Nov. 26, 1929. S. B. SARGENT 1,737,270

SELF ADJUSTING LINER PUMP

Filed Sept. 28, 1927

Fig. 1.

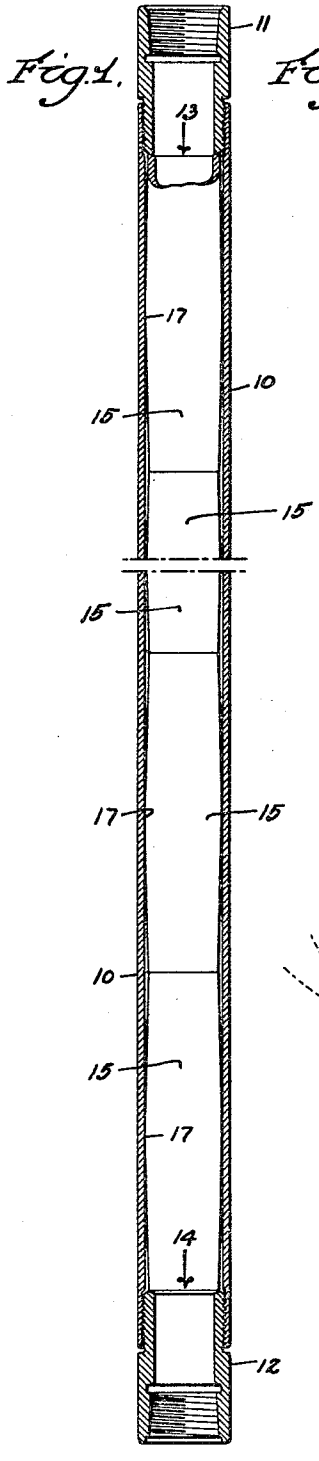


Fig. 2.

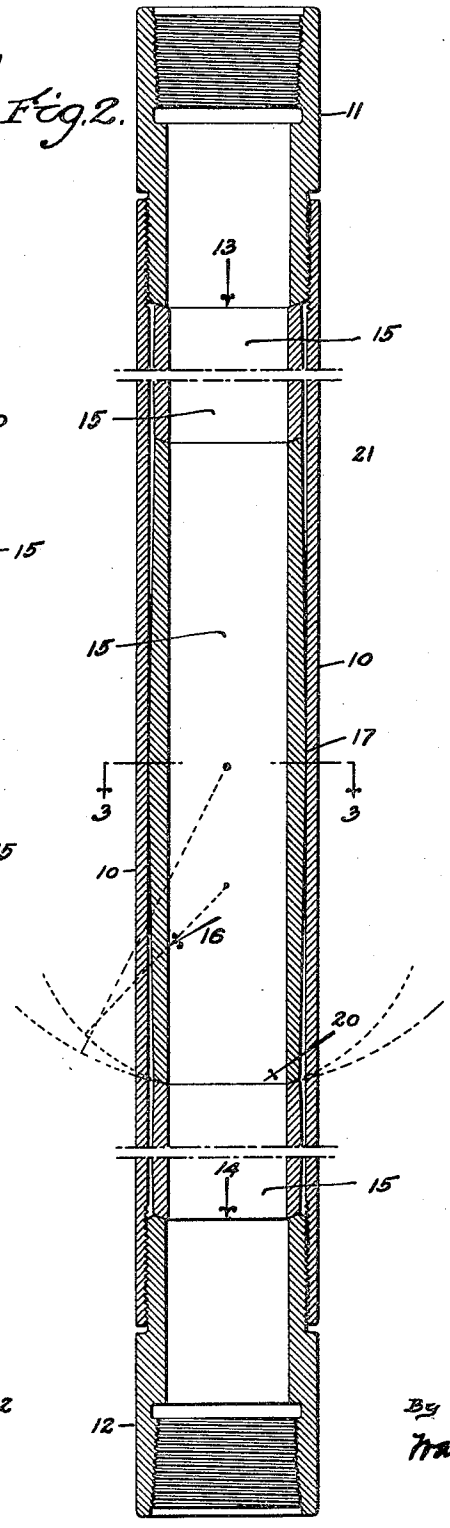
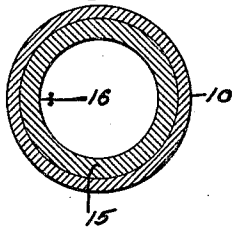


Fig. 3.



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Patented Nov. 26, 1929 1,737,270

UNITED STATES PATENT OFFICE

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SELF-ADJUSTING LINER PUMP

Application filed September 28, 1927. Serial No. 222,630.

My invention relates to the art of pumping oil wells and the like, being more particularly a pump barrel and liners therefor.

Due to the fact that pump barrels as used in oil wells are of considerable length, it has been customary to install in a barrel or tube a lining consisting of a series of short, cylindrical sections of cast iron or other suitable material. These sections are designed to be arranged end to end and together form a smooth bore to receive the pump piston. The ends of such sections are usually squared off and in the event the two ends of any sections are not parallel, the sections become out of line and form an uneven surface at the joints, resulting in leakage and damage to the piston.

The principal object of my invention is to produce a pump barrel of the class described, including a series of liners which are fashioned and shaped in such a manner that during the assembling of the pump barrel the liners adjust themselves to form a smooth straight bore for the pump piston.

Other objects and advantages will appear hereinafter from the following description and drawings.

Referring to the drawings, which are for illustrative purposes only,

Fig. 1 is a vertical sectional view of a pump barrel embodying a form of my invention.

Fig. 2 is an enlarged vertical sectional view of a portion of the device shown in Fig. 1, and

Fig. 3 is a cross-sectional view on line 3—3 of Fig. 2.

More particularly describing the form of my invention shown in the drawings, 10 designates a pump barrel threaded at its upper end to an upper coupling member or collar 11, and threaded at its lower end to a lower coupling member or collar 12. The coupling members 11 and 12 extend into the barrel 10 and form shoulders or seats 13 and 14 respectively between which a string of liner sections 15 are disposed. It is to be understood that the pressure exerted on the liner sections by the collars is sufficient to retain the liners in cooperative relation during the pumping operation.

Each liner section 15 consists of a cylindrical member having a smooth ground inner bore 16 and an outer surface or face of greatest diameter at a point 17 midway its ends, the outer face of each section from its greatest diameter being tapered to the respective ends of the section. At its point of greatest external diameter each section engages the inner surface of the barrel 10 in such a manner as to permit a rocking movement of the section in the inner barrel during the assembling of the barrel as hereinafter described.

One end 20 of each section 15 is finished as the section of the surface of a sphere, the radius of which is half the length of the liner section, or equivalent to the distance from the greatest diameter of the liner section to the end of such section, as indicated by dotted lines in Fig. 2.

The other end 21 of each liner section is reversely finished to its opposite end so as to coincide in engagement with the end of the next section and the ends 13 and 14 of the collars 11 and 12 respectively are finished to correspond to the ends of the liners.

The pump barrel is assembled in the following manner, as an example the collar 12 is attached to the barrel 10 and the liner sections 15 are placed upon a mandrel and inserted in the barrel against the end 14 of the collar, which end of the collar it is understood is shaped correspondingly to the end of the liner section engaged thereby.

The collar 11 is then threaded on the barrel 10 with its end 13 engaging the end of the last liner. The collars 11 and 12 are then tightened, which action draws the liner sections into tight engagement with each other so that the adjacent ends fit tightly against each other. By making the liner sections of greatest diameter mid length their ends so as to engage the walls of the barrel solely at that point, and having the ends of the liners spheroidal such liners readily align with each other and present a straight unbroken inner surface to receive the piston. After the assembling operation is completed, as above described, the mandrel is removed and the liners held in place entirely

by the pressure exerted by the collars on the end of the barrel.

In tightening the collars as above described, the pressure exerted by the collars on the liners—in some cases—springs the barrel and after removal of the mandrel, the liner sections are so out of alignment that the mandrel cannot be again placed in the pipe sections, resulting in the necessity of repeating the operation of assembling but with liner sections made as above described, such sections, due to the form of construction described, always tend to straighten out in alignment.

While I have shown the liner sections as having an annular enlargement intermediate their ends, which enlargement tapers inwardly in both directions towards the ends of the section, it is to be understood that my invention is not limited to such detail of construction, as any form of enlargement upon which the liner section may pivot or rock comes within the spirit of my invention.

What I claim is:

1. A liner pump barrel consisting of a barrel, a string of liner sections arranged end to end in said barrel and means, on said barrel, engaging the opposite ends of said string of liner sections, each of said liner sections consisting of a cylindrical member having a single enlarged portion intermediate its length for engaging the inner wall of said barrel.

2. A liner pump barrel consisting of a barrel, a string of liner sections arranged end to end in said barrel and means, on said barrel, engaging the opposite ends of said string of liner sections, each of said liner sections consisting of a cylindrical section having its ends spheroidal in form.

3. A liner pump barrel consisting of a barrel, a string of liner sections arranged end to end in said barrel and means, on said barrel, engaging the opposite ends of said string of liner sections, each of said liner sections consisting of a cylindrical section having its ends spheroidal in form, and provided with a single enlarged portion intermediate its length for engagement with the wall of said barrel.

4. A liner pump barrel consisting of a barrel, a string of liner sections arranged end to end in said barrel and means, on said barrel, engaging the opposite ends of said string of liner sections, each of said liner sections consisting of a cylindrical section having its ends spheroidal in form, and provided with a single enlarged portion intermediate its length for engagement with the wall of said barrel,—said string engaging means on said barrel having an end correspondingly faced to receive an end of a liner section.

5. A liner pump barrel consisting of a barrel, a string of liner sections arranged end to end in said barrel and means on said barrel engaging the opposite ends of said string of liner sections, each of said liner sections having a single annular enlarged portion intermediate its length adapted to engage said barrel, and having its ends provided with a spheroidal surface described about a point on the longitudinal axis of the liner section coincident with said enlarged portion of the liner.

6. In a liner pump, a barrel, a string of liner sections in said barrel, means on each end of the barrel for engaging the ends of said string, each of said liner sections consisting of a cylindrical member having a single annular enlargement midway its length engaging said barrel and having spheroidal faces at each end, formed on a radius half the length of the section, the spheroidal faces on the ends of each section being oppositely disposed.

7. A liner section for pump barrels consisting of a cylindrical member, having its greater diameter midway its length, and having end faces spheroidal in form.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 22nd day of September, 1927.

SUMNER B. SARGENT.