S. E. Heres,

Well Packing,

No. 51,945. Patented Jan. 9, 1866.

Fig: 1.

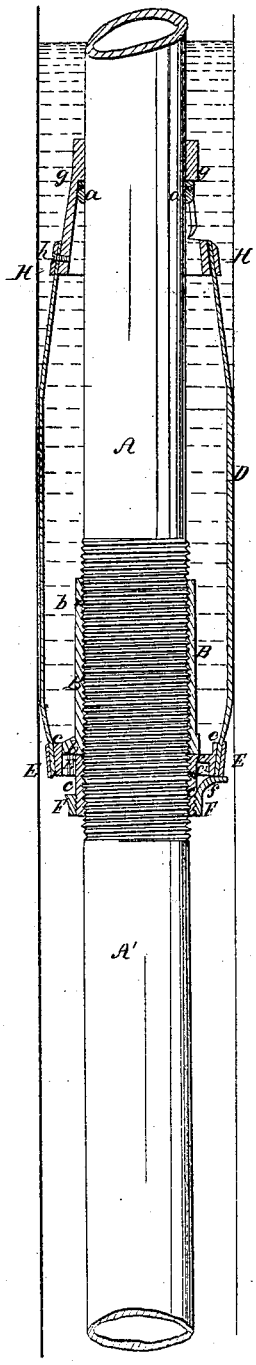


Fig: 2.

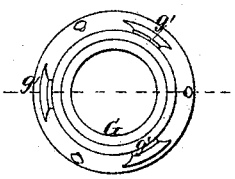


Fig: 3.

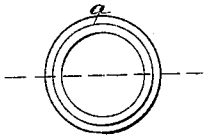


Fig: 4.

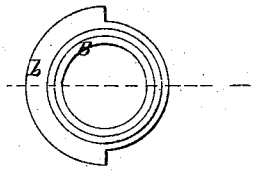


Fig: 6.

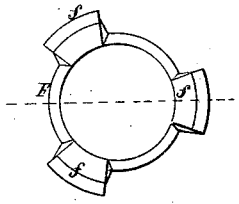
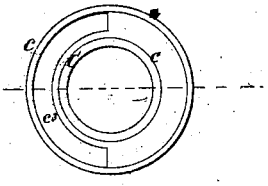


Fig: 5.



Witnesses;
C. D. Smith
W. F. Hall

Inventor;
S. E. Heres

UNITED STATES PATENT OFFICE.

S. E. HEWES, OF ALBANY, NEW YORK.

IMPROVEMENT IN WELL-TUBE PACKING.

Specification forming part of Letters Patent No. **51,945**, dated January 9, 1866.

To all whom it may concern:

Be it known that I, S. E. HEWES, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements in Well-Tube Packing; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a view showing the tubing in elevation and the packing with its connections and the tube-coupling in section. Figs. 2, 3, 4, 5, and 6 are detached views, showing in plan the several parts employed in connection with the tubing and packing.

Similar letters of reference indicate corresponding parts in the several figures.

In order to elucidate this description I will premise by stating fully objects which are to be attained by the employment of the devices which constitute the subject of this invention.

In the subterranean fissures and cavities where oil abounds gases exist, and these gases, at certain stages in the operation of pumping, force the entire column of oil upward until it stands in the space between the lower end of the pump-tubing and the packing. The oil being thus located above the end of the tubing renders the action of the pump fruitless, and the well ceases to yield until the relative positions of the tubing and that of the oil be made to correspond. A packing is used in connection with well-tubes to arrest the descent of the surface-water in the well.

My invention consists, chiefly, in means whereby the water which is detained by the packing may be made serviceable in depressing or lowering the column of oil to adapt it to be acted upon by the pump, or else such water may be made available in determining whether the oil is or is not located above the lower terminus of the pump-tubing, as will be hereinafter explained.

The invention further consists in means whereby the packing may, simultaneously with the action of the detained surface-water upon the column of oil, be adjusted so as to admit of the vertical adjustment of the tubing.

The following description will enable others skilled in the art to which my invention appertains to fully understand and use the same.

The red lines in Fig. 1 denote the sides or boundary of the well. A A′ represent the tubing to which the pump is applied to raise the oil. The two sections A and A′ of the tubing are connected by means of the pipe-coupling B. Fig. 4 is a plan of this coupling. Its lower end is formed or cast with a semicircular flange, *b*, which, as here used, constitutes a valve, under which name it will be spoken of in the succeeding description. Said valve *b* has its seat within a circular rim, *c*, joined to a flange, *c′*, which is formed or cast with a threaded collar, C, which is screwed upon the threaded portion of the lower section, A′, of the tubing and immovably fixed thereon by means of a set-screw, c^2. A plan of the collar C is given in Fig. 5. The semicircular space c^3 around the top of the threaded collar C is left open, and the flow of water through it from the packing-bag is to be controlled by the valve *b*, as hereinafter explained. The coupling B, upon which the flange *b* is formed, turns upon the section A′ of the tubing, but turns with the section A, being made fast thereto by means of the set-screw *b′*. Hence by turning the tube A the valve *b* may be made to cover or uncover the opening c^3. The annular rim *c* extends below as well as above the flange *c′*, and at the top it flares outward, so that it resembles the frustum of a cone, the base or larger diameter being at the top. Over the exterior of the rim *c* is fitted the lower end of the packing-bag D, the same being firmly clamped upon the rim *c* by means of an annulus, E, the latter being held securely in position by upwardly-projecting ears *f f f*, which are formed upon the threaded collar F, which is secured upon the collar C, the latter being also threaded externally for that purpose. Fig. 6 is a plan of the collar F and its ears *f*. The top of the packing-bag is drawn over and fitted upon the lower end of the retainer G, Fig. 2 being a plan of the said retainer. This retainer G has the form of an inverted cup, and on its interior is formed a shoulder, *g*, which adapts it to be supported upon an adjustable collar, *a*, which may be secured to the tube A, and which is seen in the detached view, Fig. 3. The packing-bag D is clamped upon the retainer G by

the annulus H, which, together with the annulus E, has the same shape as the rim *c*. The annulus H is held in proper position to clamp the packing-bag by the screws *h h*. In the retainer G is a series of openings, *g' g' g'*, through which the water flowing from above has access to the interior of the packing-bag D, which is filled and expanded in the manner represented.

The operation is as follows: The packing-bag D, which is composed of leather and applied in the manner described, is speedily filled with and expanded by the descending surface-water. As the pumping of the oil continues a vacuum is formed below the packing-bag, and owing to the great internal pressure to which the bag is then subjected that portion just above rim *c* sags down and becomes tightly wedged between the said rim and the wall of the well.

It will be seen that the packing-bag D may have its lateral expansive capacity regulated, and at the same time be allowed to sag more or less by adjusting the collar *a* upon the tube A. Of course the plain tubing is to be extended to any degree, and it is done by adding sections at the top in customary manner, the tubing being lowered accordingly.

Now, if the pump should fail to act it is known to result from the oil being too far below the tubing or else forced entirely above the lower terminus thereof by the gases. To determine which is the fact and to remedy the evil my invention is brought into requisition, as follows:

By a suitable clamp the upper tubing has a partial rotary movement imparted to it, such movement turning and raising the coupling B and thus bringing the valve *b* over the flange *c'*, so that the opening c^3 is left uncovered, the same having been previously closed by said valve *b*. The water in the bag D then instantly descends into the well, and, together with the superincumbent water and air, pressed down with great force upon the column of oil, if the latter has been forced up by the gases, and the oil is borne down by sheer force to the terminus of the tubing, where it commences to supply the pump. It is the intention to employ the pump patented by me November 14, 1865, which does not cease to act under the movements of the upper tubing; and it will be perceived that by reason of the length of the coupling B and the mode of applying the same the communication between the upper tubing, A, and the lower tubing, A', is not interfered with, in consequence of the vertical movement of said upper tubing. As soon as the proper amount of water has been allowed to flow down into the well the opening c^3 is closed and its passage is arrested by turning the upper tubing in the reverse direction. If the oil be not above the lower terminus of the tubing, the fact will be at once made known, for the pump will elevate the water which was allowed to fall into the well.

It will be observed that while the upper tubing, in being partially rotated, as above described, is elevated the lower tubing, A', remains stationary, so that the distance between the ends of the packing-bag is increased and the bag contracted in the act of opening the valve. Hence by this arrangement no special attention or labor is requisite in connection with the packing-bag, for it assumes a contracted form and is in a condition to be adjusted vertically with the tubing simultaneously with the turning of the upper tubing to let water into the well.

If the experiments, carried out as above indicated, demonstrate the oil to be below the tubing, the latter is lowered, which is readily permitted by the clamp above mentioned, which clamp supports the tubing and is adjustable to permit the tubing to slide through it while undergoing its vertical adjustment. This clamp is a well-known device in oil-well operations, and is referred to above as a means of turning the tubing.

It is evident that as the upper retainer, G, fits loosely upon the upper tubing the turning of the latter does not move or disturb the position of the packing-bag, but simply rotates within the same. The method of applying and holding the bag adapts it to be removed and a new one substituted with facility.

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

1. A valve constructed and operated substantially as described, and so arranged within an oil-well as to permit or prevent the downward passage of the surface-water, as and for the purpose explained.

2. The described arrangement of the packing-bag relatively to the water-valve and stationary and rotary tubing.

3. The combination of the coupling B, valve *b*, opening c^3, flange *c'*, and rim *c*, substantially as and for the purpose specified.

4. The rim *c*, in combination with the retaining-annulus E, the ears *f*, and collar F' for holding the lower end of the packing-bag, as explained.

5. The adjustable retainer G and annulus H, in combination with the adjustable supporting-collar *a*, as and for the purpose set forth.

6. An adjustable collar, *a*, arranged upon a well-tube, when used to sustain a movable packing, substantially as described.

To the above specification of improvements in well-tube packing I have signed my hand this 25th day of November, 1865.

S. E. HEWES.

Witnesses:

C. D. SMITH,

ALEXR. A. C. KLAUCKE.