has particular reference to certain novel features of construction and arrangement of parts an example of which is given in this specification and illustrated in the accompanying drawings wherein:

Figure 1 is a sectional elevation of an apparatus constructed in accordance with the invention and constituting an embodiment thereof.

Figure 2 is a sectional elevation of a portion of the apparatus of Figure 1 and drawn to a larger scale than Figure 1.

Figure 3 is an elevation partially in section of the device shown in Figure 2.

Figure 4 is a cross section taken on the line 4-4 of Figure 2.

In the particular example of the invention illustrated in the drawings the invention is shown as applied in a hydraulic rotary drilling apparatus. 10 designates a rotary table of conventional construction which is mount-

ed upon the derrick floor 11 and is driven by the pinion 12 fixed on the shaft 13. 14 designates an inner string of pipe or the drill stem which may be attached to the rotary 10 in any well-known manner, as by means of slips 15. The drill stem 14 is concentric with the outer casing 16 of the well. In drilling a well the rotary 10 rotates the drill stem 14 so as to operate a cutting tool positioned at the bottom of the drill stem while fluid is forced down through the hollow drill stem to wash away the borings or cuttings of the drill bit, as will readily be understood by those skilled in the art.

A section 17 is provided each end of which is threaded or provided with other means by which it may be attached to adjacent sections of the inner pipe 14. As illustrated, the section 17 is equipped with exteriorly threaded portions 18 adapted to engage in interiorly threaded portions of adjacent sections of the inner string of pipe 14. The member 17 is provided with a longitudinally extending passageway 19 which is preferably of substantially the same diameter as that of the inner diameter of the piping 14.

The member 17 is provided with a swaged or flared portion 20 which attains a diameter that is equal to or greater than the diameter of the well casing 16 so that when the inner string of pipe 14 is lowered the member 17 will rest upon the upper end of the casing 16 as at 21 thereby suspending the inner string of pipe upon the upper end of the outer string.

In order to provide for the escape of the pressure fluids when the inner string of pipe is suspended on the outer it is best to interpose packing means between the member 17 and its seat 21. As clearly shown in Figures 2 and 3 a packing sleeve 22 is positioned on the flared portion 20 of the member 17. The sleeve 22 may be composed of lead or other relatively soft metal or any material that is capable of being distorted so as to form a seal. The flared portion 20 may be provided with peripheral grooves 23 in order that the sleeve 22 may be firmly positioned thereon.

In order to provide for controllably releasing the pressure fluids when the member 17 has been seated on the outer casing I provide a suitable valve arrangement adapted to retain the fluids in the well until such time as the necessary connections can be made for properly disposing of the fluids. As illustrated, a valve 24 is suitably seated

in the member 17 so as to control the pas-
 sage of fluid through the passageway 19.
 The valve is shown in the form of a cock
 but it is to be understood that any suitable
 5 type of valve may be employed. It is pref-
 erable to equip the valve with suitable lock-
 ing means and as illustrated, a lock washer
 25 is provided which may have an opening
 26 adapted to engage the plug portion 27
 10 of the valve and which may be held in place
 by means of a cap screw 28.

In operation when an area of excessive
 pressure is encountered drilling is suspend-
 ed and the drill stem 14 is raised slightly
 15 so that the end of a section thereof is posi-
 tioned just above the rotary table as shown
 in Figure 1. The drill stem is then discon-
 nected from the swivel and hose stem and
 the member 17 is attached to the upper end
 20 of the drill stem. The slips 15 are then re-
 moved allowing the inner pipe 14 to descend
 and cause the member 17 to be seated on
 the upper end of the outer string of pipe.
 The inner string of pipe is thus suspended
 25 on the seat 21 and by reason of the pack-
 ing material 23 a seal is formed which pre-
 vents the egress of the pressure fluids from
 the well. The valve 24 is then closed and
 such connections as may be desired are made
 30 to the member 17 so that when the valve is
 opened the fluids from the well may be dis-
 posed of as may be desired.

Apparatus of preferred form and con-
 struction has been illustrated and described
 35 for the purpose of showing a way in which
 this invention may be used, but the inven-
 tive thought upon which the application is
 based, is broader than this illustrative em-
 bodiment thereof, and I therefore intend no
 40 limitations other than those imposed by the
 appended claims.

What I claim is:

1. In hydraulic well drilling apparatus, a
 well casing, a pipe connection adapted to be
 45 attached to a hollow drill stem and having
 an external periphery of greater diameter
 than that of the well casing, and a valve
 positioned within said connection.

2. In combination with a drill stem of a
 50 hydraulic well drilling apparatus, a pipe
 connection threaded at each end by means
 of which it may be attached to said drill
 stem and having a flared portion adapted to
 be seated upon the upper end of the well

casing, a sleeve fixed to said flared portion 55
 and composed of a material capable of be-
 ing distorted to form a seal, and a valve
 disposed in the pipe connection for con-
 trolling the passage of fluid therethrough.

3. In hydraulic well drilling apparatus, 60
 an inner string of pipe, an outer string of
 pipe, a connection attached to said inner
 pipe and having an outwardly swaged por-
 tion adapted to be seated on the upper end
 of said outer pipe and thus support said 65
 inner pipe thereon, and a valve adapted to
 control the passage of fluid through said
 inner pipe.

4. In hydraulic well drilling apparatus, 70
 an inner string of pipe, an outer string of
 pipe, a connection attached to said inner
 pipe and having an outwardly swaged por-
 tion adapted to be seated on the upper end
 of said outer pipe and thus support said 75
 inner pipe thereon, a valve adapted to con-
 trol the passage of fluid through said inner
 pipe and a packing member adapted to be
 interposed between the swaged portion of
 said connection and the upper end of said 80
 outer pipe.

5. A pipe section each end of which in- 85
 cludes a swaged portion of reduced diam-
 eter, a threaded portion at each end of said
 section, a valve arranged to control the pas-
 sage of fluid through said section, and a 90
 sleeve fixed on one of said swaged portions
 composed of material adapted to be dis-
 torting to form a seal.

6. In hydraulic well drilling apparatus, a 95
 well casing, a drill stem partially disposed
 within the casing, a connection attached to
 the drill stem and having an outwardly
 swaged portion adapted to be seated on the
 upper end of the well casing, packing ma-
 terial secured to the swaged portion for 100
 making a tight connection with the well
 casing, means including a rotatable table
 through which the upper end of the drill
 stem extends disposed above the well for ro-
 tating the drill stem, and removable key 105
 members for securing the drill stem to the
 table and adapted to be removed to permit
 the lowering of the swaged portion for seat-
 ing upon the well casing.

In witness whereof, I have hereunto set 110
 my hand this 3rd day of June 1922.

W. H. LYNE.