D. L. LEWIS & W. BOYNTON.

METHOD OF TUBING AND CASING OIL WELLS.

No. 188,806. Patented March 27, 1877.

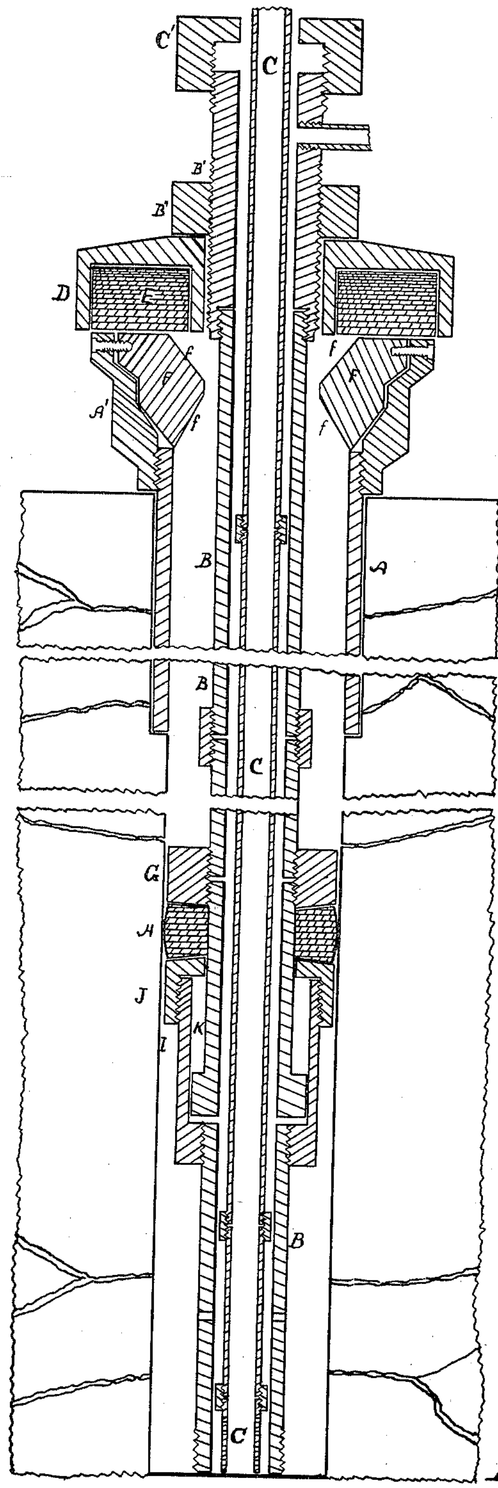

Fig. 1

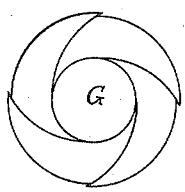

Fig. 2

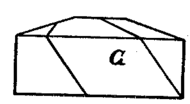

Fig. 3

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UNITED STATES PATENT OFFICE.

DANIEL L. LEWIS, OF LOVELL'S STATION, AND WILLIAM BOYNTON, OF PETERSBURG, PENNSYLVANIA.

IMPROVEMENT IN METHODS OF TUBING AND CASING OIL-WELLS.

Specification forming part of Letters Patent No. **188,806**, dated March 27, 1877; application filed February 22, 1877.

To all whom it may concern:

Be it known that we, DANIEL L. LEWIS, of Lovell's Station, Erie county, Pennsylvania, and WILLIAM BOYNTON, of Petersburg, in the county of Clarion and State of Pennsylvania, have invented a new and useful Improvement in Method of Tubing and Casing Oil-Wells; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to the construction, arrangement, and operation of oil or other deep well casings and tubing; and consists in providing various improved devices connected with said casing and tubing, and in the arrangement of the said tubing and casings, and in the operation of the whole when in its place. The objects we attain are perfection of operation, durability of parts, and increase of production of the well.

Our device is shown in the accompanying drawing, as follows:

Figure 1 is a vertical longitudinal section of an oil-well, and all its casings and tubing. Figs. 2 and 3 are views of detached devices.

In order that others skilled in the art to which this relates may be able to construct our invention, we give the following general description of it:

A represents the fresh-water casing, and rests on the ledge *a*. B represents a secondary casing, which extends to the bottom of the well. This casing is provided, at the proper point, with a device for packing the well below the salt-water vein, and near the bottom of the well it is perforated, for the escape of gas through it to the top of the well. C is the tubing in which the pump and its rod works, and through which the oil passes to the top. A′ is the casing-head, and D is the casing-cap. E is an elastic packing within the cap D. F is a disk fitting in the top of the casing-head, and is provided with an opening for casing B, which opening has conical faces *f f*, for preventing the joints of the casing B, as it enters the well or is removed from the well, catching. This cap or disk F, or one of proper size made like it, we place at the mouth of all the pipes, tubes, or casings, into which any other pipe, tube, casing, or sucker-rod enters, for the same purpose. B′ is the head of casing B. This is provided with an external thread, on which operates a nut, B″. This nut rests on the top of cap D, and is used to partially sustain casing B, and to raise it slightly, if desired. The object of this will hereafter more fully appear. C′ is a stuffing-box, for making a close joint between the tubing C and the head B′ of casing B, to prevent the escape of gas (or steam, when a well is being steamed) at that point. G is a flange on the casing B. J is a flange on a short piece of casing, I, which is attached to casing B for the purpose of forming a slip-joint, K. Between these flanges is a packing-ring, H. The object of the slip-joint is to allow the flanges to press together and expand the packing-ring to the rock. This device is placed at a proper point for shutting off the salt-water. The flange G is shown in detail in Figs. 2 and 3.

In Fig. 2 a top view is given, and in Fig. 3 a side elevation is given. It will then be seen that this flange is provided with burr-grooves, the object and purpose of which is that it can be worked up through an accumulation of sand or sediment when it is desirable to draw casing B, or when it is desirable to loosen the packing H and allow the water above to go down. This latter-named object is also one of the objects of the slip-joint, and also of the external thread and nut B″. By turning the nut B″ the casing can be slightly raised—that is, raised a few inches. This loosens the packing. If an accumulation of sand or sediment is around the burr-flange G too thick to give way easily, the upper portion of the casing B can be turned, and the burr will grind the sand out. Suppose it becomes necessary to draw the casing B, the packing H would be loosened, and the water above would pass down to the bottom of the well and be pumped up before the tubing C is drawn; then the tubing C would be drawn, and then the casing B. Where this operation cannot be done, as is the case in all wells as now cased and tubed, the salt-water

goes to the bottom of the well when the tubing is drawn, and remains there, which is injurious to the productiveness of the well.

By our device, also, the lower part of the well can be flooded at any time desired by loosening the packing H. By "flooding" we mean that the water can be let into the bottom of the well and be pumped out with the oil for a time, for the purpose of washing out paraffine or gummy accumulations.

There is still another purpose served by the nut B″. Not only casing B, but the tubing, should rest on the bottom ot the well. But when this is done its great length causes it to bend or bow toward one side of the well. By this nut and thread B″, or one similar or similarly placed on the end of any pipe serving as a tubing or a casing, it can be drawn taut, and still be left resting on the bottom of the well. This is of especial benefit in the case of tubing, for in it the force of pumping is exerted, and when this is held in suspension, as is now the case in all wells, the downward stroke of the pump often causes some part of the tubing to give way.

The flexible packing E serves to assist in adjusting the tubing by the nut B″, for when the operator tightens the nut B″ so he feels the whole weight of the tubing, (or casing, as the case may be,) he turns back until he finds the weight partially removed. He then knows the tubing is on the bottom, and the weight he feels is the tension of packing E, and at that point he leaves the nut. Of course, when a casing like B, with a slip-joint, is used, the above remarks concerning the packing E do not apply. But our nut B″ and external thread and cap D, and packing E, are intended for use on all tubings or casings, for some wells do not use or need a casing with a slip-joint. That depends on the depth of well, or, more strictly speaking, on the character of the water-veins encountered as regards amount of water; but this adjusting device, when used on the casing B, is intended simply of adjusting the pipe and the packing above the slip-joint, and exact nicety is not so essential as in the case of tubing. Here it is important that the tubing shall rest upon the bottom just enough to sustain the weight of the pipe and the force of the pumping operation, but no more, for it would then bend or bow, which would cause friction of the sucker rod, and it would also be impossible to pack it perfectly at the top. In other words, the pipe must rest on the bottom and yet be perfectly taut. The device consisting of the nut B″ and an elastic packing, E, somewhere below it permits us to perfectly adjust the tubing, so the above requisites are complied with exactly.

What we claim is as follows:

1. The arrangement within an oil-well of a casing, B, extending to the bottom, with a slip-joint, K, and packing H, and with perforations near the bottom for the escape of gas, substantially as and for the purposes mentioned.

2. The arrangement within an oil-well of the casings A and B and tubing C, when the said casing B extends to and rests upon the bottom of the well, and is provided with a slip-joint, K, and packing H, and perforations near the bottom for the escape of gas within said casing, substantially as shown, and for the purposes mentioned.

3. In combination with the slip-joint K on casing B, the packing H, placed between two flanges, said parts operating together as shown, and for the purposes mentioned.

4. In combination with a casing, B, having a slip-joint, K, and packing H between two flanges, the head B′, external thread and nut B″, as shown, and for the purpose of adjusting said casing and packing, as set forth.

5. The head B′ of a casing or tubing, when provided with an external thread and nut, B″, substantially as shown, and for the purpose of adjusting said tubing or casing within the well and upon the bottom, as set forth.

6. The head B′ of a casing or tubing, having an external thread and nut, B″, in combination with an elastic packing, E, substantially as shown, and for the purposes mentioned.

7. An oil-well casing or tubing, in combination with a device at its upper end for holding it taut, whereby the said tubing or casing is enabled to rest upon the bottom of the well, for the purpose of sustaining the weight of the same, and also the force of pumping which may be exerted within the same, substantially as set forth.

8. In combination with the casing B and packing H, the flange G, when provided with burr-grooves, as shown, and for the purposes set forth.

9. A tubing or casing head, when provided with a disk, F, with conical or flaring faces *f f*, substantially as shown, and for the purposes mentioned.

In testimony whereof we, the said DANIEL L. LEWIS and WILLIAM BOYNTON, have hereunto set our hands.

DANIEL L. LEWIS.
WILLIAM BOYNTON.

Witnesses:
JNO. K. HALLOCK,
GEO. A. STURGEON.