B. F. COLLINS.

Device for Increasing the Production of Oil-Wells.

No. 216,658. Patented June 17, 1879.

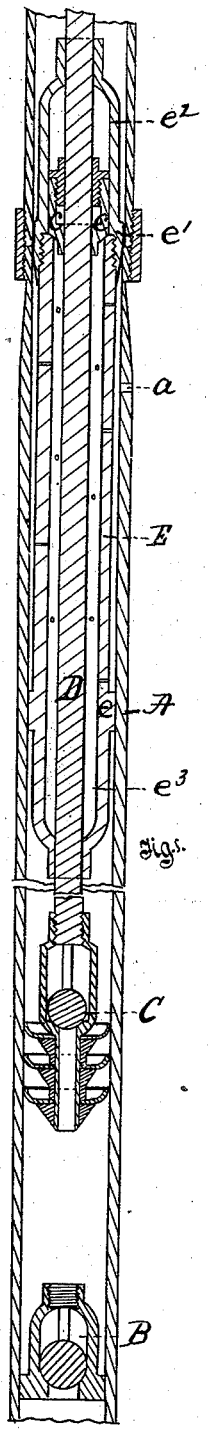

Fig. 1.

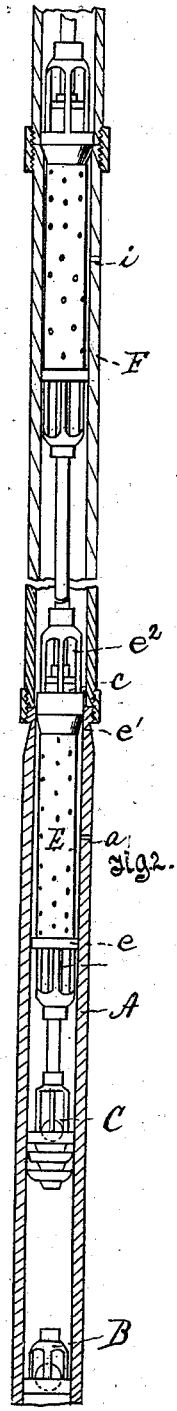

Fig 2.

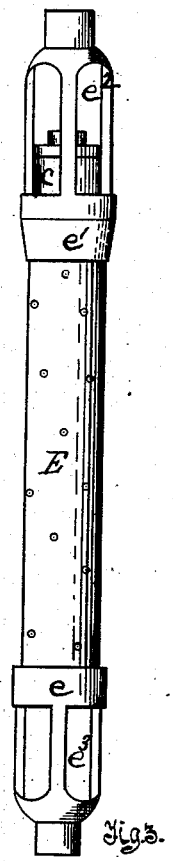

Fig 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

B. FRANK COLLINS, OF EDENBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILBUR ORR.

IMPROVEMENT IN DEVICES FOR INCREASING THE PRODUCTION OF OIL-WELLS.

Specification forming part of Letters Patent No. **216,658**, dated June 17, 1879; application filed April 10, 1879.

To all whom it may concern:

Be it known that I, B. FRANK COLLINS, of Edenburg, in the county of Clarion and State of Pennsylvania, have invented a new and useful Improvement in Devices for Increasing the Production of Oil-Wells; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional view, showing my devices as applied to the working-barrel of an oil-pump. Fig. 2 is a similar section, showing the devices not only applied to the working-barrel as when the well is in the fourth sand, but duplicated and applied in the length of the tubing, and operating on both third and fourth sands. Fig. 3 is a detached view of the strainer.

Like letters refer to like parts wherever they occur.

My invention relates to the construction and operation of devices for washing the oil-bearing rock, so as to prevent the clogging of the crevices and veins and the decrease of the production; and consists, first, in combining, with a working-barrel (or its equivalent, a tube-section) having a leak, a strainer adapted to strain the oil and remove any sand, grit, or like substance calculated to close the leak in the barrel or tube-section; second, in combining, with the strainer, cages or guides for the passage of the rod which operates the working-valves; third, in combining, with the strainer, a check-valve for supporting the column of oil in the tubing, and relieving the pressure on the leak on the downstroke of the valves.

In operating oil-wells it has been discovered that while some wells yield best if pumped dry and at a high rate of speed, others, on the contrary, yield better when pumped slowly, and the oil in the well is permitted to reach some height and stand thereat. In these latter cases it has been customary to agitate the oil in the well either by the use of what are termed "leaky valves"—that is to say, working and standing valves drilled through or otherwise constructed to permit the return of some portion of the oil—or by means of a leak in the barrel, which permitted a portion of the oil to escape from the barrel against the oil-bearing rock.

In practice it has been found that leaky valves are comparatively inefficient, because the escape of oil and the agitation ensuing therefrom are too low down, and the leak in the barrel or at a point higher up is desirable, as it acts directly on the oil-bearing rock; but the difficulty which exists in the use of the leak in the barrel or above it is, that the leak is liable to, and frequently does, become stopped up by sand, grit, &c., so that in order to again render it operative the tubing must be drawn, which is both laborious and dangerous, and may result in injury to or loss of the well.

The object of my invention is to provide means which shall guard and prevent clogging of the leak in the barrel or tubing, and which can be readily withdrawn, cleaned, and replaced, should they themselves become clogged.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the small or working barrel, below which is the usual anchor. B is the standing valve; C, the working-valve, and D the valve-rod to which the sucker-rods are attached.

At any suitable point in the working-barrel opposite the oil-bearing rock is made a leak, *a*, in the well-known manner—that is to say, provided with a steel or equivalent hard-metal bushing, that will prevent the cutting out or enlarging of the leak by wear.

E indicates the strainer, which is a hollow cylinder of less diameter than the working-barrel A, but provided below with a boss or ring, *e*, and above with a tapering boss or ring, e^1, so that when the strainer is dropped within the barrel the bosses *e* e^1 will fill the same, forming an annular chamber, *f*, which is closed above and below, and only communicates with the barrel by fine perforations made in the cylinder E.

At the ends of strainer E are cages e^2 e^3, which serve as guides for the valve-rod D, and the upper cage, e^2, is provided with a seat and a check-valve, *c*, for sustaining the column of oil in the well. The valve *c* may be constructed as shown—that is to say, a cup or

shell closed by a screw-cap; or it may be of any other preferred construction.

The sucker-rods are attached to the valve-rod above the strainer E, in the usual manner.

The above-described devices (shown in Fig. 1) are all that will commonly be employed, as the leak will, in general, be preferred in the working-barrel; but if it is desired to use a second leak at a point higher up—as, for instance, where it is desired to wash both the third and fourth sands in a fourth-sand well, or where a single sand is to be washed at a point above the working-barrel—sections of tubing are added above the working-barrel until the desired point is reached, when a section, F, is added whose internal diameter (say one and seven-eighth inch) is less than the regular (two-inch) tubing, though greater than the diameter of the working-barrel, said section having one or more small perforations or leaks, *i*, bushed with steel, and the same in all respects as the leaks in the working-barrel.

In conjunction with this section F is employed a strainer having external bosses to fill the tubing F, cages for guiding the rod D, and fine perforations, in all respects identical with the devices before described, and having the same functions.

In adjusting the devices for use, the working-barrel will be secured to its anchor, sections of tubing secured to the working-barrel, and the tubing put down in the usual manner, provided the leak is in the working-barrel. If it is to be higher up than the working-barrel, or a second leak is to be employed, then the requisite length of tubing is secured to the working-barrel and the section F is attached, after which more tubing is added, and the whole lowered in the usual manner.

When the tubing is down, the working-valve will be secured to its rod D, the strainer E slipped on the rod, and rod-sections added to bring the second strainer, F, to the desired distance above E. More sucker-rods are then added, and the valves lowered into position in the tubing.

As the internal diameter of section F and the tubing is greater than the internal diameter of the working-barrel, strainer E will pass section F, and finally seat itself in the working-barrel, while the upper strainer, whose diameters correspond with the internal diameters of section F, will seat itself in section F.

It is evident from the above description that, in withdrawing the valves, strainers, &c., the reverse operations will occur, and the strainer E of the working-barrel will meet no obstruction in passing section F if the measurements of the several parts have been properly attended to.

I prefer to make the perforations in the strainer one thirty-second ($\frac{1}{32}$) of an inch, and the leak one-eighth ($\frac{1}{8}$) of an inch; or if two leaks be used in the same barrel or section, then I prefer to make each leak one-sixteenth ($\frac{1}{16}$) of an inch; but I do not wish or intend to be limited in this respect. I shall also in some instances use wire-gauze, either to inclose the strainer, or simply to cover perforations in the strainer where it seems desirable to make the openings larger than one-thirty-second ($\frac{1}{32}$) of an inch.

The operation of these devices will be as follows: The pump being operated in the usual manner, and the rod D working freely through the strainers, the oil must pass up through the inside cylinder or strainer, because the bosses on the cage are perfectly tight in the barrel, and will prevent the oil from passing the same without going through the strainer; and as the small holes of the strainer are much smaller than the leak in the barrel, (or section F,) nothing can pass the strainer which cannot pass or would tend to clog the leak.

Should all the holes of the strainer but two or three become clogged, there will still be sufficient feed for the leak; and if all the holes of the strainer become closed, the rods, valves, and strainers can be readily drawn, and the strainers cleaned and replaced in a short space of time, and without injury to the well.

As the check-valve will support the column of oil above the strainer, the pressure of the oil will only be brought on the oil-rock when the valves are on the upstroke; but if it is deemed desirable for any reason to add the effect of the jar of the column of oil in the well to the churning action produced by the valves, then the check-valve may be omitted.

Having thus set forth the nature and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pump for oil-wells, the combination, with a working-barrel or a section of tubing having a leak, of a strainer arranged within the same, substantially as and for the purpose specified.

2. The combination, with a barrel or section having a leak, of a strainer provided with top and bottom cages or guides, substantially as and for the purpose set forth.

3. The combination of a working-barrel or section of tubing provided with a leak and a strainer having a cage and check-valve, substantially as and for the purpose specified.

In testimony whereof I, the said B. FRANK COLLINS, have hereunto set my hand.

B. FRANK COLLINS.

Witnesses:

R. H. WHITTLESEY,

F. W. RITTER, Jr.