

Dec. 8, 1931.

W. E. REMBERT

1,835,722

CASING PERFORATOR FOR OIL WELLS

Filed Jan. 9, 1930

2 Sheets-Sheet 1

Fig. 1.

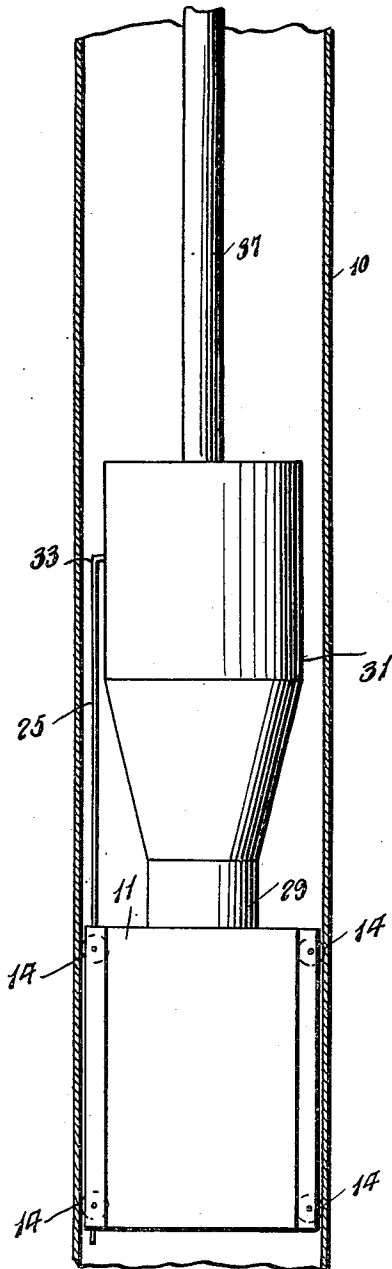


Fig. 2.

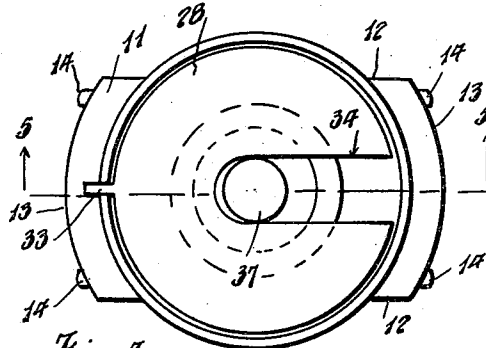


Fig. 4.

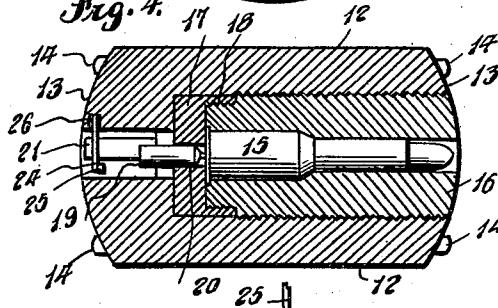
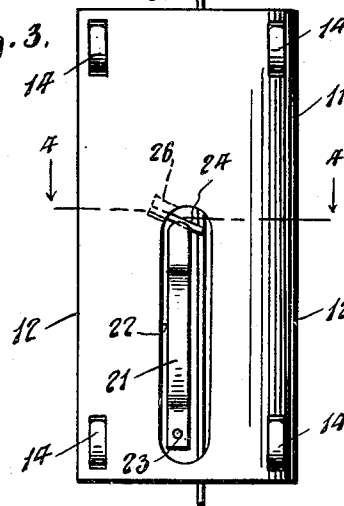


Fig. 3.



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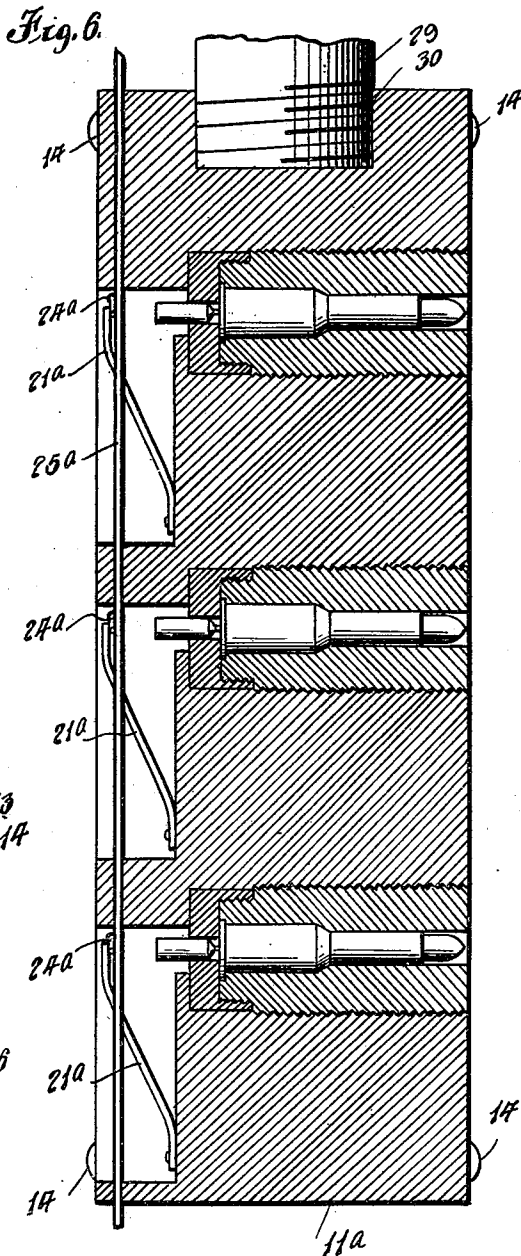
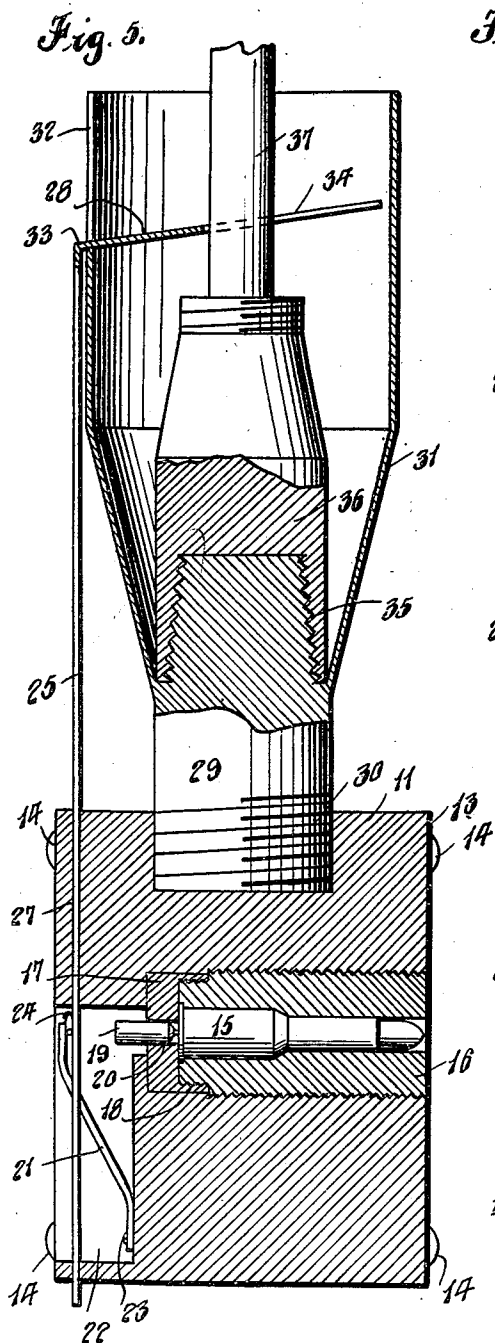
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2 Sheets-Sheet 2



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CASING PERFORATOR FOR OIL WELLS

Application filed January 9, 1930. Serial No. 419,708.

This invention relates to a method and means whereby the casing in an oil well may be perforated especially after operation of the well is no longer profitable at its original depth, as at various elevations where shallow sands have been cased off in the sinking of the well.

It is the main object of the present invention to provide a means and method which will be certain and positive in operation and which will penetrate the cement wall around the casing far enough to reach the oil bearing sand and permit the oil to flow into the casing.

Another object is to carry out the invention by using an explosive means in the form of a projectile.

I find in use that by reason of the present invention a hole of smooth bore and of any diameter desired can be produced not only through the casing itself but through the hard formation of cement and the like about the same for at least a foot beyond and that there is no tendency in the practice of the invention to mar or split the pipe or casing. Aside from accomplishing these results, I also find that the same may be performed or carried out in from one-fourth to one-tenth the time required under existing conditions of perforating oil well casings.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:—

Figure 1 is a view showing the invention in elevation and within a section of oil well casing, the latter being shown in section;

Figure 2 is a plan view of the invention;

Figure 3 is a side elevation of the firing body;

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a vertical sectional view taken on the line 5—5 of Figure 2, and

Figure 6 is a vertical sectional view taken on the same relative plane as Figure 5 but through a modified form.

Referring specifically to the drawings 10

designates an oil well casing, being conventionally disclosed, and adapted for perforation for the purposes mentioned hereinbefore. 11 designates a firing body or stock of metal, of any desired weight and configuration, preferably having flat walls as at 12 and arcuate walls as at 13 substantially conforming to the bore of the casing 10. At the walls or surfaces 13, rollers 14 are mounted to travel on the bore wall of the casing to guide the body and afford ease of operation.

The body 11 is adapted to carry cartridge 15 shown as of conventional form. Such cartridge may be carried by a barrel 16 removably screw threaded in the lateral recess in the body 11. The barrel 16 has a cap 17 at one end thereof screw threaded to the barrel as at 18 so that it may be detached therefrom. The cartridges 15 are removably inserted into the barrel 16 from the end covered by the cap 17 when the latter is removed. Such caps 17 carry firing pins 19 which are slidable through central openings 20 therein. The firing pins 19 are normally fastened to the caps 17 as by a drop of solder, frictionally or otherwise, but in such manner that a blow imparted thereto will sever it from the cap and permit it to be driven into the cartridge 15 to fire the same in the same manner that the firing pin of a gun coacts with a cartridge in a gun.

The firing pin 19 is adapted to be loosened and moved to firing position through the action of a relatively strong leaf spring 21 which is normally held retracted as shown in Figures 3 and 5. Such spring may be fastened in a recess 22 at one side of the body 11 and at 23 to the body. The upper end of such spring 21 is free and held from movement against the firing pin by a detent pin 24 carried by a trigger rod 25. Detent pin 24 extends loosely into a recess 26 formed in the body 11. Trigger rod 25 is vertically slidable in the body 11 through an opening or slot 27 and at its upper end has an angularly disposed operating head 28.

A stud 29 is screw threaded at 30 in the upper end of the body 11 and has an upwardly extending sleeve 31 integral therewith, such sleeve having a longitudinally

extending slot 32 in which a neck 33 connecting latch rod 25 and plate 28 is disposed. Such plate 28 has a radial slot 34.

Screw threaded to the stud 29 within the sleeve 31 as at 35 is a fitting 36 from which a rod 37 rises, the slot 34 enabling the operating head to fit the rod. The device is adapted to be lowered in the well casing in any suitable manner by means attached to the rod 37 or otherwise.

Presuming the device to have been lowered to the proper depth where the casing is to be perforated, and for instance in the relation shown in Figure 1, a ball, weight or other means is lowered into the sleeve 31, guided by the rod 37 if desired, which ball or weight contacts with the plate 28 causing such plate at its free end to lower and at its other end to rise accordingly raising the trigger rod 25 and detent 24, the latter moving out of the path of the spring 21 whereupon such spring 21 due to its tension strikes the firing pin 19, disengaging it from the cap 17 and plunging it into the percussion means within the cartridge 15, firing the latter and causing it to penetrate the casing and the concrete and other matter about the same, whereby means of communication is provided with the oil bearing sands above the bottom of the well and cut off during the sinking thereof, which oil will drain into the casing 10 and is adapted to be removed therefrom in the usual way.

Various changes may be resorted to provided they fall within the spirit and scope of the invention and for instance the form shown in Figure 6 may be used. It differs from the previous form solely in that it accommodates and operates simultaneously a plurality of projectiles. In such Figure 6, the body 11^a similar to that at 11 is longer so as to accommodate a plurality of the barrels 16 and cartridges 15, caps 17 and firing means 19. The trigger rod 25^a in this form is longer and has a plurality of the detents 24^a like those at 24 and which coact in the same manner with a plurality of springs 21^a similar to those at 21.

I claim as my invention:—

1. A device for perforating a well casing or the like comprising a body for insertion into the well casing, means on the body to carry a horizontally disposed cartridge and a firing pin in operative relation therewith, laterally movable means operable to move the firing pin into the cartridge, and vertically slidable trigger means normally maintaining the latter means inoperative.

2. A device for perforating a well casing or the like comprising a body, horizontally disposed cartridge firing means carried by the body, a vertically movable trigger controlling operation of said cartridge firing means, and laterally movable means extending from the trigger operable to move the trigger longitudinally on operation of the firing means.

3. A perforating device for a well casing or the like comprising a body adapted to be lowered into the same, cartridge firing means carried by the body, a trigger controlling said firing means, said trigger having a laterally extending operating portion, and means on the body on which said portion fulcrums to impart a movement to the trigger to release the firing means.

4. A device for perforating well casings or the like comprising a body adapted for insertion into the casing, means for disposing a cartridge laterally of the body and a firing pin in operative relation thereto, a spring carried by the body operable against the firing pin to drive it into the cartridge, a trigger movable longitudinally of the body and normally maintaining said spring retracted, a sleeve rising from the body having a slot, said trigger having an operating portion extending through the slot and bearing on said sleeve, said portion being operable by a weight or the like to cause vertical movement of the trigger to release the spring.

5. A device for perforating well casings or the like comprising a body adapted for insertion into the casing, means for disposing a cartridge laterally of the body and a firing pin in operative relation thereto, a spring carried by the body operable against the firing pin to drive it into the cartridge, a trigger movable longitudinally of the body and normally maintaining said spring retracted, a sleeve rising from the body having a slot, said trigger having an operating portion extending through the slot and bearing on said sleeve, said portion being operable by a weight or the like to cause vertical movement of the trigger to release the spring, a stud from which the sleeve directly extends, said stud being secured to the body, and a suspending rod secured to the stud, said operating portion having a slot through which the suspending rod extends.

In testimony whereof I affix my signature.
WILLIAM E. REMBERT.