

No. 751,758.

PATENTED FEB. 9, 1904.

R. E. SMALL.
PUMP PISTON.

APPLICATION FILED OCT. 21, 1903.

NO MODEL.

Fig. I

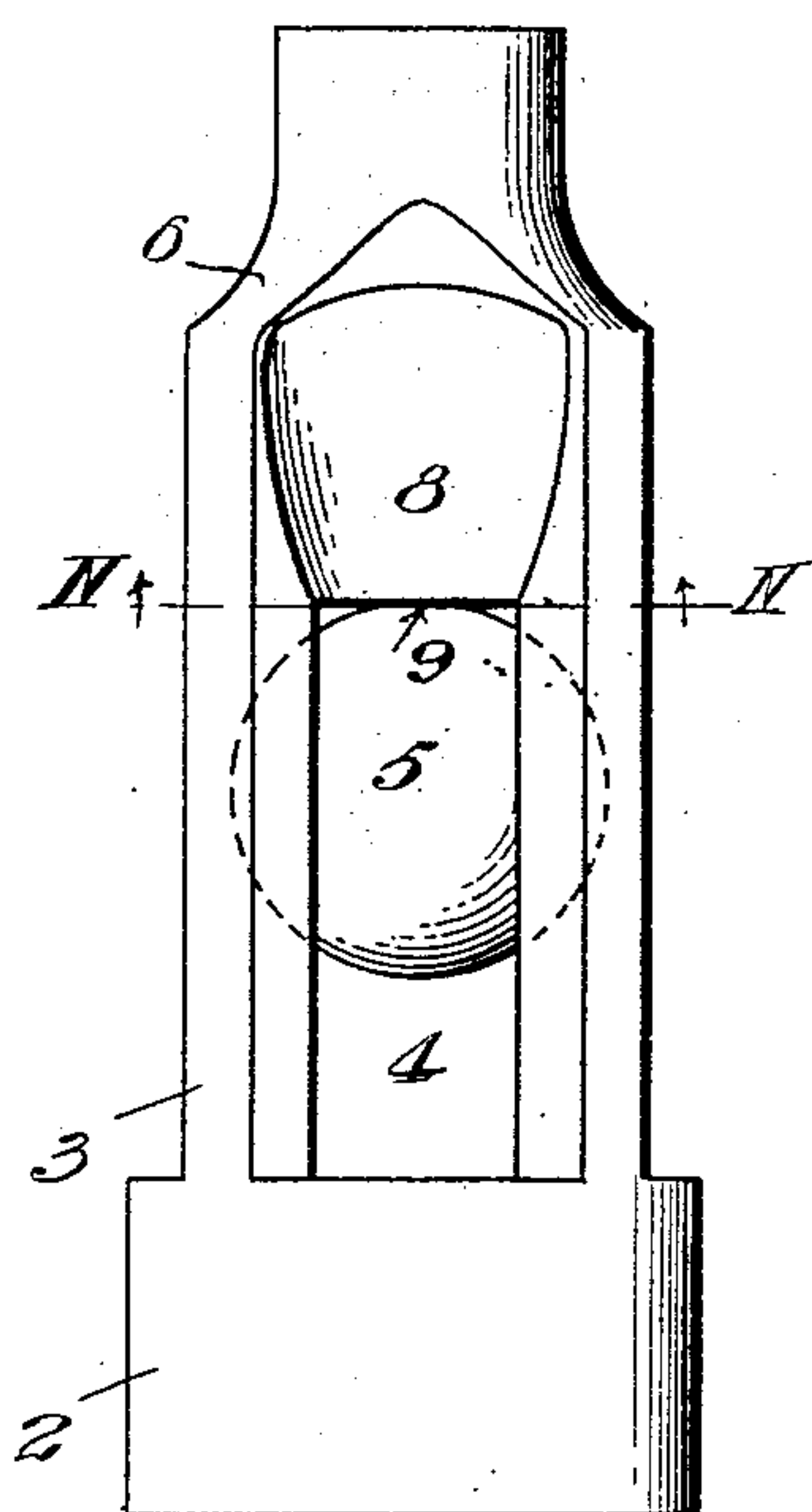


Fig. II

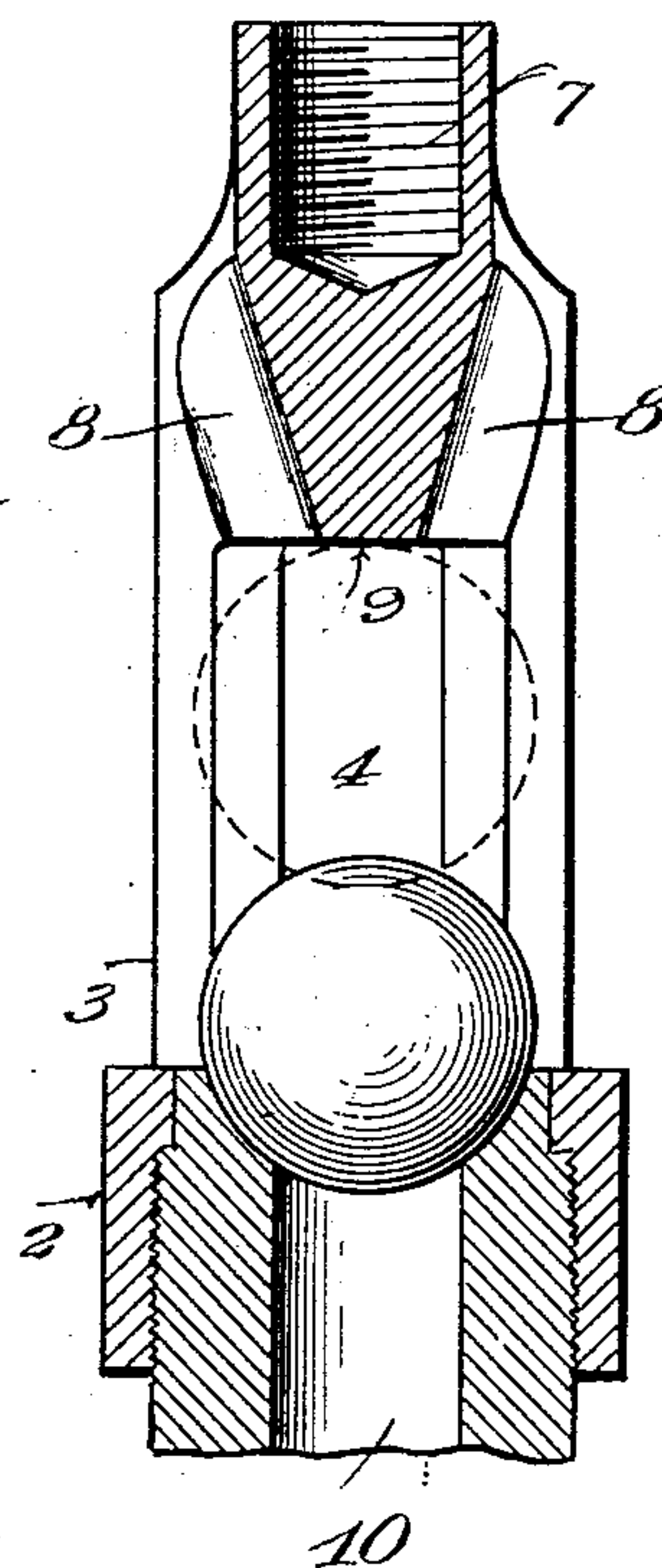


Fig. III

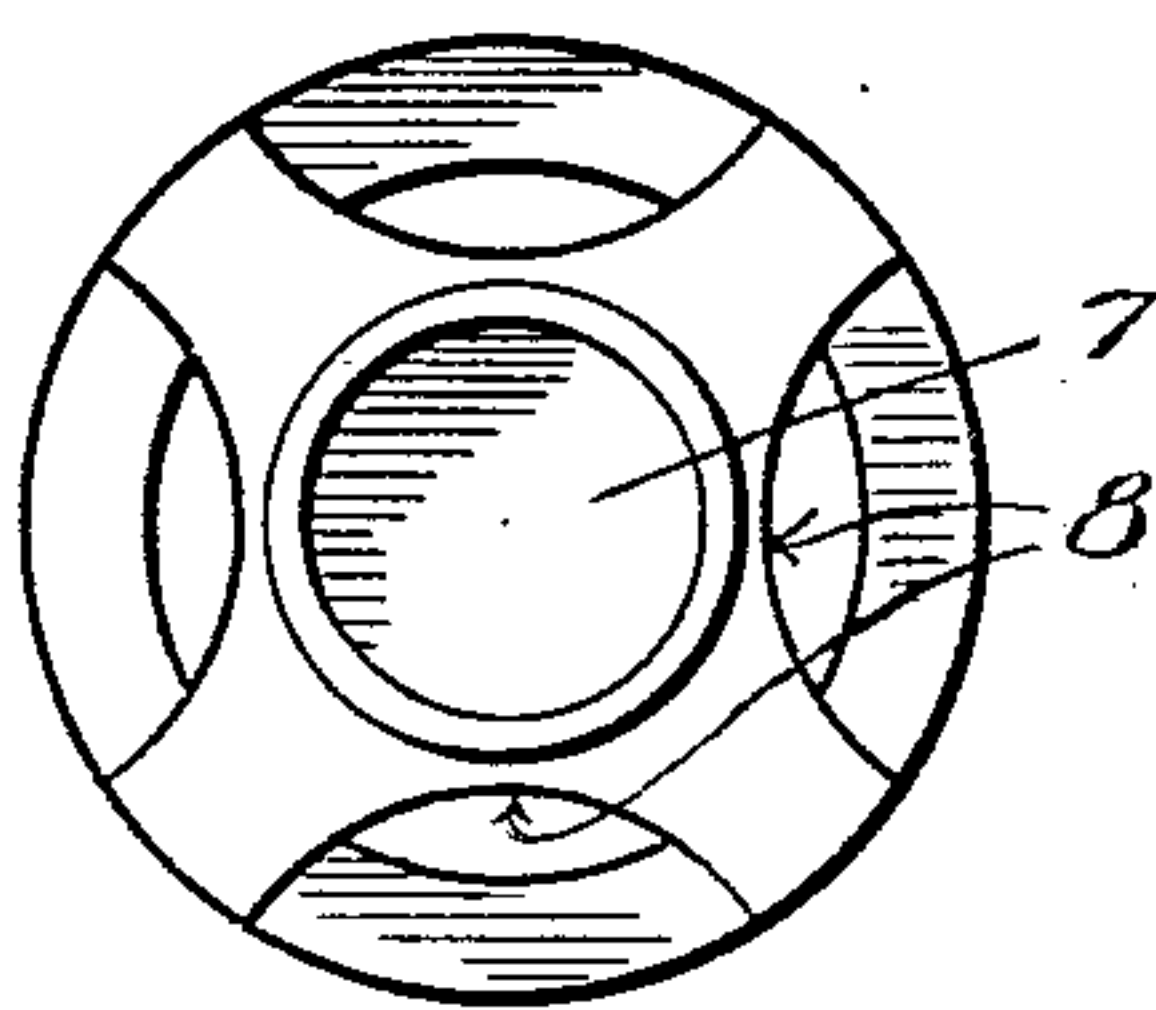
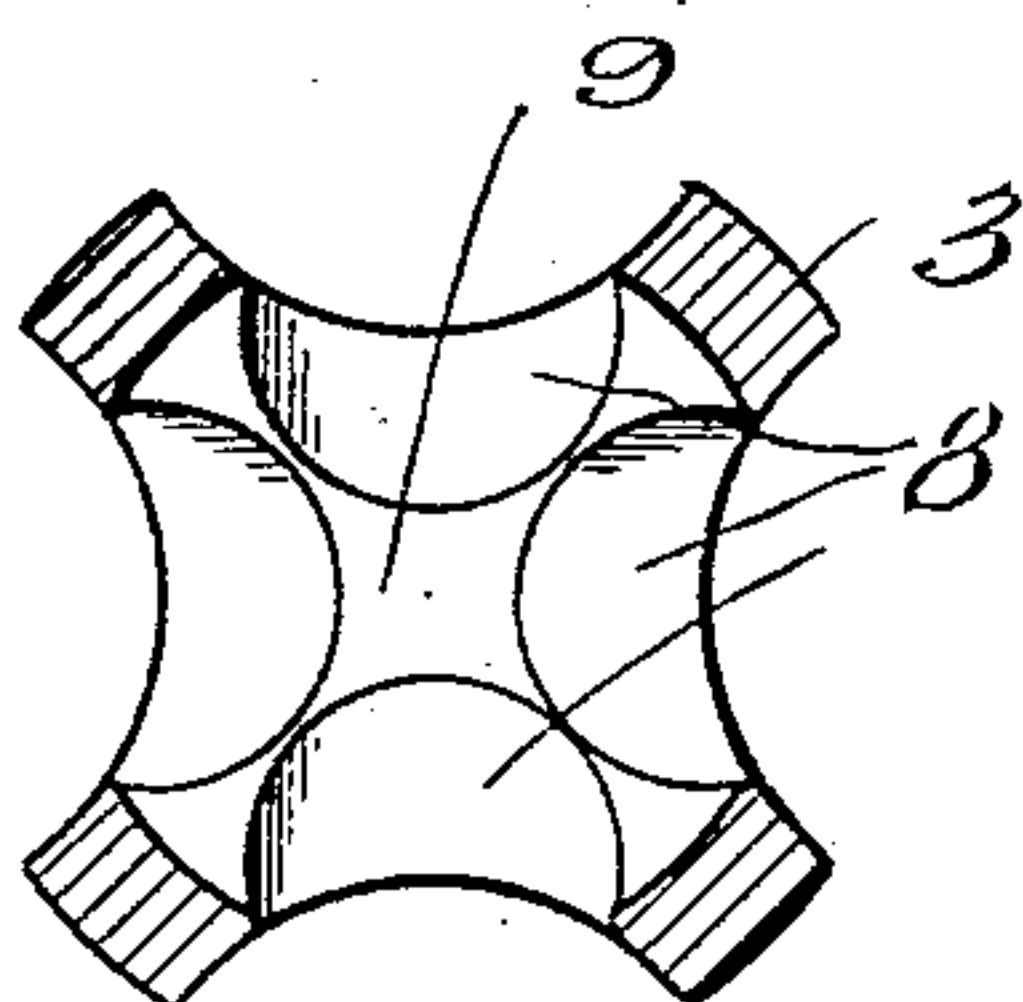


Fig. IV



WITNESSES

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UNITED STATES PATENT OFFICE.

RICHARD E. SMALL, OF LOS ANGELES, CALIFORNIA.

PUMP-PISTON.

SPECIFICATION forming part of Letters Patent No. 751,758, dated February 9, 1904.

Application filed October 21, 1903. Serial No. 177,932. (No model.)

To all whom it may concern:

Be it known that I, RICHARD E. SMALL, a citizen of the United States, residing at Los Angeles, county of Los Angeles, and State of California, have invented certain new and useful Improvements in Pump-Pistons, of which the following is a specification.

This invention relates to pumps for pumping liquids, and particularly for pumping oil, being especially adapted for use in pumping heavy and low-grade hydrocarbon oils—such, for instance, as the California crude oil containing large amounts of asphaltum, minerals, and impurities.

The primary object of the invention is to provide a valve-cage which will give a maximum freedom to the oil and in which all possibility of the gumming up or clogging of the ways of the cage is avoided, at the same time providing the cage with oil-ways adapted to deliver the oil on the upstroke of the piston onto the valve, so as to forcibly seat the same, preventing all possibility of the sticking of the ball-valve in the top of the cage.

With these and such other objects and ends in view, as will hereinafter appear from the detail description of construction and operation, the invention consists, primarily, in a valve-cage for a pump-piston including a ball-valve, a seat therefor at the lower end of the cage, the center of the cage being provided with a chamber in which the ball is adapted to operate, the wall of the chamber being cut away to form open ways at its periphery, the cage being provided at its top with inwardly-inclined concave ways adapted to permit the oil to flow from the top of the cage inward onto the upward portion of the ball-valve, the bottom of the head of the cage (forming the top of the chamber of the cage) being horizontal, so that there is no recess provided in which the ball-valve may stick, the side ways or openings in the periphery of the valve-cage forming extensions of and being in open communication with the concave ways at the top of the cage.

The invention consists, further, in the construction and in the combination of parts hereinafter described, and particularly pointed out

in the claims, and will be more readily understood by reference to the accompanying drawings, in which—

Figure I is a front elevation of a valve-cage embodying my invention. Fig. II is a longitudinal sectional view thereof. Fig. III is a plan view. Fig. IV is an inverted plan view on line IV IV, Fig. I.

As shown in the drawings, the top section 2 of the plunger is extended upward by standards 3, preferably four in number, open ways being formed between the standards, and a central chamber 4 being formed within the chamber in which the ball-valve 5 operates. The standards 3 are preferably formed integral with the section 2 of the plunger and with a top portion 6, which is provided with a socket 7, into which the plunger-rod may be screwed. Inside the barrel 2 and below the ends of the standards 3 is provided a seat for the ball-valve. From the top or head of the valve-cage extends a series of oil-inlets adapted to permit the oil upon the upstroke of the plunger to flow directly onto the ball 5. These inlets are formed by recesses 8, which are concave and which extend inwardly toward the center of the chamber 4. The periphery of the head 6 is cut away at the top, so that the cavities 8 are free and unobstructed at the periphery of the cage and afford no opportunity for the accumulation of sediment, which is calculated to obstruct the free passage of liquid through the inlets formed by these cavities.

In operation the downstroke of the plunger throws the ball-valve 5 into the position of Fig. I, allowing the oil or other liquid to pass up freely around the ball. In this position, as shown in Fig. I, the top of the ball abuts against the straight edge of the top wall 9 of the chamber 4. I avoid the provision of any cavity or indentation in the wall 9 in which might accumulate sticky or gummy substance tending to hold the ball-valve in its raised position. Upon the upstroke of the piston the oil or liquid is directed through the cavities 8 toward the center of the chamber 4 and onto the upper portion of the ball 5, forcing the ball downward and seating the same, holding

the liquid from passing down through the duct 10.

By this construction I avoid all pockets or crevices or ledges calculated to accumulate the 5 impurities of the oil or liquid and clog the ways 8.

It is my object to so construct my inlets 8 that they shall be entirely free and unobstructed and by giving them the concave and 10 inwardly-inclined form shown eliminate all possibility of clogging the ways by the accumulation of gummy substance and prevent all possibility of the ball-valve sticking in the top of the cage.

15 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a pump-piston, a valve and a valve-seat, a cage for said valve extending above 20 said seat and provided with a central valve-chamber, the top wall of said chamber being horizontal, the top of said cage provided with downwardly and inwardly extending concave channels, the said concave channels registering with the open ways provided at the sides 25 of the valve-cage and being open at the periphery of the cage and being entirely free

and unobstructed and opening into the chamber of the cage above the ball-valve.

2. In a pump-piston, a valve and a valve-seat, a cage for said valve extending above 30 said seat and provided with a central valve-chamber and with open ways at its periphery, the top of said cage provided with downwardly and inwardly extending concave channels registering with the open ways provided at the 35 sides of the valve-cage, said channels being open at the periphery of the cage and being entirely free and unobstructed and opening into the chamber of the cage above the ball-valve, the walls between the several channels 40 being inwardly tapered and meeting at an apex against which apex the ball-valve is adapted to strike in its upward throw.

In testimony whereof I have signed my name 45 to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 15th day of October, 1903.

RICHARD E. SMALL.

Witnesses:

FREDERICK S. LYON,
WALTER H. LYON.