

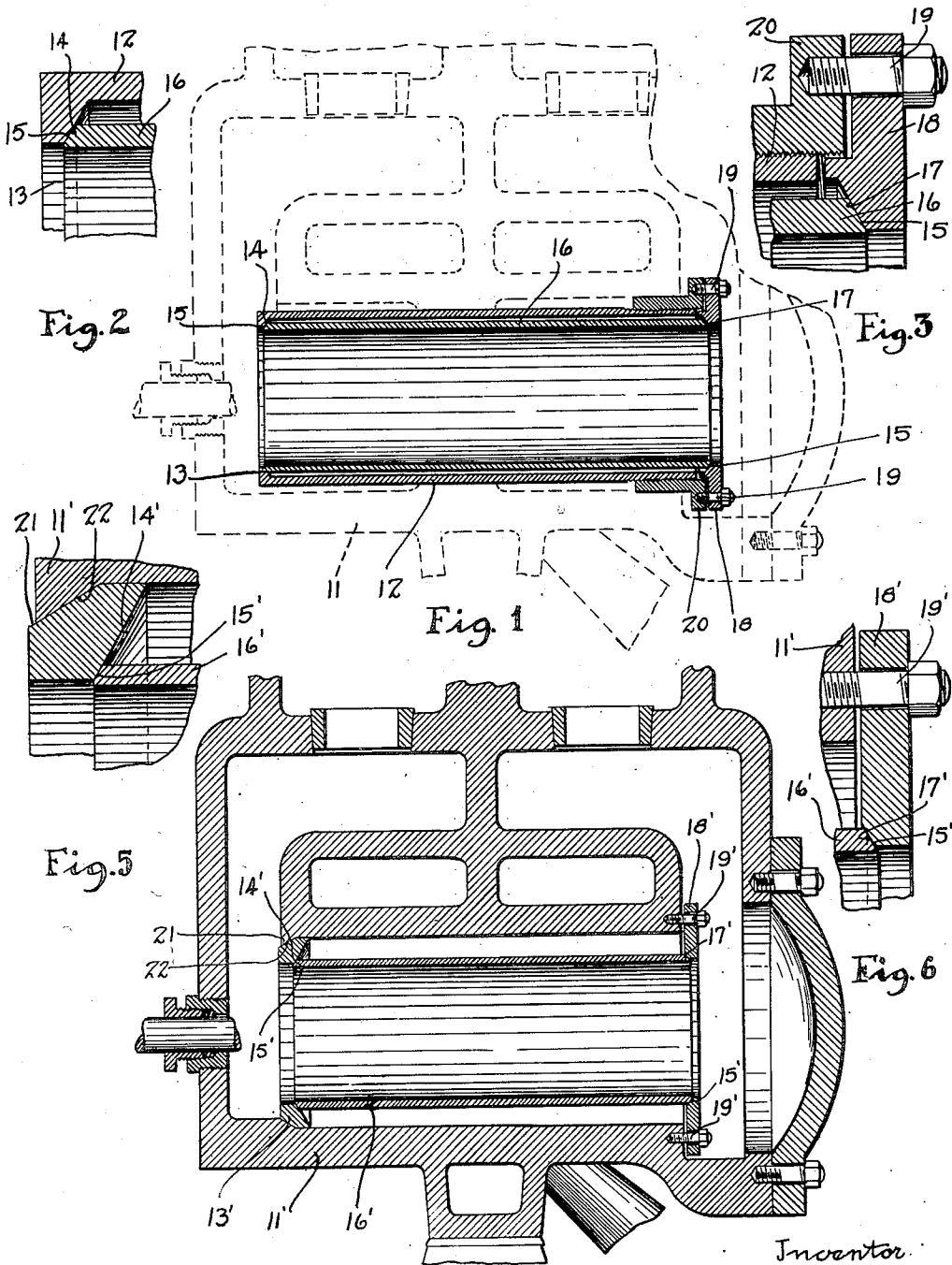
June 3, 1924.

1,496,247

D. C. SILL

PUMP CONSTRUCTION

Filed March 14, 1923



Inventor
Daniel C. Sill

By *Lyon & Lyon*
Attys.

Patented June 3, 1924.

1,496,247

UNITED STATES PATENT OFFICE.

DANIEL C. SILL, OF TAFT, CALIFORNIA.

PUMP CONSTRUCTION.

Application filed March 14, 1923. Serial No. 624,953.

To all whom it may concern:

Be it known that I, DANIEL C. SILL, a citizen of the United States, residing at Taft, in the county of Kern and State of California, have invented a new and useful Pump Construction, of which the following is a specification.

This invention relates to the construction of pumps and will be described as applying to, so termed, mud pumps.

With the mud pumps at present in use, it is frequently necessary to pull the cylinder liner and replace the same by a new one, for the reason that the sand and mud passing through the pump cut the cylinder and this allows leakage past the plunger. In the present pumps of this description the liner is surrounded by packing which, when the liner is being pulled, tends to securely hold the liner against removal. It requires several hours to remove the worn cylinder liner and substitute a new one. Thus the pump is kept idle for a considerable length of time and the expense of making the change is relatively great. To this expense is also added the cost of the new liner.

An object of this invention is to provide a construction that will permit of the use of old pieces of standard drill pipe as liners for pumps.

Another object is to make provision for readily assembling the liner in pumps of the present construction.

Another object is to provide a modified pump construction that will admit of the use of old pieces of drill pipe without the necessity of employing the usual cylinder liner.

The accompanying drawings illustrate the invention:

Figure 1 is a longitudinal mid section of a pump construction embodying the invention, the water cylinder being indicated in broken lines.

Fig. 2 is an enlarged fragmental section of the left end joint between the cylinder and the removable liner.

Fig. 3 is an enlarged fragmental section of the right end joint between the cylinder and the removable liner.

Fig. 4 is a longitudinal mid section of a modified pump construction embodying the invention.

Fig. 5 is an enlarged sectional detail of the left end joint between the cylinder and liner shown in Figure 4.

Fig. 6 is an enlarged sectional detail of the right end joint between the cylinder and liner in Figure 4.

First describing the form of the invention shown in Figures 1 to 3, of the drawings, a typical water cylinder is indicated partly in broken lines at 11 and partly in full lines at 12. The portion 12 is generally termed "liner" in the art but for purposes of description the term "cylinder" will be employed to designate the cylinder body 11 and its liner 12, when the liner 12 is not specifically mentioned as the primary liner as an element distinct from the cylinder body 11. This liner 12 is, however, constructed differently than the usual liner in that one end thereof is provided with an internal shoulder 13 having a beveled face or liner seat 14 for engagement with one of the beveled ends 15 of a liner 16, which may be termed the secondary liner.

The other beveled end 15 of the liner 16 is engaged by the beveled inner face or liner seat 17 of a clamping ring 18 which is detachably secured by suitable means, as the bolts 19, to a flanged collar 20 of the liner 12. The collar 20 is not a new element as it is employed in mud pumps at present in use.

To install the invention, described above, in mud pumps already constructed, the liner 12 with the beveled face 14 will be substituted for the liner ordinarily furnished as a part of the pump equipment. This substitution may take place, either before the pump is sold or subsequently at any time and, if desired, the pump may first be employed with the old liner in place as originally constructed and the replacement effected after the old liner has become worn from use.

After the liner 12 is in place, the liner 16 will be slipped into the liner 12 from the right end thereof, in Figure 1, and held in place by the operator while he applies the clamping ring 18 and bolts said clamping ring in place. The beveled faces 14, 15, 17 properly center the liner 16 in the pump and, when said liner 16 becomes worn from use, it may be readily removed and a new one substituted therefor by removing the clamping ring 18. If mud has penetrated between the

liner 12 and the liner 16, the liner 16 may be loosened, after the clamping ring has been removed, by tapping the exposed end of the liner 16 with a hammer. It will be seen that the operation of renewing the liner 16 is comparatively simple and can be expeditiously accomplished, thus materially reducing the cost of replacements and shortening the periods of time in which the pump is idle while making the replacements.

The invention makes it possible to utilize practically waste pieces of drill pipe for, though the liner 16 may be made in any desired manner, I prefer to employ old pieces of drill pipe that have been discarded. To use such pieces of drill pipe, it is merely necessary to bore them and bevel the ends so as to fit the beveled faces 14, 17. Since there is much old drill pipe in the oil fields, there is practically no cost for the material used in making the novel liners, and this is a considerable item of saving as it is frequently necessary to renew the liner of a mud pump as often as once a day. Especially is this the case when the hole is being drilled through sand formations, the sand operating to very quickly cut and score the liner.

Now referring to Figures 4, 5 and 6, the elements that correspond in function with those described above will be indicated by the same reference characters with the addition of a prime mark. It will be noted that there is no element corresponding to the liner 12 since the liner 16' is inserted directly into the cylinder body 11'. The cylinder body 11' is provided with an internal shoulder 13' which, in this instance, is formed by an annular member of separate construction from the cylinder body, but which when in place constitutes a part of the cylinder the same as though integral therewith. The shoulder 13' has a beveled face 21 to fit a beveled face 22 at one end of the bore of the cylinder body. Since, in this form of the invention, the collar 20 or its counterpart is not employed, the clamping ring 18' is bolted directly to the cylinder body 11'. Thus it will be seen that, if the cylinder body 11' be properly constructed, the liner 16' can be employed without using a liner corresponding to that indicated at 12 in Figure 1. The beveled ends 15' of the liner 16' engage the beveled faces 14', 17' of the shoulder 13' and clamping ring 18', respectively, and in this respect this form of the invention is identical with that shown in Figures 1 to 3.

Though I have not shown any packing in the joint between the clamping ring 18 and collar 20 or between the clamping ring 18' and the cylinder 11', it is to be understood that, if there is any tendency to leakage at this joint, a suitable gasket may be employed. However, such gasket is well known

in this art and it is therefore unnecessary to illustrate and describe the same.

I claim:

1. In a pump construction, the combination of a cylinder having an annular shoulder provided with a beveled face, a liner having beveled ends and seating at one end against the beveled face of the shoulder and spaced from the cylinder wall, and a clamping ring detachably connected with the cylinder and having a beveled face to seat against the other beveled end of the liner.

2. In a pump construction, the combination of a cylinder having a removably mounted member in its bore provided with a beveled face, a liner having beveled ends and seating at one end against the beveled face and spaced from the cylinder wall, and a clamping ring detachably connected with the cylinder and having a beveled face to seat against the other beveled end of the liner.

3. In a pump construction, a liner for use therein, the pump having a shoulder in one end of the cylinder bore and having a clamping ring detachably connected with the cylinder at the opposite end of the bore, said liner having a cylindrical bore of a length to extend from the shoulder to the clamping ring and adapted to form the working cylinder of the pump, the outside diameter of the liner being materially less than the inside diameter of the pump cylinder.

4. In a pump construction, the combination of a cylinder, a liner in the cylinder having an internal shoulder at one end thereof and a flanged collar at the other end, a clamping ring detachably secured to the flanged collar, and a second liner seated at one end against the shoulder and at its opposite end against the clamping ring, said second liner being spaced from the inner face of the first liner excepting at the shoulder.

5. In a pump construction, a secondary liner for use therein, the pump having a primary liner secured in the cylinder and said liner having a shoulder at one end thereof and there being a clamping ring detachably connected with the cylinder, the inside diameter of the clamping ring being less than the inside diameter of the primary liner and said secondary liner having a cylindrical bore of a length to extend from the shoulder to the clamping ring and adapted to form the working cylinder of the pump, the outside diameter of the secondary liner being materially less than the inside diameter of the primary liner to form a space between said liners.

Signed at Los Angeles, California, this 15th day of February 1923.

DANIEL C. SILL.