Dec. 27, 1949 E. E. STEVENSON 2,492,332

TAPERED PUMP LINER

Filed Jan. 26, 1946

Fig. 1.

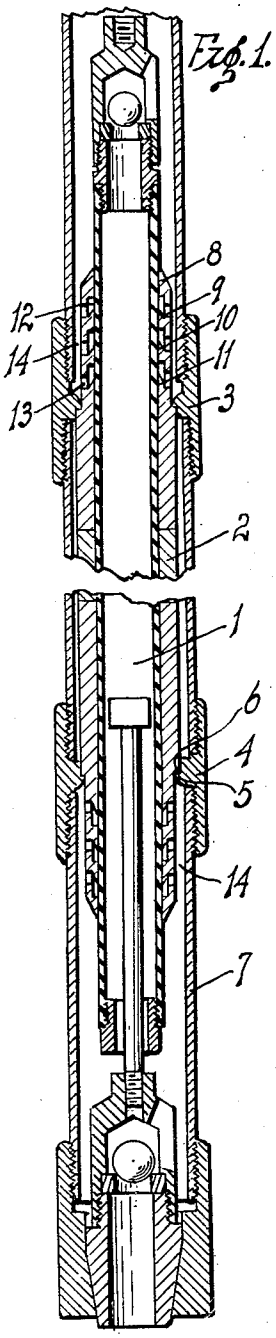


Fig. 2.

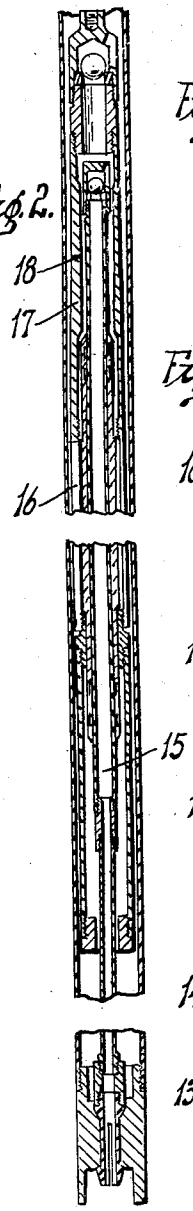


Fig. 3.

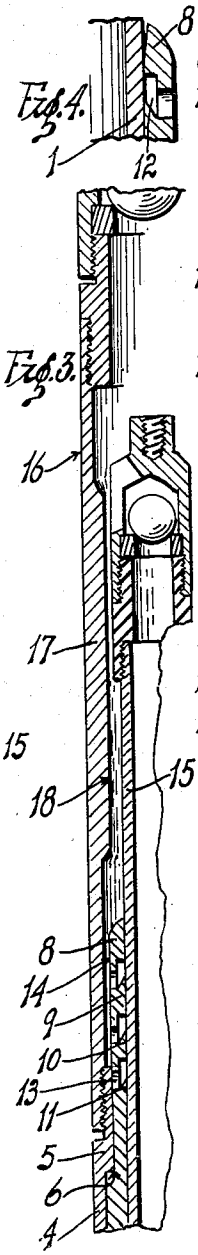


Fig. 4.

Fig. 5.

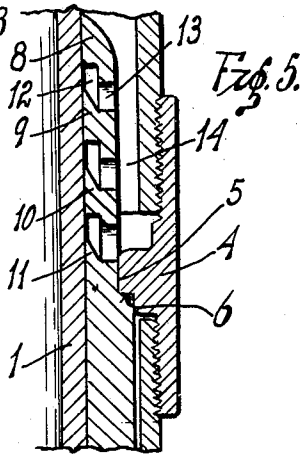


Fig. 6.

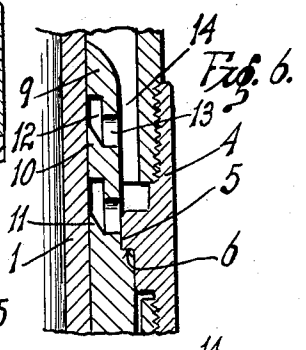


Fig. 7.

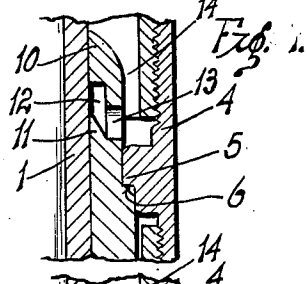
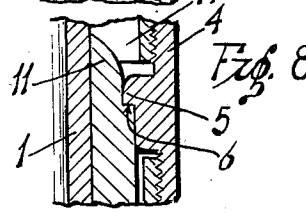


Fig. 8.



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TAPERED PUMP LINER

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2 Claims. (Cl. 103—220)

1

This invention relates to a tapered liner which is placed in reciprocating pumps such as oil well pumps, and the prime object of the tapered liner is to scrape or wipe over the moving surfaces of a pump, thus removing sand and other materials which are carried through the pump with fluid.

The features of my invention are that the useful life of a pump is materially prolonged, the frictional resistance of the pump is materially reduced, and the maintenance of the pump while in operation is also materialy reduced.

Another object of my invention is to provide a novel pump liner which is provided with a plurality of superimposed tapered or scraping surfaces on either or both ends thereof, these tapered surfaces bearing against the reciprocating part of the pump, thereby clearing the surfaces of sand or other material which might adhere to the reciprocating surface and retard its movement.

Still another object of my invention is to provide a pump liner of the character stated wherein the plurality of superimposed tapered surfaces can be sucessively cut off as the uppermost tapered surface wears away.

Another feature of my invention resides in the ports through the liner whereby accumulated sand or the like can drain away from the moving surface of the pump.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a fragmentary, longitudinal sectional view of a type of reciprocating plunger pump with my improved liner mounted therein.

Figure 2 is a fragmentary, longitudinal sectional view of a traveling barrel type of pump, and showing my liner mounted therein.

Figure 3 is an enlarged fragmentary, longitudinal sectional view of the pump illustrated in Figure 2.

Figure 4 is a fragmentary, longitudinal sectional view illustrating a worn condition of my liner.

Figures 5, 6, 7 and 8 are fragmentary, longitudinal sectional views of my liner, and successively showing how the liner is cut away to provide new scraping surfaces.

Referring more particularly to the drawing, in Figures 1, 2 and 3, I have illustrated the tapered liner mounted in different types of pumps. In Figure 1 is shown a traveling plunger

2

type which includes a reciprocating plunger 1, operating in a stationary liner assembly 2. The liner assembly includes a plurality of sections which are clamped between the collars 3 and 4. The collars are each provided with an annular seating ring 5, this ring bearing against a shoulder 6 on the liner. In this manner the liner is held securely in position within the tubing 7, and is held against longitudinal displacement. The remaining structural features of the pump are usual and well known, and form no part of this invention.

The traveling plunger 1 is reciprocated by means of sucker rods (not shown), all of which is usual and well known in the art. As fluid moves through the pump, quantities of sand and dirt are carried with the fluid and this sand and dirt tends to settle on the outer surface of the reciprocating member. To remove this accumulated sand and dirt, either or both ends of the liner 2 are constructed as follows:

Either or both ends of the liner 2 are constructed with a plurality of superimposed scraping surfaces 8, 9, 10 and 11. An annular groove 12 is provided between each of the adjacent tapered or scraped surfaces, and the purpose of these grooves is to receive sand or dirt which might pass the scraping surface next above the groove, and then gather this sand so that it may flow out through ports 13 and thence to the annular space 14, where the sand either settles or is gradually removed by the flow of fluid through the pump. The grooves 12, ports 13 and annular space 14 provide ample space to receive accumulated sand and also provide an adequate means of continuously removing the sand from adjacent the reciprocating element of the pump.

The upper or lowermost scraping surface will gradually wear, as shown in Figure 4, and when so worn, it will be ineffective to remove accumulated sand. When the liner is so worn, the worn portion is cut or ground off as successively shown in Figures 5 to 8 inclusive. This repair can be done in the field and no precision tools are required. The pump can then be reassembled and mounted in the well.

In the traveling barrel type of pump shown in Figures 2 and 3, the stationary plunger 15 is mounted in the traveling barrel 16. The various check valves and other structural details of the pump are usual and well known in the art, and will not be described in detail. The upper nipple 17 of the traveling barrel is formed with a heavy wall, shown at 18. The purpose of this wall is to reduce the volume of the upper portion of the

pump which normally fills with fluid and is, therefore, a dead space in that fluid constantly rests in this region of the pump. By reducing the volume of this upper portion of the pump, the output of the pump is increased, and there is a greater overall efficiency.

Having described my invention, I claim:

1. In combination with a pump, including a plunger, a liner, said liner engaging the plunger, said liner having a plurality of superimposed tapered scraping surfaces on the end thereof, each of the said scraping surfaces simultaneously engaging the plunger of the pump, said liner having an annular groove between adjacent tapered scraping surfaces, and a plurality of ports extending from each of said annular grooves through the wall of the liner.

2. In combination with a pump, including a plunger, a liner, said liner engaging the plunger, said liner having a plurality of superimposed tapered scraping surfaces on one end thereof, each of said scraping surfaces being on the same

diameter and simultaneously engaging the plunger of the pump, said liner having an annular groove arranged between adjacent tapered scraping surfaces and being open on the side towards the plunger, and a plurality of ports extending from each of said annular grooves and extending through the wall of the liner.

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