J. HAHN.

DEEP WELL PUMP.

APPLICATION FILED JAN. 3, 1910.

976,071.

Patented Nov. 15, 1910.

Fig. 1

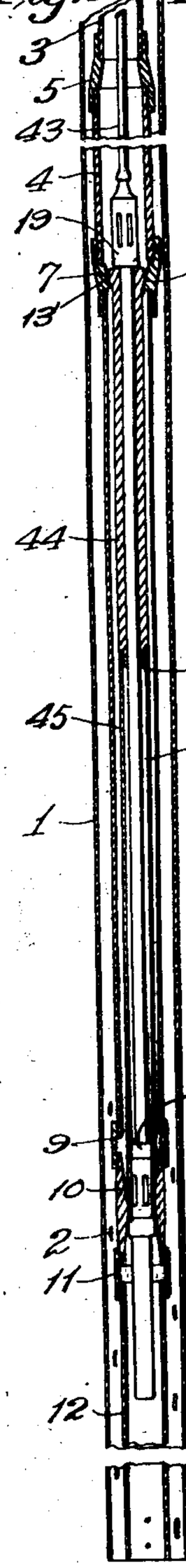

Fig. 2

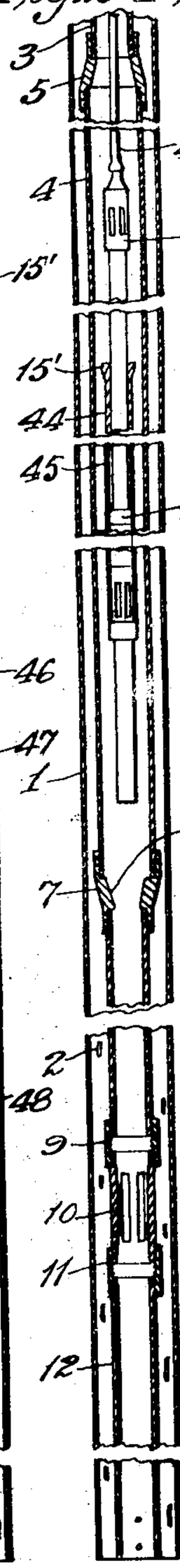

Fig. 3

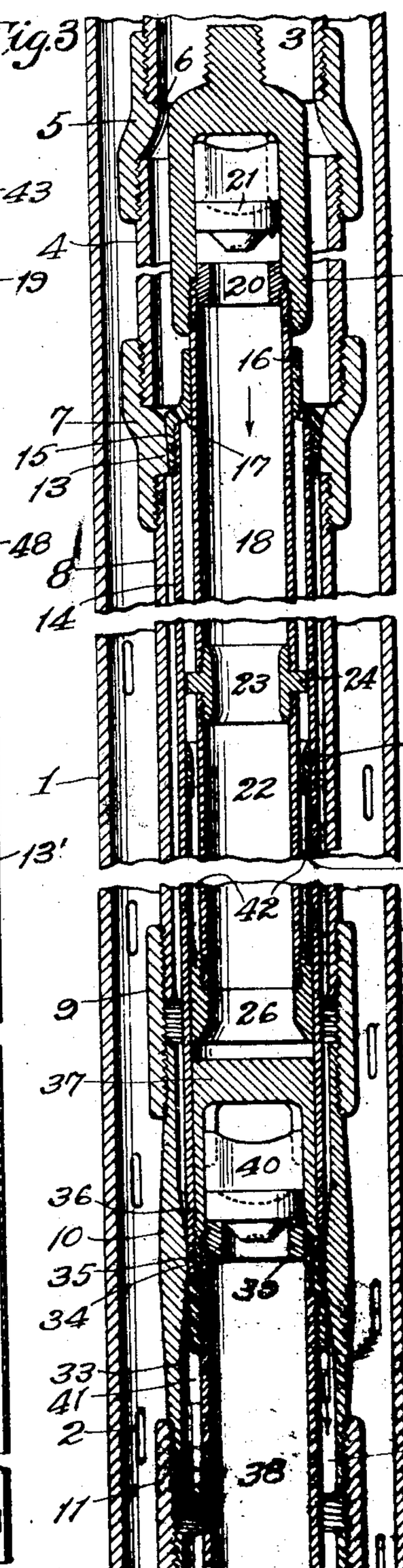

Fig. 4

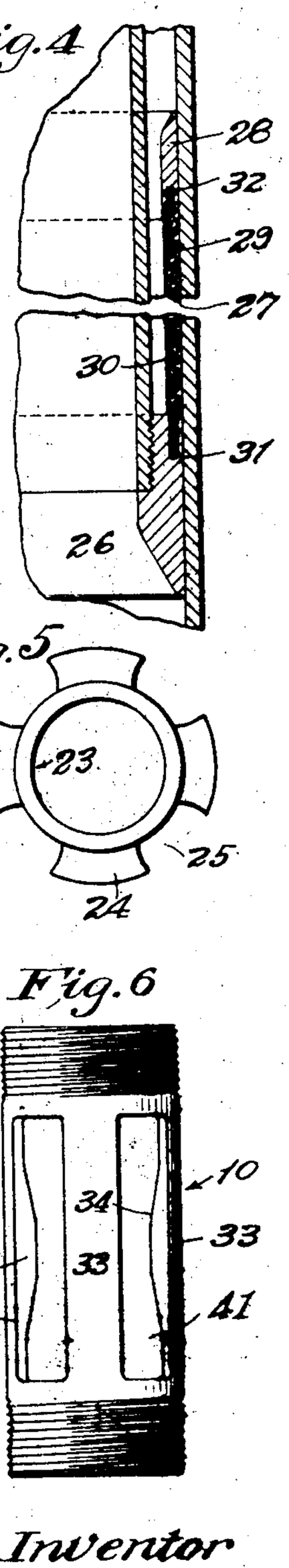

Fig. 5

Fig. 6

Witnesses

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UNITED STATES PATENT OFFICE.

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DEEP-WELL PUMP.

976,071. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed January 3, 1910. Serial No. 536,323.

To all whom it may concern:

Be it known that I, JOHN HAHN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Deep-Well Pumps, of which the following is a specification.

This invention relates to improvements in certain respects, of the deep well pumps invented by me heretofore as exemplified in United States Letters Patent No. 735,248, patented Aug. 4, 1903, and No. 753,828, patented Mar. 1, 1904, and in applications for Letters Patent of the United States, Serial No. 452,131, filed Sept. 8, 1908, and Serial No. 480,787, filed Mar. 1, 1909, in which some of the features shown herein are shown and claimed, and for that reason are not claimed in this application.

Objects of this invention are: simplicity and cheapness of construction, and also to make provision for washing the sand out in a convenient manner with small expense of time and labor. Also to provide a fluid packed plunger and to draw movable portions of the pump from the pump tubing without disturbing the tubing.

Further objects are to provide for keeping the interior of the working barrel free from adhering substances; to provide for forcibly seating the working barrel; and to improve means for frictionally holding the working barrel down.

Other objects are, to make provision for holding the plunger barrel straight in the working barrel; to prevent unnecessary strain on the cup of the plunger barrel; to keep the working barrel free from materials that might adhere thereto; and thus to increase the life of the plunger barrel.

Other objects and advantages may appear from the subjoined detail description.

The accompanying drawings illustrate the invention.

Figure 1 is a broken mid-section showing the position of parts when the pump is in working position. Fig. 2 shows the position of parts when the pumping apparatus is drawn up to afford a passage through which sand and heavy oil and other obstructions that might clog the pump tubing may be washed down and out below the standing valve, without withdrawing the pump from the tubing and without disturbing the tubing. Fig. 3 is an enlarged fragmental section showing the pumping apparatus and other parts in detail. The reducer which is fixed to the lower end of the ordinary pump tubing and to the upper end of the enlarged chamber is displaced from actual position, being lowered inside the casing in order to bring it into the view. The sucker-rod is omitted from this view. The plunger barrel cage and the plunger barrel are shown nearly at the limit of the down-stroke. Fig. 4 is an enlarged fragmental sectional detail showing the lower end of the plunger barrel with a scraper foot formed by a collar thereon; and a portion of the working barrel and a distensible cup or sleeve arranged to serve as a packing and provided with an annular scraper at the top to scrape the interior of the working barrel. Fig. 5 is a plan detail of the plunger barrel guide and working barrel puller. Fig. 6 is a side elevation of the slotted resilient section of the pump tubing.

The well casing 1 may be of the usual form, provided with perforations 2, through which the oil or other liquid enters. The upper sections 3 of the pump tubing may be of the usual form.

An enlarged intermediate pump tubing section 4 to form an enlarged chamber is connected with the upper pump tubing 3 by a reducer 5 having an internal shoulder 6 upon which the upper section 3 seats when screwed home. A lower reducer 7 is screwed onto the lower end of the enlarged intermediate chamber section 4 and a lower section 8 of pump tubing which may correspond approximately in diameter with the upper section 3 is screwed into the reducer 7. On the lower end of the section 8 is screwed a collar 9 into which is screwed a resilient slotted frictional guide section 10 to the bottom of which is screwed a collar 11 into which is screwed the bottom section or anchor 12 of the pump tubing which anchor may extend down as usual to any depth desired inside the well-casing.

The lower reducer 7 is provided with a spigot seat 13, the internal diameter of the lower end of which is less than the internal diameter of the upper section 3. The working barrel 14 is provided with an enlarged head forming a tapered sleeve 15 to fit in the spigot seat 13. In the form detailed in Fig. 3, said head is contracted at its upper end to form a tubular guide 16 for the plunger barrel and is provided between said tapered sleeve and guide with a perforated

shoulder 17 to admit liquid into the space between the working barrel 14 and the plunger barrel to form a liquid packing between the head 16 of the working barrel and the foot-piece 26 of the plunger barrel.

The plunger barrel shown in Fig. 3 is composed of a number of parts. The upper section 18 of said plunger barrel is screwed into the lower end of a single-piece cage 19 to hold therein the valve seat 20 which seats the valve 21. Said upper plunger barrel section 18 is connected with the lower plunger barrel section 22 by a coupling formed of threaded nipple 23 which has projections 24 between the screw-threaded ends of the nipple to engage the shoulder 17 for the purpose of pulling the head of the working barrel from its spigot seat 13, and also to form a guide for the plunger barrel inside the working barrel to hold the plunger barrel straight. Passages 25 for liquid are provided between the projections 24 so that liquid which flows through the perforations of the shoulder 17 may pass to the lower end of the plunger barrel. Said plunger barrel is provided at its lower end with a foot-piece in the form of a scraper 26 which fits the interior of the working barrel 14; and the plunger barrel is also provided with a cup having a distensible sleeve 27 that fits the bore of the working barrel 14 and that is hermetically fastened to the lower portion or section 22 of the plunger barrel by the foot 26. The upper end of the cup is provided with an annular scraper tip 28 of durable material, as wood-fiber, metal or hard rubber and the scraper fits the inside of the working barrel to scrape the same. The plunger barrel is thus formed with a stiff bottom and top and a flexible distensible wall therebetween, and the top and wall of the cup are spaced apart from the plunger barrel to admit liquid to distend the wall 27 against the inside of the working barrel. When the cup is distended by the liquid pressure therein, it forms a perfect packing between the plunger barrel and the working barrel.

The distensible body 27 of the cup may be formed of any suitable strong flexible material, as canvas 29 having an inner rubber or other impermeable facing 30. The ends of said sleeve are seated in grooves 31 and 32 in the foot 26 and in the annular scraper tip 28. Said tip and the sleeve remove and retain semi-liquid materials that may adhere to the inside of the working barrel.

The resilient section 10 is provided with resilient slats 33 having inward extensions 34 that project inwardly beyond the line of the bore of the tubing to engage the outside of the working barrel 14, which fits the tubing. The lower end of the working barrel is internally screw-threaded at 35 to receive a neck 36 of the single-piece standing valve cage 37 which is similar in construction to that described in my said application Serial No. 480,787, and into the lower end of which is screwed the downward extension 38 of the working barrel which holds the standing valve seat 39 in place in the standing valve cage 37 in which the standing valve 40 is mounted.

The inward extensions 34 of the resilient slats 33 are spaced apart from the spigot seat 13 a distance somewhat less than the distance between the tapered sleeve 15 and the bottom of the standing valve so that when the working barrel is inserted with its tapered sleeve 15 in the seat 13, the standing valve will have spread apart the slats 33 and the projections 34 will frictionally engage the working barrel or the standing valve, as the case may be. In Fig. 3 of the drawing the working barrel is shown engaged by the inward projections 34. The slots 41 of the resilient connection 10 admit liquid as indicated by bent arrows from the interior of the well-casing into the open space 42 around the downward extension 38 which forms the conduit to direct the liquid up into the standing valve cage. The weight of the anchor 12 operates to straighten the slats 33 from their outwardly bent position, thereby increasing the grip of said slats upon the working barrel to hold the same in place. The plunger cage 19 projects outward from the upper section 18 of the plunger barrel and thereby forms a shoulder to engage the contracted portion 16 of the head so that when the cage 19 is forced down by the sucker-rod 43, the tapered sleeve 15 may be driven home in its seat 13. When the cage is drawn up for the purpose of pulling the working barrel, the projections 24 will engage the inside of the head and the plunger barrel may be operated to jar the head loose from the spigot seat and then to draw the plunger and the working barrel and their attached parts from the pump tubing without disturbing the tubing.

When the pump is in working position, the liquid in the pump tubing will flow downward through the perforations at 17 into the open space between the plunger barrel and the working barrel and thence into the open space inside the cup sleeve 27 and will thereupon distend said sleeve, forcing the same tightly against the inner walls of the working barrel so as to prevent any leakage of the liquid back to the standing valve.

At each upward stroke of the plunger barrel the scraper 28 will scrape the inner walls of the working barrel and any sticky substance that may adhere to the walls will thus be directed down into the space inside the sleeve and will assist in distending the sleeve to make perfect packing.

In the form shown in Fig. 1, the working

barrel is made of two sections 44 and 45, the upper section 44 being of less diameter than the lower section 45, which is screwed onto the upper section 44, leaving a shoulder 46 at the bottom of the upper section 44 and an enlarged chamber 47 below said shoulder to accommodate the enlarged foot 48 of the plunger barrel which forms a shoulder to engage the shoulder 46 in the same manner as the projections 24 engage the shoulder 17 in Fig. 3, so that the plunger barrel may be employed to jar loose the tapered sleeve 15 of the working barrel head from its spigot seat 13.

In Fig. 1, the working barrel is shown seated, and in Fig. 2 the working barrel is shown pulled out of its seat by engagement with the shoulder 46 of the plunger barrel foot 48.

The operation will be understood by reference to Figs. 1, 2 and 3. In Fig. 1, the cage 19 is shown in position for driving the working barrel into its spigot seat and into the resilient slotted frictional guide section 10, so that the working barrel will be frictionally held by the guide section and the spigot seat, and will be hermetically sealed in the pump tubing by the spigot seat. In Fig. 2, the plunger barrel and the working barrel are shown drawn up from the spigot seat 13. In Fig. 3, the working barrel is shown fully seated and the plunger and plunger barrel cage are shown in operation, the straight arrow on section 18 of the plunger barrel indicating the downward stroke of the plunger barrel which causes the plunger barrel valve 21 to lift. In practical operation, the down stroke of the plunger barrel will terminate before the cage 19 engages the guide 16. The position shown in Fig. 1 occurs only when the working barrel is to be driven in place.

I claim:

1. In a pump, a working barrel having an enlarged head adapted to guide the plunger barrel and forming a tapered sleeve to fit a spigot seat, pump tubing provided with a spigot seat for said sleeve, a plunger barrel in the working barrel, and a cage on the plunger barrel outside said head; there being a space provided between the plunger barrel and the working barrel and perforations through the head from such space.

2. Pump-tubing composed of a plurality of sections, one of said sections connecting two other of said sections and provided with outwardly bowed slats having inward projections that extend beyond the line of the inner wall of the upper section, the weight of the lower section tending to straighten the slats to force the inward projections inwardly to form a contraction in the tubing, between the sections.

3. A pump comprising a working barrel and a plunger barrel inside the working barrel, said plunger barrel being provided intermediate its ends with projections forming a guide to engage the inside of the working barrel.

4. A pump comprising a working barrel, a plunger barrel inside the working barrel, a distensible cup connected with the plunger barrel, said plunger barrel being provided with projections forming a guide to engage the inside of the working barrel to keep the plunger barrel straight within the working barrel.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 27th day of December, 1909.

JOHN HAHN.

In presence of—
JAMES R. TOWNSEND,
L. BELLE RICE.