(No Model.) 2 Sheets—Sheet 1.

I. N. HOADLEY.

PACKER FOR GAS OR OIL WELLS.

No. 370,701. Patented Sept. 27, 1887.

FIG. I.

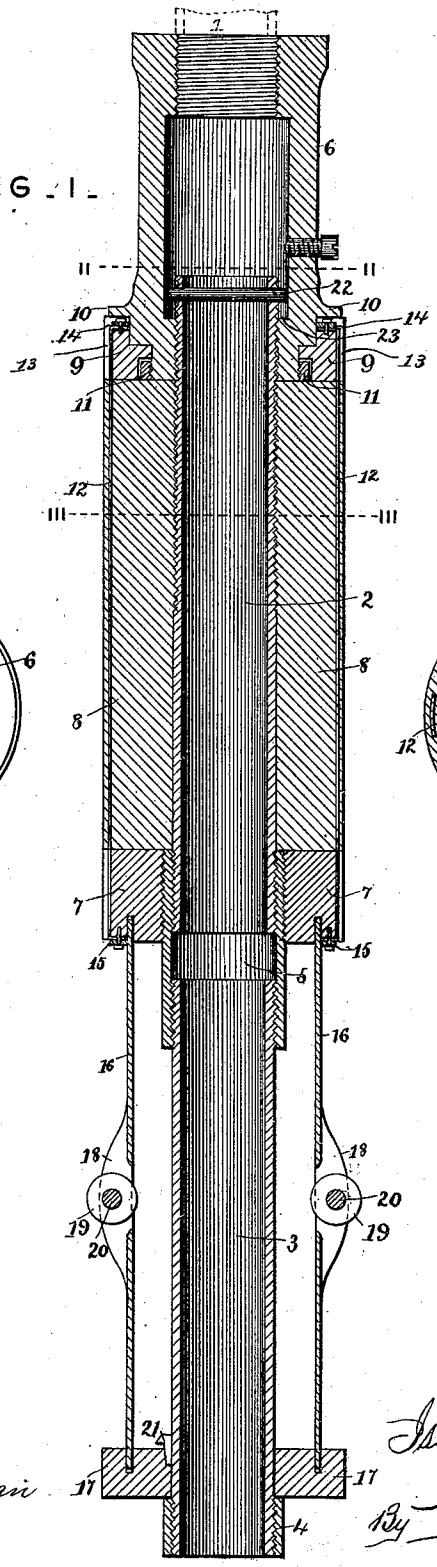


FIG. II.

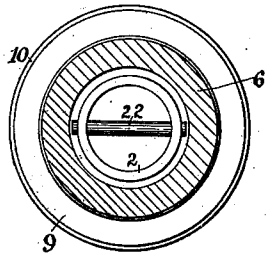
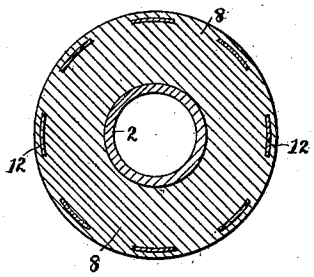


FIG. III.



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Inventor:
Isaac N. Hoadley
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FIG. IV.

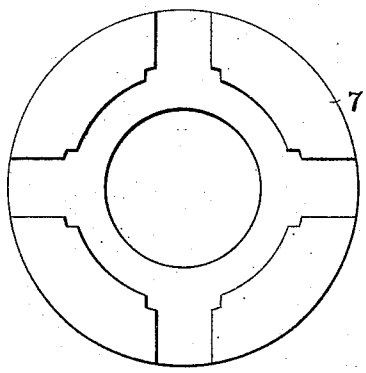


FIG. V.

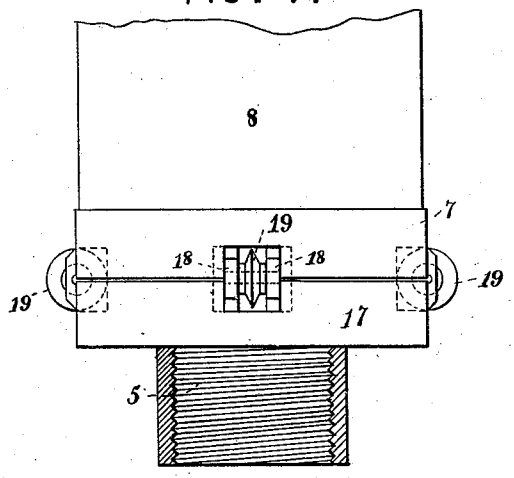
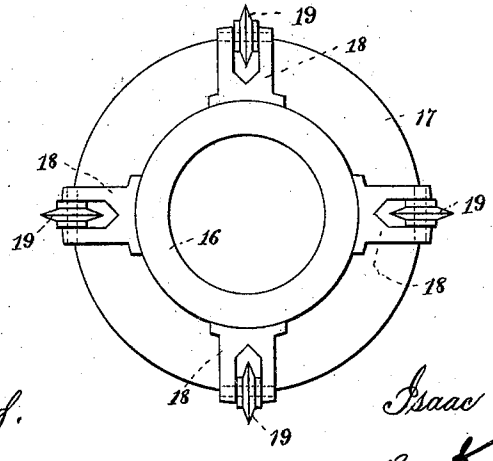


FIG. VI.



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UNITED STATES PATENT OFFICE.

ISAAC N. HOADLEY, OF BRADFORD, PENNSYLVANIA, ASSIGNOR TO THE HOADLEY PACKER COMPANY, (LIMITED,) OF SAME PLACE.

PACKER FOR GAS OR OIL WELLS.

SPECIFICATION forming part of Letters Patent No. 370,701, dated September 27, 1887.

Application filed February 2, 1887. Serial No. 226,267. (No model.)

To all whom it may concern:

Be it known that I, ISAAC N. HOADLEY, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Packers for Gas or Oil Wells, of which the following is a specification.

My invention is especially intended for use on flowing gas or oil wells, the object being the enabling of the location of the packer at any distance above the bottom of the well. In such wells it is usually advantageous to have the packing located as near the casing at the top of the well as possible; but it has generally been impracticable to so locate the packing in cases in which the packing is expanded by the rotation of the gas or oil pipe or tube, for the reason that no effective means of preventing the rotation of the packing and the lower section of the pipe or tube at an intermediate point in the well had been devised.

My present improvements relate not only to means for enabling the packing on the lower section of the pipe to be held from rotation at an intermediate position in the well, but to the form of the packing and means employed for expanding and retracting it.

In the accompanying drawings, Figure I shows a portion of an oil-well pipe or tube to which my improved packing has been applied. Fig. II is a transverse section of the same on the line II II, Fig. II. Fig. III is a similar view on the line III III, Fig. I. Figs. IV, V, and VI represent a modification in the method of retaining the lower section of the pipe from rotation by means of sharpened wheels, Fig. IV being a sectional side elevation of the lower end of the packer and flanges thereunder, Fig. V an under side view of one of said flanges, and Fig. VI a plan view of the other flange with the rubber ring and wheels in position.

1 2 3 may represent three adjacent sections of a gas or oil pipe or tube. It may be supposed that section 3 is the lowermost section in the well, or that below section 3 any desired number of sections of pipe are applied to enable the pipe to extend to or toward the bottom of the well. In this latter case the sections 1 2 3 would simply represent any intermediate portion of the pipe to which the packing is to be applied.

4 is a thimble at the lower end of section 3. It may be of form to serve for the attachment of any additional length of pipe. The other coupling-thimbles, 5 and 6, serve to connect sections 3 2 and 2 1, respectively. The exterior of coupling 5 is screw-threaded at its upper end to receive a flange, 7, which supports the cylindrical rubber packing 8.

9 is an annular follower resting on the upper end of packing 8. The packing is expanded against the walls of the well by forcing together its ends. This is accomplished by rotating the pipe above the packing, the lowermost section of such pipe being shown at 1. The engagement of coupling 6 with section 1 is by a left-hand screw-thread, and with section 2 by a right-hand screw-thread. The screw-thread on section 2 is made sufficiently long to allow considerable movement of the coupling-thimble 6 thereon. Exteriorly the coupling-thimble 6 has shoulders or a number of lugs, 10, bearing upon the follower 9. Thus, when the upper sections of the pipe are rotated and the coupling-thimble 6 turned down on section 2, the shoulders or lugs 10, while rotating with little friction on follower 9, will force said follower down and expand the packing. A ring, 11, screwed on the lower end of coupling-thimble 6, retains the follower 9 upon said coupling-thimble, but does not bind it against the shoulder or lugs 10. This ring 11 is useful in enabling the follower 9 to be raised when the packing is to be retracted for the purpose of removal from the well. For this purpose, as well as for keeping the packing in a solid mass while being expanded, I mold the packing with a number of strips, 12, preferably of stout linen or canvas. Eight of such strips are shown in section in Fig. III. These strips project beyond the upper end of the packing, and are fixed to the follower 9. In order to prevent the exposed ends of the strips from being torn by contact with the walls of the casing or well, I provide cut-away portions in the peripheries of flange 7 and follower 9, (shown at 13 in Fig. I.) The ends of the strips, being turned over the flange and follower, may be clamped by rings 14 15, bolted

in place. It will now be readily understood that if at any time it be desired to withdraw the packing from the well, and the upper section of the pipe be therefore rotated in a direction the opposite of that employed for expanding the packing, the follower 9 will be raised, and by stretching the strips 12 will return the packing to its cylindrical form. The flange 7 acts, also, as a support for the upper end of the mechanism employed for preventing the rotation of the packing on the lower sections of the pipe. As here shown, said mechanism consists of stout bars 16, which may or may not be of spring metal, and which are supported at their ends in flanges or rings 7 17. Preferably, four of these bars are arranged at equal distances about the pipe. At their centers the bars 16 carry in cheeks 18 wheels 19, which are free to rotate on axes 20, and which have sharpened and hardened bearing-faces. The extreme width of the device from the bearing-faces of the opposite wheels 19 is such that the same will enter under some pressure the casing. While the pipe and its packing are being lowered through the casing the wheels 19 rotate and pass easily over the couplings of the several sections of the casing. As soon as the wheels reach the narrow bore of the well below the casing, they bite into the rock and instantly form a seat for themselves, which effectually prevents the rotation of that section of the pipe to which they are attached. They may be lowered to any distance preferred below the end of the casing; but it is obvious that it is usually best to locate them and the packing as little below the casing as possible. Preferably the means of support of the bars 16 are those here shown, the bars being rectangular in cross-section and being placed in corresponding sockets in rings 7 and 17. In applying the device, ring or flange 17, being forced upward, is supported by the coupling 4, so that the bars cannot be removed without loosening said coupling. A key, 21, prevents the rotation of ring 17 when in position.

In Figs. IV, V, and VI, I have represented a method of applying the wheels 19, whereby the spring-supporting bars 16 of said wheels (shown in Fig. I) may be dispensed with. In these figures the flange 17 rests upon the coupling-thimble 5, and is recessed to receive the bearing-cheeks 18 of the wheels 19. The upper flange, 7, resting immediately under the packer 8, is similarly recessed, as shown in Fig. V and by dotted lines in Fig. IV. These two flanges, when placed together with the wheels and their bearings in place, will retain the latter. The wheels are pressed outward with any necessary force by a rubber ring, 16, or metallic spring so formed and proportioned to its seat between the two flanges 7 and 17 as to yield sufficiently to inward pressure on the peripheries of the wheels when the packer is pressed into the upper end of a well-casing.

To prevent the withdrawal of thimble 6 from section 2, a stop, 22, which may be a pin rigid in seats in section 2, is provided, adapted to come in contact with a shoulder, 23, or thimble 6 when the latter is raised.

In the following claims all that portion of the pipe above section 2 is referred to as the "upper section" collectively.

I am aware that it has been proposed to form a screw-thread on the exterior of a well-tube and to turn thereon a pair of internally-screw-threaded nuts or collars, to which are secured the respective ends of several plate-springs having lateral projections designed to engage the side walls of the well for the purpose of enabling the well-tube to turn independently of said nuts or collars, the object being to compress a rubber packing-sleeve between the upper one of said nuts or collars and a flange or collar carried by the tube. This is not the equivalent of my invention, and such I do not claim.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination, with the well-tube, of the packer, a pair of flanges between which it is situated, wheels, springs for forcing them outward into engagement with the wall of the well for preventing the rotation of one of said flanges, and screw-threads formed on the tube and engaging corresponding threads on one of the flanges, whereby said flanges are forced together by the rotation of the tube, substantially as and for the purpose set forth.

2. In combination with the pipe of a gas or oil well, bars 16, fixed thereto, having projecting part carrying wheels engaging with the side of the well and adapted to prevent rotation of the pipe, substantially as and for the purpose specified.

3. In combination with a pipe-section, 3, thimbles 4 5 at the ends thereof, a flange, 7, rigid on one of said thimbles, a second flange, 17, supported on the other thimble, and bars 16, having projecting parts to engage with the side of the well and fixed between the said flanges, substantially as and for the purpose specified.

4. In combination with the pipe of a gas or oil well in two sections, the upper adapted to move on the under, a packing having a fixed abutment on the under section, a follower resting on said packing, and shoulders or projections on the upper section engaging both sides of said follower, substantially as and for the purpose specified.

5. The combination, with the sections 1 and 2 of the tube, of a coupling-sleeve, 6, having internal screw-threads engaging external threads on the section 2, and the internal flange, 23, and the stops 22, carried by the section 2 and adapted to engage said flange to prevent the separation of the parts, substantially as set forth.

6. The combination of pipe-section 2, screw-threaded at each end, a fixed coupling, 5, at

its lower end, a packing, 8, having fixed abutment at its lower end, a follower, 9, resting on the said packing and coupling-thimble 6, screw-threaded at each end, and shoulders to engage the said follower, substantially as and for the purposes specified.

7. In combination with a pipe for a gas or oil well having two sections, the upper capable of rotation on the lower, wheels having sharpened peripheries supported on the lower section and adapted to bite into the wall of the well to prevent said section from turning, and a packer supported on the lower section and expanded by the turning of the upper section, substantially as described.

8. The combination, with two sections of the tube movable vertically independently of each other, of a flange fixed to each section, so as to be immovable vertically independently thereof, a packing-tube situated between the two flanges, and flexible strips secured at their extremities to said flanges, substantially as set forth.

9. The combination, with the externally-screw-threaded tube-section 2, having flange 7, and means for preventing its rotation, of the sleeve 6, having screw-threads engaging the threads of the section 2 and having flange or projections 10 and ring 11, the ring 9, confined between said flange and ring, so as to permit the rotation of the sleeve independently thereof, the packing 8, interposed between the ring 9 and flange 7, and the strips 12, secured at their extremities to said flange 7 and ring 9, substantially as and for the purposes set forth.

ISAAC N. HOADLEY.

Witnesses:
JAS. A. TENLON,
FRED. H. NEWELL.