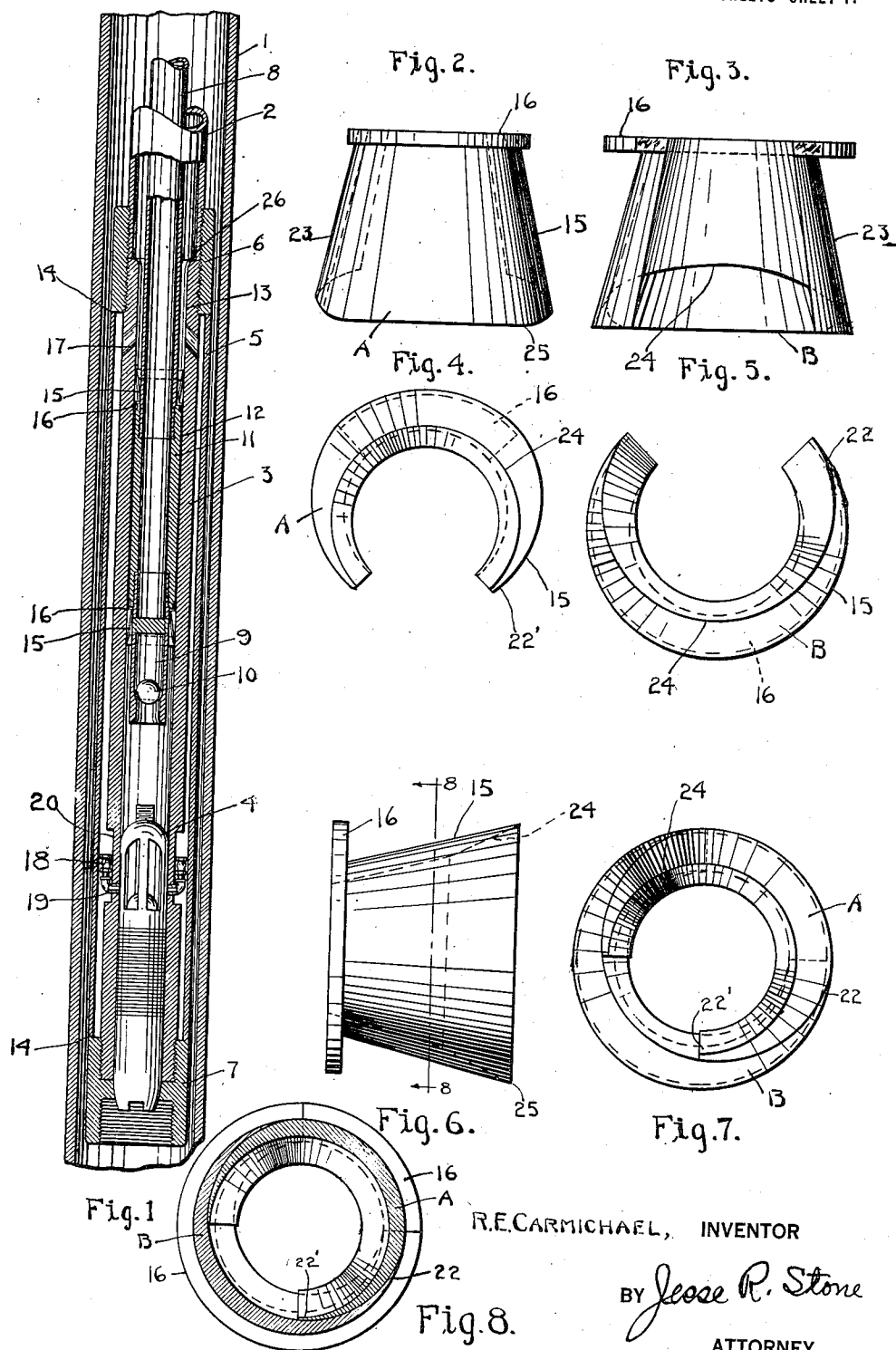


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 APPLICATION FILED JAN. 11, 1918.

1,295,848.

Patented Mar. 4, 1919.
 2 SHEETS—SHEET 1.



R. E. CARMICHAEL, INVENTOR

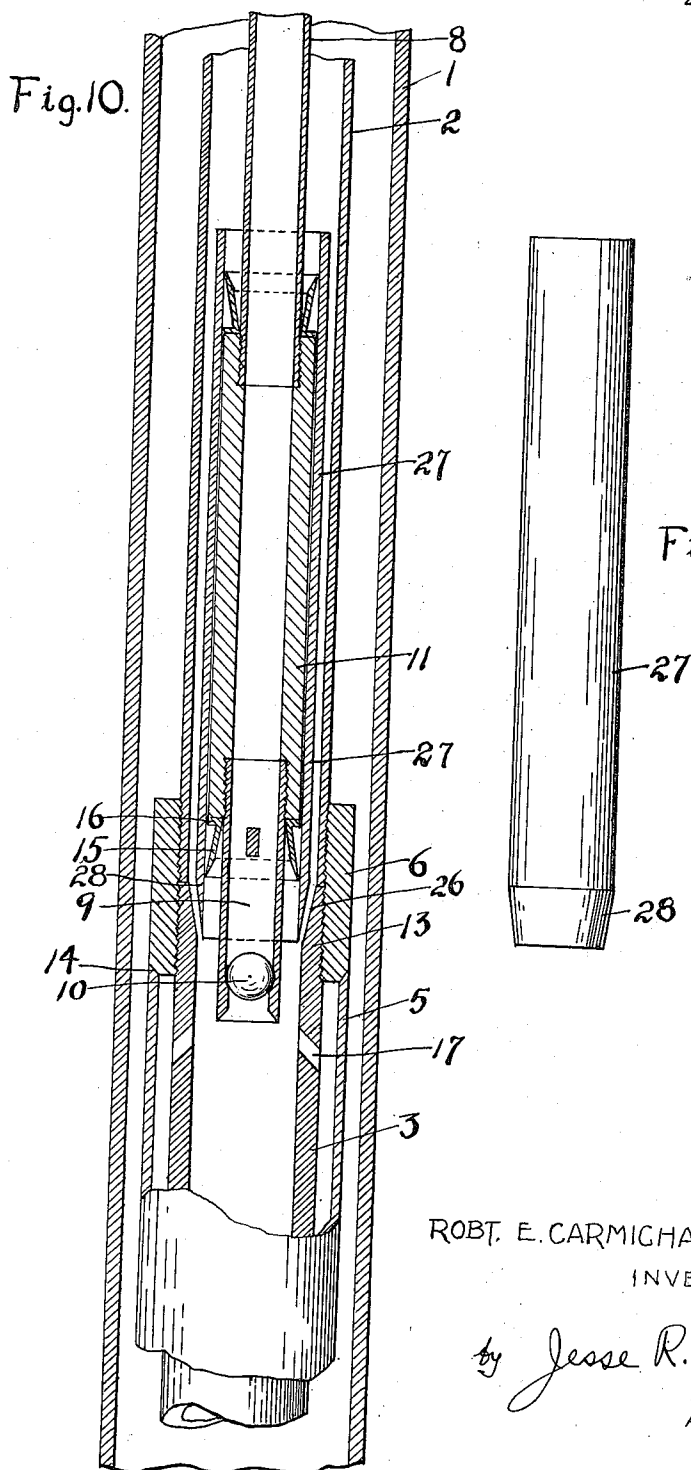
BY *Jesse R. Stone*
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ROBT. E. CARMICHAEL,
 INVENTOR

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UNITED STATES PATENT OFFICE.

ROBERT E. CARMICHAEL, OF DAMON, TEXAS, ASSIGNOR OF ONE-HALF TO GEORGE HAMMAN, OF HOUSTON, TEXAS.

MEANS FOR REDUCING WEAR IN THE WORKING BARRELS OF PUMPS.

1,295,848.

Specification of Letters Patent.

Patented Mar. 4, 1919.

Application filed January 11, 1918. Serial No. 211,451.

To all whom it may concern:

Be it known that I, ROBERT E. CARMICHAEL, a citizen of the United States, residing at Damon, Brazoria county, Texas, have invented a certain new and useful Improvement in Means for Reducing Wear in the Working Barrels of Pumps, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention is an improvement in pumps of the character set forth in my U. S. Patent No. 1,246,543, patented November 13, 1917, and differs therefrom in the provision of means for preventing excessive wear between the reciprocating pump rod and the adjacent working barrel.

Pumps of this nature are specially adapted for operation in water or oil wells where the fluid being pumped is mixed with quantities of sand or other sediment. Such pumps may also be used in pumping up sand and water or similar substances for use in buildings, roads, etc., as is now commonly practised. In pumps ordinarily used for these purposes it is found that some of the sand coming into the working barrel on its passage to the surface will gradually work in between the working barrel and the pump rod. The ordinary packing rings on the pump rod fail to prevent this entrance of the sand and rapid and excessive wear of these parts results. Hence it becomes necessary, because of this wear, to remove the pump rod, and occasionally also the working barrel, and replace the worn parts. This takes time and is expensive and causes frequent delays.

My present invention was devised to prevent the entrance of sand around the pump rod and to greatly reduce the wear and hence the annoying and expensive delays consequent on frequent repairs to the wearing parts.

Another object is to provide a resilient scraper or collar surrounding the pump rod and bearing against the inside of the working barrel to prevent the entrance of sand between these parts.

Another object is to construct this scraper

in such manner that it may be readily detachable in order that it may be easily and quickly replaced when necessary.

Another object is to provide a convenient means for introducing the pump rod into the working barrel.

Another object is to so construct this scraper that it will be resilient and adjustable to automatically maintain a constant pressure against the working barrel to preserve a tight contact and take up wear of the parts.

Other objects and advantages will more clearly appear in the description which follows and will be more specifically set forth in the claims.

In the drawing forming a part of this specification: Figure 1 is a longitudinal section of my invention showing the lower working parts of my pump in position in the well. Figs. 2, 3, 4 and 5 are details of the two parts composing my scraper. Figs. 6 and 7 are assembly views of the scraper, Fig. 6 being a side view and Fig. 7 a top plan view thereof. Fig. 8 is a transverse section taken on line 8-8 of Fig. 6. Fig. 9 is an elevation of the guide barrel used in assembling my device. Fig. 10 is a detailed view showing a central longitudinal section of the upper end of the working barrel of the pump with the plunger about to be inserted therein through the use of the guide barrel. The plunger is shown in a position at right angles to the showing in Fig. 1. Like characters of reference refer to like parts throughout the several views. In the drawings 1 designates a well casing which extends to any suitable depth into the earth and receives a pump casing, 2, of any well known or usual construction. Attached to the lower end of the pump casing is a working barrel, 3, at the lower end of which is a standard foot valve 4, of the ball type, the pump casing and working barrel being held in properly connected relation by means of an internally threaded collar, 6.

Arranged to reciprocate within the pump casing, 2, is the usual hollow pump rod, 8, having at its lower end a conventional plunger, 9, provided with a ball valve, 10.

To prevent the deposit of sand around the

foot valve, 4, thus clogging its action and preventing its proper operation I have provided means for introducing some fluid under pressure into the working barrel in the immediate neighborhood of the foot valve. As the fluid under pressure I may use water, oil, steam or air, but under ordinary circumstances water is found preferable. The structure by which this result is secured is shown in Fig. 1. Surrounding the working barrel, 3, I provide a hollow, cylindrical liner, 5, which is clamped tightly in place between a shoulder, 14, on the collar, 6, and a similar, shoulder, 14, on a lower collar, 7, which is threaded to the lower end of the working barrel. Toward the upper end of the working barrel, 3, are inclined passages, 17, leading to the space between the liner and said working barrel. Thus water, or other fluid which is pumped down from the surface inside the casing, 2, will pass between the pump rod, 1, and the working barrel, and find an outlet through the passages, 17, into the space between the liner and the working barrel. This fluid is adapted to be projected into the casing about the foot valve so as to stir up the accumulated sand which might settle and pack about the valve.

The means by which this fluid finds entrance to the valve chamber is by way of openings, 19, in the side of the working barrel adjacent the valve. Each of the passages have threaded therein a curved tubular inlet pipe provided with an automatic valve set in the housing, 18, in said pipe in such manner that the water may pass into the working barrel but may not pass outwardly therefrom. Thus on the downward stroke of the pump rod, 8, water backs up in the valve housing, 18, but does not issue therefrom. On the upward or working stroke of the pump the pressure of the water inside the liner forces water in through the openings, 19, in such manner that it issues in contact with the foot valve, loosening the sand thereabout and providing for the ready operation of the foot valve at all times.

The lower end of the pump rod, 8, is provided with a detachable section, 11, in the lower end of which is threaded the plunger, 9, previously described. The pump rod section, 11, is of a diameter adapted to fit closely within the working barrel, 3, and has thereabout a slight space, 12, between the pump rod and the working barrel after the usual pump construction. In order to provide a packing or tight contact between the pump rod and the working barrel I have provided my present improvement. This consists of a collar or scraper, 15, adapted to surround the pump rod and to be detachably connected by means of an outwardly projecting annular base, 16, to

the upper and lower ends of the pump rod section, 11. This scraper is of resilient sheet metal of substantial thickness and adapted to press resiliently outward into full contact at its outer ends with the inner surface of the working barrel.

Referring more especially to Figs. 2 to 8, inclusive, I have shown in detail a construction of my present invention. The scraper, 15, is made up of separate parts, or sections, preferably two in number, as A and B, adapted to fit one within the other in the manner to be described. The scraper is composed of a lower annular attaching base, 16, and has an outwardly extending scraping member, 23, which is of uniform thickness on the inner end but toward the outer end is beveled on the inner side, as shown at 24 in dotted lines in Fig. 6. This provides an outer sharp scraping edge, 25, which is adapted to contact with the inner side of the working barrel and in the reciprocation of the pump rod will prevent any grains of sand or sediment from working into the space, 12, between the rod and the working barrel. The part "A" of my scraper is crescent shaped in plan view and has a lower base, 16, which extends in a sector shape substantially 90 deg. of a circle, as shown in dotted lines in Fig. 4. The base, 16, on the part "B" which is also crescent shaped, extends the remainder of the way about the circle and has an extent of about 270 deg. of a circle. The part "A" is adapted to fit within the part "B" as shown in Fig. 7, and in order to provide a uniform frusto-conical shaped cup or scraper, the edges of the two parts, "A" and "B" are rounded or beveled off, as shown clearly in the different views, so that when the two parts are matched and fitted together they will form an outwardly extending portion of uniform thickness to a height of about two-thirds of the length of the scraper, from which height the thickness will be gradually reduced to a sharp edge at the outer margin, 25. It may be readily seen, however, that the scraper, 23, may be beveled or sharpened in any manner, and may be of gradually reduced thickness from the base to the outer margin, and I do not wish to confine myself to any particular structure of scraper, the idea being to provide a resilient outwardly projecting flange or scraper which will be pressed at all times in contact with the inner surface of the working barrel and prevent any sand or sediment from working between the operating parts.

It will be noted that the contacting portions of the two parts, "A" and "B", where they are adapted to fit together, have been reduced in thickness, as at 22 and 22', so that the two interfitting portions of these sections will form a wall of uniform thick-

ness through the scraper and will be beveled at the upper edge to provide a uniformly decreasing thickness terminating in the sharp edge, 25. This will allow to some extent a lateral separation of sliding of the parts on each other, however, so that as the scraper becomes worn at its upper margin, the parts may separate slightly and allow the scraper, 23, to be pressed resiliently outward, and still maintain a watertight cup or collar surrounding the pump rod.

The annular base, 16, of the scraper is rigid and will not be easily distorted or bent, but the part, 23, is resilient as previously stated. When the lower end of the pump rod is introduced into the working barrel, the scraper is compressed at the outer end. By so doing the contacting surfaces of the parts "A" and "B" slip by each other slightly so that the diameter of the outer end at 25 is reduced from its normal size so that it may enter the working barrel, 3. This is a difficult matter to accomplish when the working barrel is deep in the well, and I have provided therefor my guide barrel, 27, for purposes of assembling the working parts in that position. This guide barrel, 27, is of the same inner diameter as the working barrel, and has a lower beveled end, 28. While the pump rod is at the surface where the scraper may be compressed, it is fitted within this length of pipe and with the scraper thus housed, the pump rod is inserted down into the well. When the end of the pump rod reaches the upper end of the working barrel, which is beveled inwardly as at 26, the beveled end, 28, of the guide barrel, seats within the upper beveled end, and hence further advance of the guide member is stopped and the pump-rod and scraper continue down into the working barrel without difficulty. The resilience of the metal in the scraper presses the edge, 25, thereof into contact with the inner surface of the working barrel, as described. The guide barrel remains in its position without interfering in any way with the action of the pump and it is not necessary to withdraw it until the plunger is drawn up again and then it is caught by the scraper and brought to the surface. It is obvious that this guide barrel may be used with various types of pumps as well as my specific invention here disclosed.

There being a scraper at each end of the drill stem section, 11, as described, each of them projecting outwardly away from the said section, it will be impossible for any sand to gain entrance to the space, 12, between the member, 11, and the working barrel, 3, to cause wear therein. It will be noted also that these scrapers answer as a packing in the nature of piston rings to prevent the escape of water or other fluid

around the outer surface of the pump rod as is necessary in the successful operation of the pump.

The operation of my device will be clear from the foregoing description and it will be obvious that changes in the structure of the scraper and in its means of attachment may be made without departing from the spirit of my invention.

What I claim as new and desire to protect by Letters Patent is:

1. In a pump, a working barrel, a pump rod and plunger reciprocable therein, means mounted on said pump rod to bear closely against the working barrel at both ends of said plunger, said means comprising a radially extending rigid attaching base, an outwardly flaring resilient flange thereon, a sharp outer edge on said flange adapted to scrape the inner surface of said working barrel.

2. In a pump, a working barrel, a pump rod reciprocable therein, means mounted detachably on said pump rod to prevent the entrance of sand between the pump rod and working barrel, said means comprising an annular attaching base, an outwardly flaring forwardly extending flange on said base adapted to press resiliently against the inner surface of said working barrel.

3. In a pump, a working barrel, a pump rod reciprocable therein, a removable section on the forward end of said rod, a forwardly extending scraper on the lower end of said section, a rearwardly extending scraper on the upper end of said section, said scrapers comprising outwardly flaring metal flanges adapted to press resiliently against the inner surface of the working barrel.

4. In a pump, a working barrel, a pump rod reciprocable therein, a removable section of slightly larger diameter than the pump rod on the lower end of said rod, a scraper on the lower shoulder of said section, a second scraper on the upper shoulder of said section, each of said scrapers comprising an outwardly flaring metallic flange serving to tightly close the space between said rod and working barrel for the purpose specified.

5. A scraper for preventing the entrance of sand between the pump rod and working barrel of pumps comprising a base for attachment to a pump rod, a resilient flaring flange thereon, said flange being composed of two beveled interfitting parts adapted to overlap each other to form a wall of uniform thickness in any horizontal plane to allow the scraper to be compressed or expanded to bring the outer edge in tight contact with the outer working barrel.

6. A scraper for preventing the entrance of sand and water between the pump rod and working barrel of pumps, comprising two interfitting parts of unequal size making up an attaching base, and an outwardly flaring

resilient flange, the two parts of which are beveled to overlap in such manner as to allow relative movement thereof to maintain a close fit at all points with said working barrel for the purpose specified.

7. In a pump, a working barrel, the upper end thereof being beveled inwardly, a plunger and scraper adapted to fit therein, a guide barrel comprising a short pipe, the lower end being beveled to seat in said working barrel, and adapted to house said plunger for the purpose specified.

8. In a pump, a working barrel, a plunger adapted to reciprocate in said working barrel, a guide barrel adapted to house said plunger comprising a short length of pipe whose inner diameter is approximately the same as that of the working barrel, the lower end of said guide barrel being adapted to automatically seat upon said working barrel for the purpose specified.

9. In a pump the combination of a working barrel, a plunger reciprocable therein, a scraper on each end of said plunger, said scraper comprising a sleeve longitudinally divided and interfitting along the line of division to maintain a tight closure and to al-

low said sleeve to expand outward into contact with the inner surface of said working barrel and resilient means to maintain said tight closure.

10. In a pump, the combination with a working barrel of a plunger reciprocating therein, and a scraper carried by said plunger which consists of a split sleeve, provided with interengaging portions adjacent the line of division which have inclined lateral surfaces in contact with each other and relatively movable, whereby the advancing edge of the sleeve may be made to engage the interior surface of said barrel at all points of said edge.

11. In a pump, a working barrel, a plunger reciprocating therein, a scraper at both ends of said plunger, each of said scrapers comprising a resilient sleeve divided longitudinally and with the edges beveled and overlapped along the line of division whereby the outer edge of said scraper is held closely against said working barrel at all points.

In testimony whereof, I hereunto affix my signature this the 4th day of January, 1918.

ROBERT E. CARMICHAEL.