

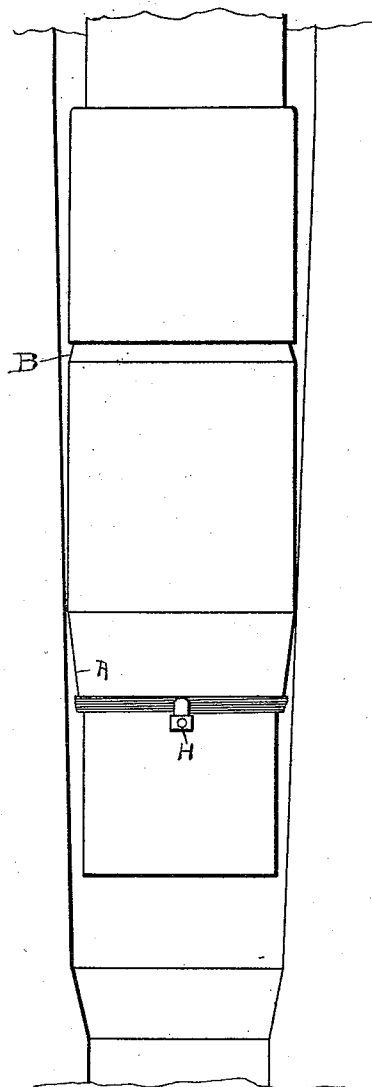
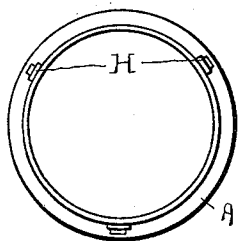
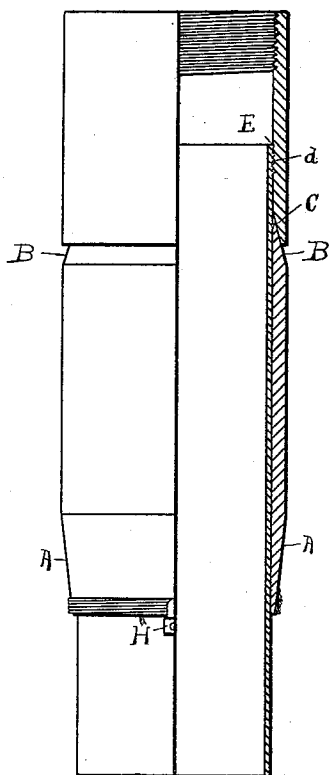
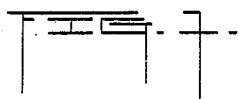
(No Model.)

M. S. HOWE.

PACKER FOR NATURAL GAS OR OIL WELLS.

No. 532,783.

Patented Jan. 22, 1895.



Witnesses

Arch. M. Cathin

Frank D. Blodstone.

Inventor,

Maurice S. Howe

by Roy R. Catlin

Attorney.

UNITED STATES PATENT OFFICE.

MAURICE S. HOWE, OF WABASH, INDIANA.

PACKER FOR NATURAL-GAS OR OIL WELLS.

SPECIFICATION forming part of Letters Patent No. 532,783, dated January 22, 1895.

Application filed November 25, 1892. Serial No. 453,131. (No model.)

To all whom it may concern:

Be it known that I, MAURICE S. HOWE, a citizen of the United States, residing at Wabash, in the county of Wabash and State of Indiana, have invented certain new and useful Improvements in Packers for Natural-Gas or Oil Wells; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to a device for and method of packing gas and oil wells, and consists in certain new and useful improvements in the construction and use of same.

There are in Indiana at the present time a great number of gas and oil wells, and this number is on the constant increase.

A gas or oil well consists of a hole, usually about eight inches in diameter, drilled into the ground, or rock until a depth is reached which is supposed to be below all points where water will interfere, and which is in the solid and firm rock, usually several hundred feet below the surface of the ground. At this point a pipe five and five-eighths inches is introduced, consisting of a number of joints securely screwed together, and of sufficient length to extend from the surface of the ground to the bottom of such eight inch hole, and then the well is continued on to the required depth of one or more thousand feet with a smaller drill of five and five-eighths inches in size until the gas or oil bearing rock is reached.

Natural gas when found has the enormous pressure of over three hundred pounds to the square inch, and must be kept free from water and moisture, and to accomplish this a number of devices called "packers" have come into use.

Heretofore when a well was bored it has been packed by introducing in the well a pipe smaller than five inches which extends from top of ground to the point where packing is to be done, and there by springs, screws, or levers, a rubber ring is expanded against the

walls of the well, whereby water and moisture are kept above the packing, and the gas or oil must seek the surface of the ground through the packing tube. As this is necessarily done after the well is fully constructed, and owing to the pressure of the gas being attended with much danger, and is otherwise wasteful and extravagant, a well cannot be made deeper, cleaned out, by removing obstructions, or "torpedoed" while this packing is in the well, and to remove it is difficult, and dangerous.

My invention relates to a packer constructed as hereinafter described which is designed and intended to be attached by a threaded head to the end of the casing pipe, then have the packing placed on the bottom end of the casing, and thereafter put in place, and firmly fixed before the completion of the well.

My invention of a packer is shown in the accompanying drawings.

Figure 1 is a partial longitudinal section of a well tube and packing device. Fig. 2 is a bottom plan; and Fig. 3 is a side elevation indicating the use of the device in a well.

In the following description reference is made to pipe of certain sizes, for the reason that such sizes are those commonly used, but other relative sizes could be used as well, and are included in my claim.

Fig. 3, shows a rubber sleeve which is designed to fit over a short piece of five and five-eighth inch pipe, such piece of pipe being eighteen or twenty inches long, midway between A and B. Said rubber sleeve is one half inch thick and at upper end at B, has a two inch taper or bevel and at lower end A, has a three inch taper or bevel. The three inch taper or bevel is securely wrapped with wire, and is still more firmly held in place by two or more clamps as shown at A and H, in Fig. 1.

The upper or head end of packer is capped by the metal head. This head is screwed onto the short section of packer pipe by the threads "d" as shown, and such head is under-cut and recessed at C. C. in such manner that when the head is screwed onto the packer pipe which has been invested with the rubber sleeve, the outer part of head C. C. extends down and over the two inch bevel of the rub-

ber sleeve, and thereby holds same firmly and securely in place, as is more fully shown at B', in Fig. 2. The packer head with the part inclosed in rubber sleeve is seven inches in diameter over all. Such metal head is also threaded to engage with the end of casing pipe as shown at E, and when so attached the interior of the casing and the interior of the packer form a smooth continuous tube of five and five-eighths inches inside diameter. Now the well having been drilled to the point where the packing is to be put in, with an eight inch bit, then a smaller bit is used say six and one-half inches, and by means of this smaller bit the well is continued deeper to a point say two feet below the bottom of the eight inch well, and this distance takes the shape of a cone, carefully and neatly sloped down from eight inches in diameter to six and one-half inches in diameter, and this cone shaped part of the well forms the seat for the packer. The packer is now connected to the casing pipe, and by attaching successive joints of same, is let down until the packer rests in the cone shaped seat prepared for same as above described, and the weight of the casing holds same firmly to this seat, and thereby effectually packs the well so that no water can get below the packing, and all gas and oil found in rock below the packing must arise to the surface on the inside of such casing. The well now being firmly and properly packed, a smaller drill is passed down inside of casing and the well is continued to any required depth, and as soon as gas or oil bearing rock is reached the well is all ready for use, and can be cleaned out at any time, sunk deeper, torpedoed or repaired in any way without tampering with the packing, the whole being safer, better and cheaper than any other method in use. It is safer for the reason that it is dangerous to life and property to try to pack a well which has a pressure of three hundred or four hundred pounds to the square inch of inflammable and explosive gas. It is better for the reason that it can be done when the well is empty and there are no screws or levers to get out of order. The packer has a firm seat and is held there by gravity, in such manner that there is no force resisting gravity. It is cheaper, not only for reasons stated above, but because there is a net saving of one string of packing pipe from the surface of well to packing point which costs at least one hundred dollars.

My invention is more especially applicable to gas wells, usually dug to a depth of one thousand feet through solid rock and holding gas under an average pressure of about three hundred and twenty five pounds to the square inch. Prior to the present improvement such wells have been equipped with three tubes; first, a "drive" pipe with an internal diameter of not less than eight inches, such pipe extending through the soil to the

rock; secondly, a casing extending some hundreds of feet from the surface to below the water bearing rock and having by universal usage an internal diameter of five and five eighths inches and an outside diameter of six inches; and thirdly, a tubing of two or three inches diameter extending from the surface to the bottom of the well. Heretofore in gas wells these three sizes of pipe or tubing have always been used and the packing against water has been applied between the inner tube and its surrounding metal casing.

I am aware that it has been proposed to dispense with the lower or interior tube in oil wells and that to carry out this purpose it was proposed to use a separate packer having upwardly extending fingers to receive and guide a casing to a seat on a lead ring held in said packer and that it has been suggested that the exterior of the lower part of such packer might be made of frusto-conical form to fit a corresponding seat formed in the rock to pack the joint, and such device is not of my invention.

My improvement requires that the packer be fixed to the casing or to an extension thereof so as to be carried and lowered thereby to its seat. This is of prime importance since it is impracticable to lower independently in gas wells a separate packer for the reason that it would not be possible to suitably guide and seat such a packer at the great depth required often equal to an eighth of a mile. Great simplicity of parts and a large range of seating adaptability and a fixed attachment to the casing are essential for packing a gas well as by my improvement. It is also desirable that the packer seat in the rock have a vertical extent in excess of the length of the packer and that the latter have a length greater than the diameter of the casing in order to insure a proper guiding and gradual seating of the packer and to distribute the pressure through a considerable vertical extent. This insures that the packer will be properly seated and avoids the destruction of the packer by crushing out. The improvement can be carried out by the use of a single tubular extension of the casing provided with an exterior compressible packing sleeve adapted to be lowered with the casing to and into a frusto-conical portion of the well below the water bearing rock.

I am aware that an expansible rubber packing having a sheet metal guide or lining and attached to the casing by exterior straps has been proposed for oil wells and such construction is not of my invention.

Now, having fully described my invention, what I desire to secure to myself by Letters Patent is—

For use in a gas well having a suitable conoidal seat, the combination of the casing, the packer head screwed into the foot of said casing, and the horizontally compressible

sleeve immediately and closely fitting the casing and adapted to closely fit its seat in the rock at every point in its circumference and having its edges held to the casing by devices
5 situated within the outer circumference of the body of the packing, the whole being suitable for casing and packing the well against descent of water and ascent of gas, and the compressible sleeve constituting the unob-

structed bottom support of the casing, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MAURICE S. HOWE.

Witnesses:

OLIVER M. BOGUE,
JOHN H. DICKEN.