L. L. RICHARD.

SAND PUMP FOR WELLS.

APPLICATION FILED MAR. 15, 1916.

1,203,784. Patented Nov. 7, 1916.

Fig. 1.

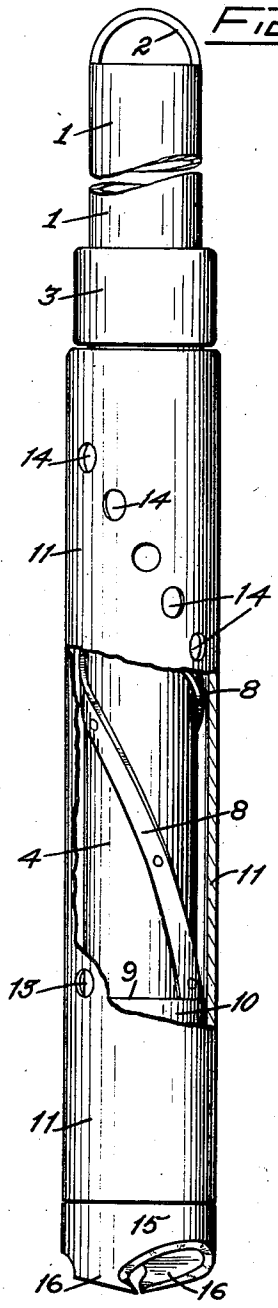


Fig. 2.

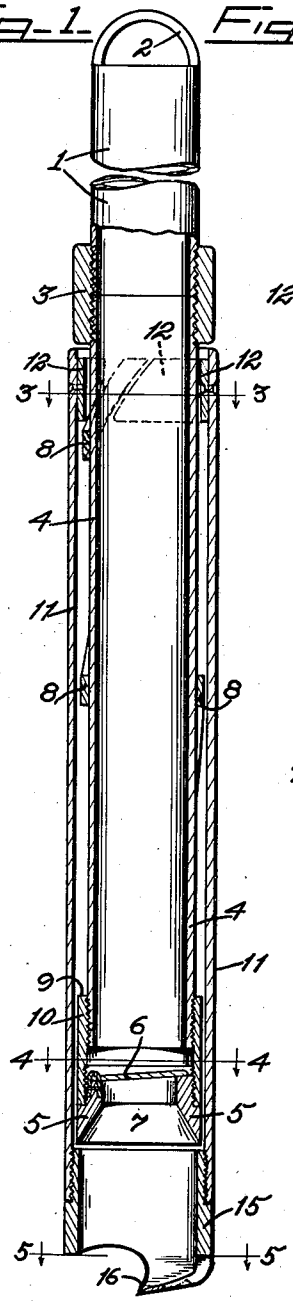


Fig. 3.

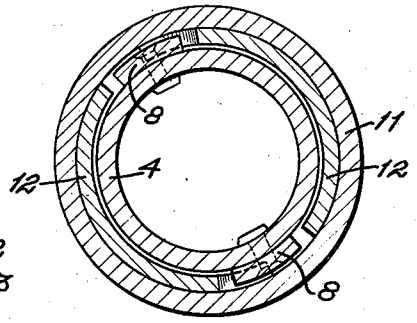


Fig. 4.

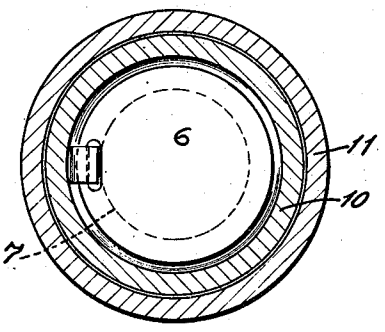
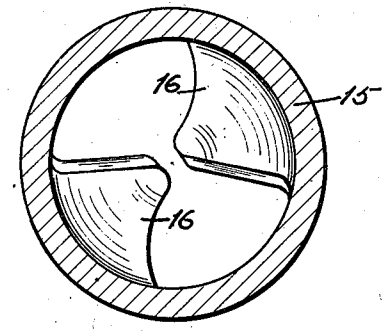


Fig. 5.



WITNESS

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SAND-PUMP FOR WELLS.

1,203,784. Specification of Letters Patent. Patented Nov. 7, 1916.

Application filed March 15, 1916. Serial No. 84,294.

To all whom it may concern:

Be it known that I, LEROY L. RICHARD, a citizen of the United States, residing at Coalinga, in the county of Fresno and State of California, have invented certain new and useful Improvements in Sand-Pumps for Wells, of which the following is a specification.

My invention relates to sand-pumps for wells, and more particularly to a device of this class in which a rotating bottom is employed for loosening the sand prior to its admission into the barrel.

It frequently happens, in the drilling and pumping of wells, and particularly oil wells, that sand enters the well and clogs the bore for a considerable distance at its lower portion. Sometimes, moreover, a sudden inrush of oil or gas forces a body of sand several hundred feet up in the well, and forms a tightly packed bridge within the casing. In either event, the use of drilling tools to remove the obstructing sand is not desirable, for the reason that such tools only pack the sand tighter, and by so doing are liable to split or break the casing. When the sand is very tightly packed, the ordinary sand pump is also unsuccessful, since it carries no means for effectively loosening the sand.

The object of my invention, therefore, is to provide a sand pump by means of which a firm sand pack or bridge may be readily loosened and removed without injury to the casing of the well.

A further object of my invention is to provide a device of the described type which has a clear and unobstructed passage within the barrel for the admission and retention of the sand.

These and other advantages will be apparent from the following description of my sand pump, when read with reference to the accompanying drawings, in which—

Figure 1 is an elevation, broken, of my sand-pump. Fig. 2 is a vertical section of the same. Fig. 3 is a cross section, enlarged, on the line 3—3 of Fig. 2. Fig. 4 is a cross-section, enlarged, on the line 4—4 of Fig. 2. Fig. 5 is a cross-section, enlarged, on the line 5—5 of Fig. 2.

In the drawings, the reference numeral 1 designates the barrel of the pump, which is of the usual type, and provided at its upper end with a bail 2 to which the sand line is attached. Connected to the lower end of the barrel 1, as by means of a threaded coupling 3, is a cylindrical extension 4; and upon the lower end of this extension 4 is carried a bottom 5, having a valve 6 and a flared bore 7, said bottom being of a well known type used in connection with ordinary sand pumps. The outer surface of the cylindrical barrel extension 4 is formed with spiral threads 8, having a relatively long pitch, and terminating at their lower ends at an annular shoulder 9, the portion of the extension below said shoulder, indicated by the numeral 10, having a diameter preferably equal to the outside diameter of the threads 8. Surrounding this threaded barrel extension 4 is a cylindrical sleeve 11, upon the inner surface of which, preferably near its upper end, are spirally formed guide lugs 12, adapted to engage the spiral threads 8 upon said barrel extension 4. Suitable drainage apertures 13 are provided in said sleeve 11 near its lower end, and other drainage apertures 14, preferably disposed spirally, as shown, to follow the paths of the threads 8, are provided in the upper portion of said sleeve. The lower end of the sleeve 11 is formed or provided with a sand-loosener. In practice this is best an auger 15 which in the drawing is a separate piece screwed to the lower end of the sleeve, said auger being hollow, as shown, and preferably formed with two opposite inwardly projecting inclined blades 16, adapted to bore into and loosen the sand when the auger is rotated.

In operation, the sand pump is lowered into the well until the auger 15 strikes the sand. The barrel 1 and the extension 4 are then given a vertical reciprocatory motion, which, by means of the interengaging threads 8 and lugs 12, imparts an oscillatory rotary motion to the sleeve 11 and the auger 15. The blades 16 of said auger are thus caused to work into and loosen the sand, and the loosened sand is forced up into the interior bore of the extension 4 and the barrel 1, at each downward stroke thereof, the valve 6 retaining said sand therein.

It is to be noted that the interior bore of the pump is clear and unobstructed except by the valve 6, a feature which facilitates the entrance of sand into said bore and its removal therefrom. The dumping of the pump is accomplished in the usual manner.

That is, after the interior of the barrel becomes full, the pump is drawn up out of the well and being swung over to a dump box is lowered upon an upstanding pin in said box, which said pin enters through the auger 15 and the bottom 5, and, striking the valve 6, opens the same, thus permitting the sand to run out.

The drainage apertures 13 and 14 are provided in the sleeve 11 to permit the escape of sand from the space between said sleeve 11 and the barrel extension 4. The positions of the apertures 14 are such that any material in said space is forced out, on the upward stroke of the barrel extension 4, by the threads 8 and the shoulder 9, said shoulder rising above the uppermost aperture on said upward stroke. At the lower limit of the stroke, the shoulder 9 lies below the lower apertures 13, thus permitting free drainage when the parts are in this position.

My invention has been described and illustrated herein in its preferred form, but I do not wish to be construed as limiting myself thereto, for the reason that changes may be made in the form and construction of the device without affecting the essential principles of the invention.

I claim:—

1. A sand pump comprising a barrel; a check valve in the lower end of said barrel for admitting sand thereinto; a movable sleeve surrounding said barrel; means carried by said sleeve for loosening the sand prior to its admission into the barrel; and means positioned between said barrel and said sleeve for rotating said sleeve when said barrel is moved lineally therewithin.

2. A sand pump comprising a barrel; a check valve in the lower end of said barrel for admitting sand thereinto; a sleeve surrounding said barrel; means carried by said sleeve for loosening the sand prior to its admission into said barrel; and means dependent upon a relative lineal movement of the barrel and sleeve for rotating said sleeve about said barrel.

3. A sand pump comprising a barrel; a check valve in the lower end thereof for admitting sand thereinto; a rotatable sleeve surrounding said barrel; means carried by said sleeve for loosening the sand prior to its admission into the barrel; and means for rotating said sleeve about said barrel.

4. A sand pump comprising a barrel; a check valve in the lower end thereof for admitting sand thereinto; a rotatable sleeve surrounding said barrel; an auger carried by the lower end of said sleeve; and means for rotating said sleeve about said barrel.

5. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel; an auger carried by the lower end of said sleeve; and means dependent upon a relative lineal movement of the barrel and sleeve for rotating said sleeve about said barrel.

6. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel; an auger carried by the lower end of said sleeve, and means positioned between said barrel and said sleeve for causing said sleeve to rotate when said barrel is moved lineally therewithin.

7. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel; means carried by the lower end of said sleeve for loosening the sand prior to its admission into the barrel; and means for rotating said sleeve when said barrel is moved lineally therewithin, comprising a spiral thread carried by the outer surface of the barrel and co-acting lugs carried by the inner surface of the sleeve.

8. A sand pump comprising a barrel; a cylindrical extension carried by the lower end of said barrel; an admission check valve in the bottom of said extension; a sleeve surrounding said extension; an auger carried by the lower end of said sleeve; and means for rotating said sleeve when said extension is moved lineally therewithin, comprising a spiral thread carried by the outer surface of the extension and coacting lugs carried by the inner surface of the sleeve.

9. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel and formed with drainage apertures in the wall thereof; means carried by the lower end of said sleeve for loosening the sand prior to its admission into the barrel; and means positioned between said barrel and said sleeve for rotating the sleeve when the barrel is moved lineally therewithin.

10. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel and formed with drainage apertures in the wall thereof; means carried by the lower end of said sleeve for loosening the sand prior to its admission into the barrel; means positioned between said barrel and said sleeve for rotating the sleeve when the barrel is moved lineally therewithin; and an annular shoulder carried by the lower end portion of said barrel and forming a close fit within said sleeve, said shoulder being positioned to drop below the lowermost of said drainage apertures at the lower limit of the lineal movement of the barrel, and to rise above the uppermost of said apertures at the upper limit of said movement.

11. A sand pump comprising a barrel having an admission check valve in its bottom; a sleeve surrounding said barrel and formed with spirally disposed drainage ap-

ertures in the wall thereof; means carried by the lower end of said sleeve for loosening the sand prior to its admission into the barrel; inter-engaging spiral threads carried by said barrel and said sleeve for rotating said sleeve when said barrel is moved lineally therewithin, said threads being positioned below said spirally disposed apertures in said sleeve; and an annular shoulder carried by the lower end portion of said barrel and forming a close fit within said sleeve, said shoulder being positioned to drop below the lowermost of said drainage apertures at the lower limit of the lineal movement of the barrel, and to rise above the uppermost of said apertures at the upper limit of said movement.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEROY L. RICHARD.

Witnesses:
M. HARWOOD,
ARTHUR T. WEBB.