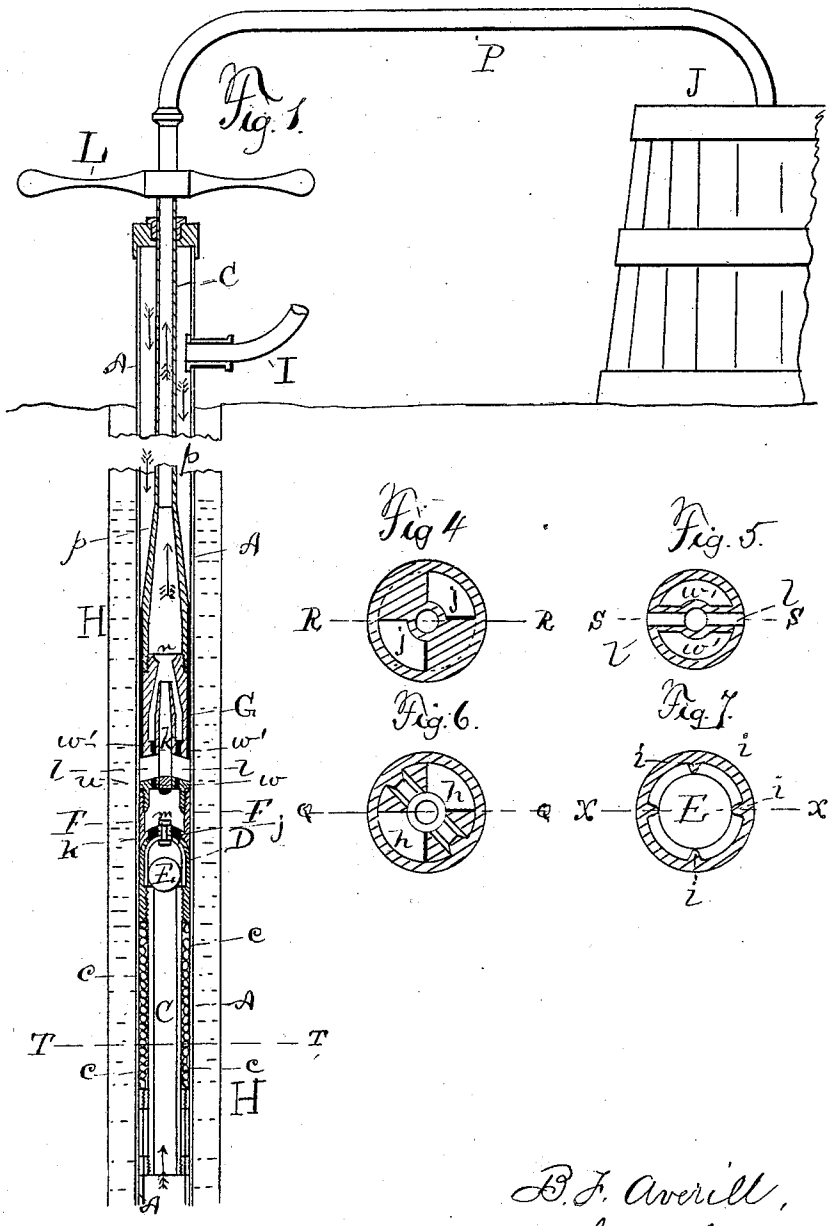
(No Model.) 2 Sheets—Sheet 1

B. F. AVERILL.

DEVICE FOR TREATING THE WALLS AND TUBING OF OIL WELLS.

No. 257,127. Patented Apr. 25, 1882.



Witnesses:
P. H. Parsons.
J. R. Drake.

B. F. Averill,
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N. PETERS. Photo-Lithographer. Washington. D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

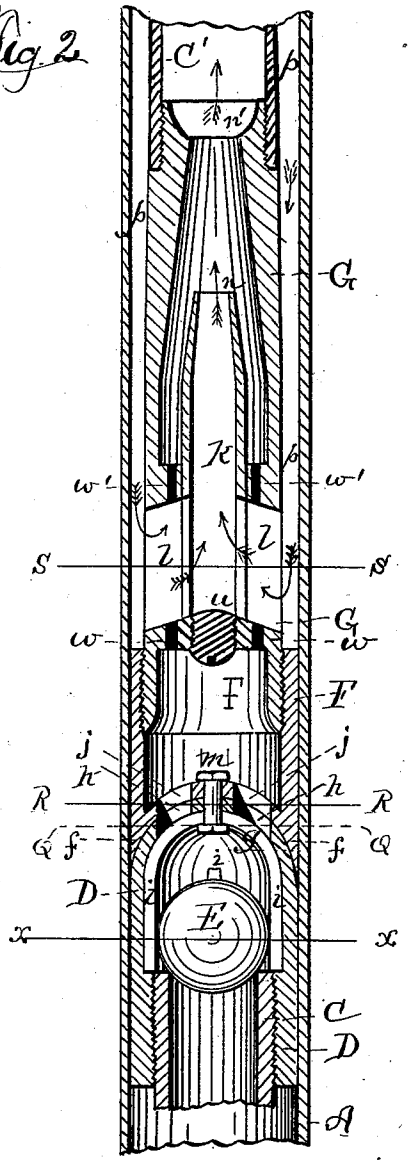
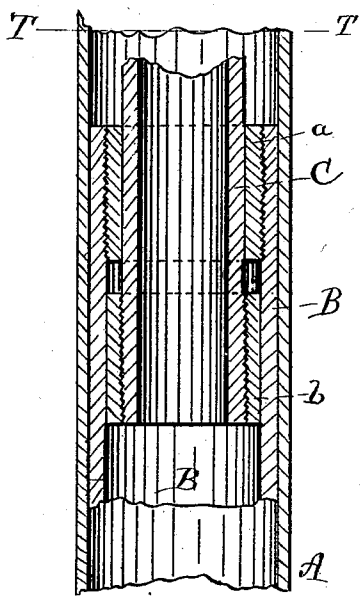


Fig. 3.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. AVERILL, OF DUNKIRK, NEW YORK, ASSIGNOR OF ONE-HALF TO THOMPSON PIKE, OF SAME PLACE.

DEVICE FOR TREATING THE WALLS AND TUBING OF OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 257,127, dated April 25, 1882.

Application filed March 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. AVERILL, a citizen of the United States, residing at Dunkirk, county of Chautauqua, and State of New York, have made certain Improvements in Devices for Treating the Walls and Tubing of Oil-Wells by Radiation of Heat Derived from Steam, of which the following is a specification.

This invention relates to a device to be set into the two-inch tubing and working-barrel commonly used in oil-wells, and to introduce or inject steam therein to soften the paraffine, &c., that clogs the walls of such wells and also the tubing, thereby stopping production; also, to increase the flow of oil and gas by the radiation of heat from the tubing derived from steam in the tubing to its surroundings, the particular object of this invention being to get a device that will not allow any steam to come in direct contact with the walls of the wells, and thereby produce a back-pressure thereon, as is the case with the usual devices for steaming wells.

My device is to be kept constantly in a well to augment the flow of oil and gas; and the invention consists in the construction and arrangement of the parts and their combination as a whole, as hereinafter fully set forth.

In the drawings, Figure 1 is a vertical section, showing the two-inch tubing, working-barrel of a well, and its walls, and with my steaming device inside the well and its connections outside; Fig. 2, an enlarged vertical cross-section of the main working parts; Fig. 3, a vertical section of the lower part of the same cut off in line of T, Fig. 1; Fig. 4, a sectional plan through line of R, Fig. 2; Fig. 5, a sectional plan through line S; Fig. 6, a sectional plan through line Q, showing oil-ports in cap; and Fig. 7, a sectional plan through line of *x* through ball-valve, &c.

A A represent the outside tubing or working-barrel of an oil-well.

B is a short-leg pipe reaching to the bottom of the working-barrel or tubing, and at its top held by a sliding nut, *a*, to the pipe C, and with a second nut or collar, *b*, just below it screwed onto pipe C, as fully shown in Fig. 3. These nuts are only a short distance from the bottom of the tubing or working-barrel.

Above nut *a*, and between pipe C and barrel A or tubing, the whole space around pipe C is filled with packing *c c*, as shown in Fig. 1, and clear up to the bottom of a hollow cap, D, which is screwed onto pipe C. The whole weight of the pipe, &c., above this cap D rests on the packing *c c*, and prevents cap D from turning. This cap has a rounded or dome top, *g*, with oil-ports *h h* therein. (See Figs. 2 and 6.) Inside the cap are ribs *i i i i*, Figs. 2 and 7, which strengthen the cap and hold a ball-valve, E, therein, as shown in Figs. 1, 2, and 7. Setting on this rounded cap D and surrounding the top *g* is a hollow nut, F, its bottom *f* rounded out, so as to exactly fit the cap D. This bottom has two ports, *j j*, exactly corresponding with ports *h h* in cap D, (shown in Figs. 1 and 2 with the ports together, and therefore open.) This nut F is fastened to cap D by a swivel-bolt, *m*, through the apex of the cap D and bottom of nut F, and on this it (nut F) turns to open or close the ports in both. In the top of this nut F is screwed, inside, a long connection, G, and which has a hollow steam-ejection pipe, *k*, (see Figs. 1 and 2,) cast inside it. A plug, *u*, closes the opening at the bottom of the pipe *k* into hollow nut F; but there are two ports, *w w*, in the bottom of this connection G leading into the connection, and ports *w' w'* above leading up into pipe C'. Thus, when ports *h* and *j* are opened, as in Fig. 2, it allows the passage of oil and gas into connection G and pipe C' as well as around them, and when the ports *h* and *j* are shut to prevent oil coming up, only steam can go down as far as top of nut F, and through the oblong steam-ports *l l*, leading from the steam-space *p*, all around pipe C', into ejection-pipe *k*, and through its narrowed mouth *n* into connection G, and through its narrowed mouth *n'* into steam-pipe C', which runs from the mouth of the well to connection G, into which it is screwed. The pipe C receives steam from a boiler through pipe I, (see Fig. 1,) no engine being necessary. All these working parts are from connection G to bottom of leg B and bottom of working-barrel or tubing but a few feet from the well-bottom. The pipe C' is therefore nearly as long as the well is deep.

The operation is simple: When put into the

well the ports are shut to prevent oil from flowing into the nut F and pipe C′, and are kept closed till after the well is sufficiently heated. Steam for heating is let in through pipe I into space *p p*, where it goes by the openings *l l* in connection G into the ejection-pipe *k*, and back up through pipe C′ into the tank J at the top of the well, and when it is found to be hot as it thus returns it is known that the walls of the well have become sufficiently heated to melt the paraffine, &c. When the well is thus sufficiently treated the handle L turns the whole pipe C′ and connection G and nut F sufficiently to open the ports *h* and *j*, when oil and gas and the residue of the steam flow up. A mere quarter-turn of the handle L closes or opens the ports *h* and *j*. If any steam gets into the hollow above the ball-valve E, that prevents any getting below it. By this arrangement no steam can get into the well below the packing *c c c*, and only in the tubing or barrel as far down as nut F. There therefore cannot be any steam in the walls or any back-pressure of steam therefrom. These devices just described are kept constantly in the well and a circulation of steam is continued till unnecessary for a time, and then turned in again, as desired. The lower parts, from and below cap D, are prevented from turning by the packing *c c c*, as before stated.

The object of curving the cap D at top and the bottom of the nut F to set thereon is to get a greater area or surface of ports than a flat connection of both would give, also to make a tighter joint to prevent steam, gas, or oil escaping, especially if the pipe gets out of line, as sometimes happens.

At the top of the pipe C′ is a stuffing-box to prevent escape of steam, and above that a connection is made with the oil, steam, and gas pipe P by a universal joint.

I claim—

1. In a device for treating oil-wells by steam, and in combination with the long pipe C′, the hollow connection G, with steam-ports *l l* and oil-ports *w w w′ w′*, and also the hollow steam-ejection pipe *k* therein, all secured to the hollow nut F, having the plug *u*, substantially as and for the purpose specified.

2. In a device for treating oil-wells by steam, the combination of the pipe C′, connection G, and nut F, having ports *j j*, and the cap D with rounded-dome top *g*, having ports *h h* therein, said top fitting into the rounded-out bottom of the nut F, all substantially as and for the purpose specified.

3. In a device for treating oil-wells by steam, the combination of the nut F, cap D, constructed as described, the ball-valve E therein, pipe C, nuts *a* and *b*, and leg B, all arranged and operating substantially as specified.

4. In a device for treating oil-wells by steam, in combination with the steam-pipe C′ and tubing or working-barrel A, the steam-space *p p* between the two, and the connection G, having steam-ports *l l* therein, substantially as and for the purpose specified.

5. In a device for treating oil-wells with steam, the combination of the pipe C′, connection G, nut F, cap D, pipe C, nuts *a* and *b*, packing *c c*, and leg B, all constructed, arranged, and operating substantially as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

B. F. AVERILL.

Witnesses:
J. R. DRAKE,
T. H. PARSONS.