E. V. CROWELL.

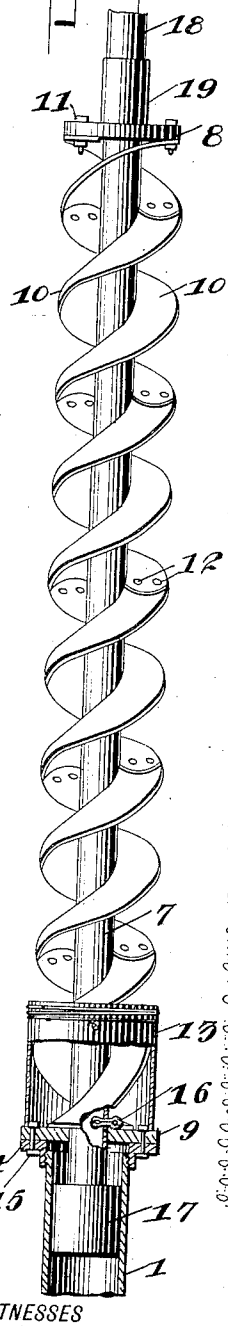
PACKER.

APPLICATION FILED OCT. 22, 1919.

1,357,958.

Patented Nov. 9, 1920.

Fig. 2.



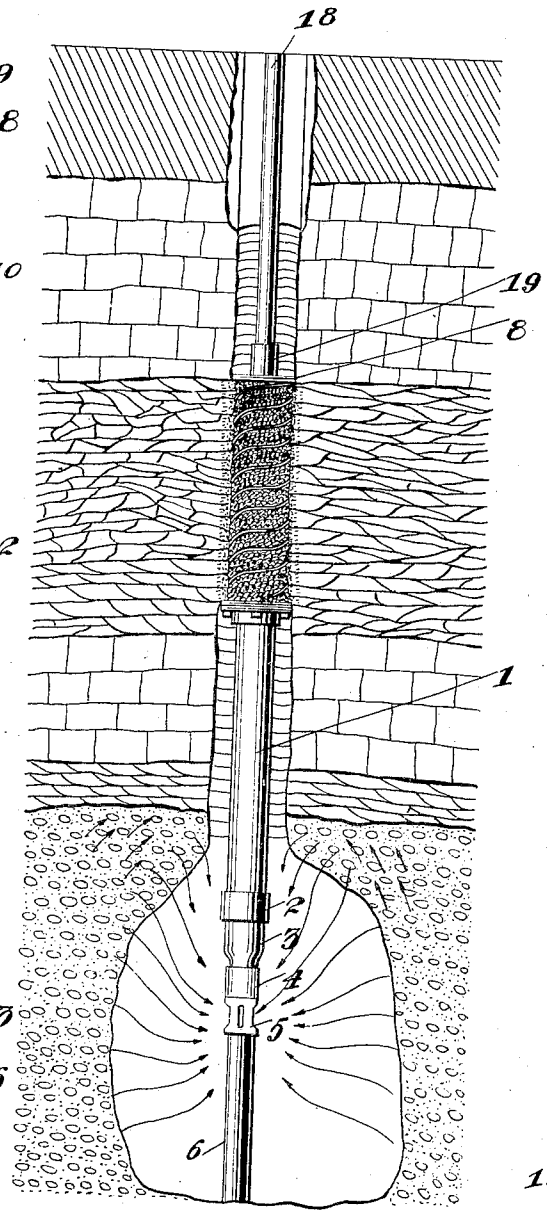
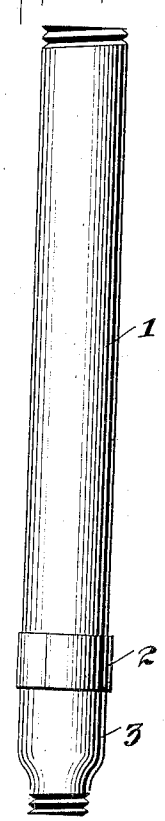


Fig. 1.

Fig. 3.



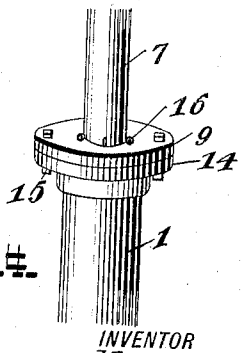


Fig. 4.

WITNESSES

Geo. D. Hall.

C. E. Trainor.

INVENTOR

E. V. Crowell.

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

ERD. V. CROWELL, OF TULSA, OKLAHOMA.

PACKER.

1,357,958. Specification of Letters Patent. Patented Nov. 9, 1920.

Application filed October 22 1919. Serial No. 332,356.

To all whom it may concern:

Be it known that I, ERD. V. CROWELL, a citizen of the United States, and a resident of Tulsa, in the county of Tulsa and State of Oklahoma, have invented certain new and useful Improvements in Packers, of which the following is a specification.

My invention is an improvement in packers, and has for its object to provide a device of the character specified, especially adapted for providing a water tight seal in a well, for the purpose of cutting off a flow of water, wherein the arrangement is such that the engagement of the packer with the bottom of the well will automatically expand the packer to cause it to seal the well, and wherein the withdrawing of the packer from the well will contract the packer.

A further object of the invention is to provide a packer by means of which the outlet of the well may be restricted in order to economize in casing or to build up pressure, as, for instance, in a gas well, sometimes to economize in casing, and again to build up a pressure, if a gas well, by confining the out-let to a smaller diameter pipe.

In the drawings:

Figure 1 is a view showing the packer in use,

Fig. 2 is an enlarged detail of the upper portion of the packer,

Fig. 3 is a view of the lower portion,

Fig. 4 is an enlarged perspective detail of the connection of the upper and lower portions.

In the present embodiment of the invention a base or anchor 1 is provided, having connected with its lower end, by means of a collar 2, a swaged nipple 3. The reduced lower end of this nipple is engaged with the upper end of a sleeve or collar 4, which is engaged at its lower end with the upper end of a gas cage 5, and a section of pipe 6 of suitable length is connected with the lower end of the cage.

The packer proper comprises a section 7 of piping of suitable length, having near its upper end a flange or collar 8 secured thereto, and at its lower end the piping 7 is provided with a similar flange or collar 9, which is slidable on the pipe. Spiral blades 10 are arranged between the collars 8 and 9, two blades being provided in the present instance, and each blade has its ends secured to the collars by bolts and nuts 11. In the present instance the spiral blades are composed of sections, which are riveted together at their meeting ends as indicated at 12, and a sleeve 13 of tin or like light material is arranged on the collar 9, the said sleeve extending above the collar a short distance, covering approximately a half spiral of the blades.

The sleeve which may be a loosely wrapped strip, may be held at its upper end by a wire binder, and the collar 9 is rigidly secured to a threaded coupling 14, which engages the threaded upper end of the anchor 1. In the present instance this connection is by means of bolts and nuts 15. Cotter pins indicated at 16 are provided for preventing the pipe 7 from slipping down into the base or anchor, it being understood that the lower end of the pipe 7 extends into the anchor, through the coupling 14, and the said lower end is provided with an enlargement in the form of coupling 17 for engaging the coupling 15 when the pipe 7 is drawn upward, to withdraw the packer. These cotter pins are passed through openings in the pipe 7, and are sheared off when the weight of the packer comes on to the pins, after the anchor has engaged the bottom of the well. The gas cage has openings as shown for permitting the passage of gas from the well to the packer. Piping 18 is connected with the upper end of the pipe 7, by means of the coupling 19 to lower the packer into the well.

In use suitable sealing material, as for instance hemp, fiber or any soft pliable material is filled in between the spirals, and the spirals are collapsed in a manner to be presently described. This packing is compressed and forced outward, the spiral serving as a guide for delivering the packing outward, to thoroughly seal the well. The tin sleeve at the bottom of the packer is to prevent the gas from getting in beneath the sealing medium when the packer is being lowered into the well. When the packer is properly positioned, the wire binder of the sleeve is broken by the expansion of the blades.

In operation with the packer properly assembled it is lowered into the well. When the anchor engages the bottom and the weight of the packer comes on to the cotter pins, they are sheared and the pipe 7 moves downwardly into the anchor 1. The spirals are collapsed, moving closer together, and they are expanded radially outward. When the packer is in soft shale formation, the spirals have a tendency to cut into the wall, and into small irregularities in the wall, and the packer will expand uniformly throughout the full length of the packing material. When the packer is withdrawn, the blades are contracted and the coupling 17 draws up the anchor with the packer.

It will be understood that a particular purpose of the device is to restrict the outlet of the well, that is, with the packer shown the outlet of the well might be restricted to the capacity of the pipe 7. The space between the said pipe 7 and the well wall is sealed and all of the flow must be through the pipe 7. Thus the outflow from the well may be restricted to permit a smaller casing to be used or to build up a pressure in the case of gas wells. The gas gage is merely a species of valve for placing the pipe 7 in communication with that portion of the well below the seal. As shown in Fig. 1 by the arrow heads the gas enters through the gage, which is, in effect, the inlet for the pipe 7. The pipe 18 is connected with the upper end of the pipe 7 and this pipe serves as a continuation of the pipe 7 for permitting the contents of the well to move outwardly and also for permitting the packing to be raised or lowered. It is the weight of the tube or casing connected with the pipe 7 that shears the pin 16 and expands the packer.

The spirals are formed from a series of plates riveted together in coils which are of much larger diameter when laid flat, than when elongated along the pipe. When the packer is positioned in a well and made operative, the spirals collapse, and the individual plates in their efforts to return to their original diameter exert a powerful lateral pressure on the wall of the well. Thus the packer takes a claw hitch hold on the well. The spirals expand uniformly throughout their full length, keeping pace with the lateral expansion of the packing material, serving as guides for delivering the force of the packing material outward, into the finest variations of the wall of the well. A packer for a six inch hole is made of plates eight inches outside diameter when flat.

The sleeve 13 is to prevent the gas from getting in under the sealing medium when the packing is being lowered or positioned in the well. The sleeve shuts off the gas at the bottom of the packing. When the packer is properly positioned the wire binder which holds the sleeve together is broken. It will be understood that this sleeve may be omitted, if desired.

I claim:

1. A device of the character specified, comprising a core, a fixed head at one end of the core, a head at the other end through which the core is slidable, spiral blades arranged about the core between the heads and secured to the heads at their ends, an anchor connected with the bottom head and into which the core is slidable, a frangible means arranged between the core and the lower head for holding the core out of the anchor and adapted to be sheared by the weight of the core and blades when the anchor engages the bottom of the well, said blades being adapted to carry a packing material between them, and a sleeve encircling the lower end of the blades and resting on the head adapted to be displaced by the expanding of the blades.

2. A device of the character specified, comprising a core, a fixed head at one end of the core, a head at the other end through which the core is slidable, spiral blades arranged about the core between the heads and secured to the heads at their ends, an anchor connected with the bottom head and into which the core is slidable, a frangible means arranged between the core and the lower head for holding the core out of the anchor and adapted to be sheared by the weight of the core and blades when the anchor engages the bottom of the well, said core having enlargements within the anchor below the head for engaging the head when the packer is drawn upward.

3. A device of the character specified, comprising a core, a fixed head at one end of the core, a head at the other end through which the core is slidable, spiral blades arranged about the core between the heads and secured to the heads at their ends, an anchor connected with the bottom head and into which the core is slidable, a frangible means arranged between the core and the lower head for holding the core out of the anchor and adapted to be sheared by the weight of the core and blades when the anchor engages the bottom of the well, said anchor having openings at its top and the core being hollow for permitting the passage of gas.

4. A device of the character specified, comprising a core, a fixed head at one end of the core, a head at the other end through which the core is slidable, spiral blades arranged about the core between the heads and secured to the heads at their ends, an anchor connected with the bottom head and into which the core is slidable, a frangible means arranged between the core and the lower head for holding the core out of the

anchor and adapted to be sheared by the weight of the core and blades when the anchor engages the bottom of the well.

5. A device of the character specified comprising an anchor and a core arranged to telescope with the anchor, spiral blades arranged between the anchor and the core and adapted to be expanded when the core is telescoped into the anchor, and means for temporarily holding the core in extended position and adapted to be broken when pressure is brought upon the core.

ERD. V. CROWELL.