To all whom it may concern:

Be it known that I, PETE RITTER, a citizen of the Republic of Germany, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Standing Valve for Oil-Well Pumps, of which the following is a specification.

My invention relates to oil well pumps, and more particularly to the standing valves employed therein.

The standard form of oil well pump consists essentially of a stationary barrel, a plunger working in the barrel, a working valve carried in the plunger and a standing valve adapted to close the bottom of the barrel. The standing valve ordinarily consists of a steel ball seated in a standing valve body which has a conical seat formed thereon, this seat resting upon a co-acting seat formed in a shoe secured to the lower end of the barrel.

In many cases oil well pumps are called upon to pump oil which may contain considerable sand, silt, and other abrasive matter. It is quite essential, therefore, that the standing valve seat be securely seated at all times to prevent the entrance of sand or silt between the surfaces of the seats thereof, and to prevent a cutting of the seat in the shoe and the co-acting seat on the standing valve body due to leakage therethrough. In many cases considerable gas is present in the well and this gas tends to lift the standing valve body. The standing valve body is also subjected to the vibration of the pump, all of these causes tending to either lift it or shake it loose from its seat. It is an object of my invention to provide a standing valve body which is positively held against its seat at all times with considerable pressure.

In the standard form of oil well pump, the pump barrel is suspended on sucker rods and suitable facilities are provided in the derrick for quickly pulling these sucker rods from the well, so that ready access can be had to the barrel. It is also common practice to either provide a garbutt rod by which the standing valve seat may be withdrawn with the plunger, or to provide detachable connections between the lower end of the barrel and the standing valve body, so that the standing valve body can be picked up and withdrawn from the well with the plunger. It is a further object of my invention to provide means for resiliently forcing the standing valve body against its seat and at the same time allow the standing valve body to be withdrawn with the plunger either through the agency of a garbutt rod or by a suitable pick-up device.

Since nearly all the oil pumped contains some sand or silt which tends to settle in the pump, it is a further object of my invention to provide a device of the above described character which will not be affected or rendered inoperative by the presence of sand or silt in the oil.

It is a further object of the invention to provide a device of the above described character which can be readily withdrawn from the well and which will not be affected by corrosion of the parts.

It is a further object of the invention to produce a standing valve structure which will be simple to construct, efficient in operation, and of very high efficiency.

Further objects and advantages will be made evident hereinafter.

Referring to the drawing which is for illustrative purposes only,

Fig. 1 is an elevation through the lower portion of the pump barrel showing the shoe and the standing valve body supported in place therein.

Fig. 2 is a section on a plane represented by the line 2—2 of Fig. 1.

Fig. 3 is a view showing the method of inserting and withdrawing the standing valve body from the shoe.

In the form of my invention disclosed, 11 is the lower end of the pump barrel which is supported from the tubing of the well, not shown. Sliding inside the pump barrel 11 is a standard plunger, not shown, which is supported in the usual way from sucker rods, not shown. Secured to the lower end of the barrel 11 is a shoe 12, this shoe having an opening therethrough concentric with the axis C—C of the pump. The upper portion of the opening 13 is provided with a short conical seat 14, upon which a standing valve body 15 is seated, this body having a conical seat 16 co-acting with the seat 14. The upper portion of the body 15 is threaded as shown at 17, for the reception of the lower portion of a cage 18. A hardened seat 19 is clamped between the cage 18 and the upper portion of the body 15, and a steel ball 20 is free to move vertically inside the cage 18 and to seat upon the upper portion of the seat 19. The body 15 is provided with an
annular groove 30 which completely encircles it below the seat 16, and situated in this groove is a split ring 31. This ring is preferably formed of spring steel and is so made that it tends to expand to the position shown in Fig. 1. A conical surface 35 is provided inside the opening 13 below the seat 14, this opening 35 being in such a position that the upper wall 36 thereof is engaged by the ring 31 with the valve seat in place.

The standing valve body can be readily inserted or withdrawn from the shoe by exerting suitable pressure thereon, the ring 31 readily contracting to pass through the narrow portion of the opening 13 below the seat 14. It is, however, necessary to exert considerable force upon the ring to withdraw it, and any movement of the standing valve body 15 in the seat due to vibration of the pump, or due to the escape of gas upwardly therethrough, simply tends to wedge or seat the standing valve body 15 more firmly in the opening 13. This seating of the standing valve body is very important, as it tends to exclude foreign matter from the seat 14 and to prevent any leakage therearound. It is very important that the standing valve seat be so constructed that sand deposited on the upper surface thereof will not cause it to stick and bind. By placing the split ring 31 below the seat 14, the ring 31 is protected from silt, and there is no tendency for it to become jammed.

I claim as my invention:

1. In a well pump, the combination of: a shoe having a central opening therein; a standing valve body in said shoe opening; and resilient means acting on inclined surfaces formed in said shoe opening to force said standing valve body against said seat.

2. In an oil well pump, the combination of: a shoe having a central opening therein; a standing valve body adapted to be seated on a seat in the upper portion of said opening; and resilient means below said seat acting on inclined surfaces formed in said central opening of said shoe to force said standing valve body against said seat.

3. In an oil well pump, the combination of: a shoe having a central opening therein; a standing valve body adapted to be seated on a seat in the upper portion of said opening; and resilient means carried by said standing valve body below said seat acting on inclined surfaces formed in said central opening of said shoe to force said standing valve body against said seat.

4. In an oil well pump, the combination of: a shoe having a central opening therein; a standing valve body adapted to be seated on a seat in the upper portion of said opening; and an elastic ring below said seat acting on inclined surfaces formed in said central opening of said shoe to force said standing valve body against said seat.

5. In an oil well pump, the combination of: a shoe having a central opening therein; a standing valve body adapted to be seated on a seat in the upper portion of said opening; and an elastic ring carried by said standing valve body below said seat acting on inclined surfaces formed in said central opening of said shoe to force said standing valve body against said seat.

6. In an oil well pump, the combination of: a shoe having a central opening therein; a standing valve body adapted to project into said opening and seated therein; and a resilient split ring substantially coaxial with said opening, said ring being carried in a groove in said standing valve body, and being sufficiently expandable to engage a conical shoulder formed on the inner surface of said opening, thus forcing said standing valve body downwardly in said shoe.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 15th day of April, 1924.

PETE RITTER.