Nov. 9, 1954 L. H. PIERCE 2,693,758

DISCHARGE APPARATUS FOR PUMPS

Filed Oct. 9, 1950

Fig. 1

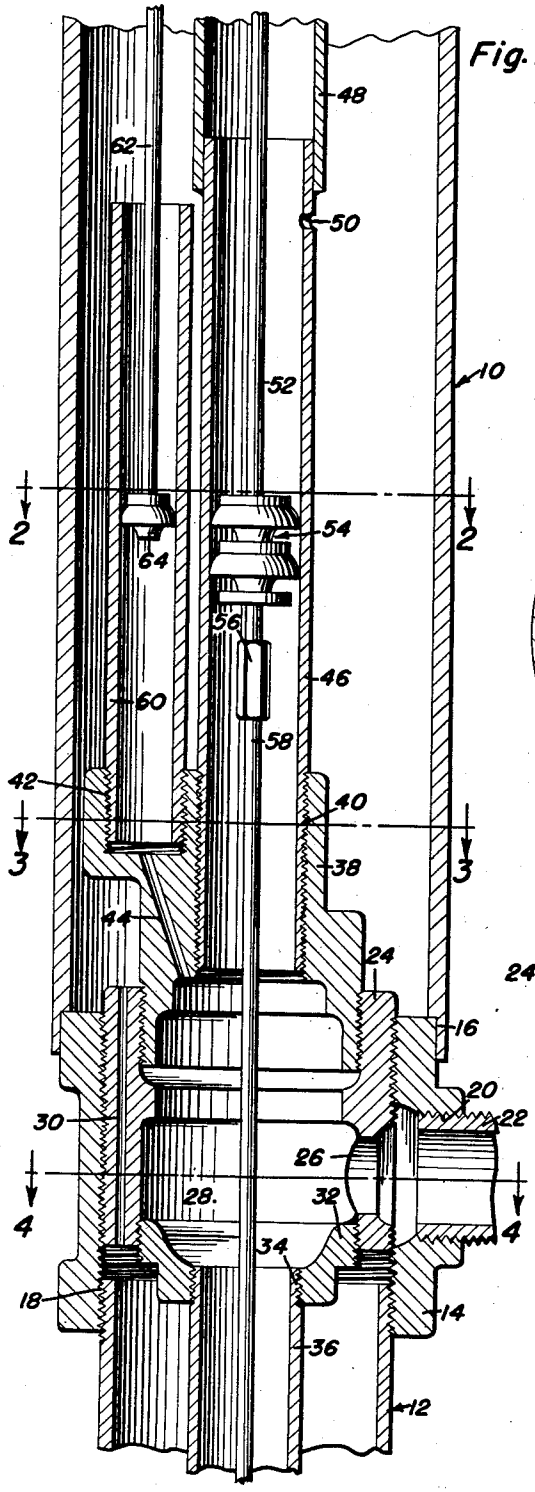



Fig. 2

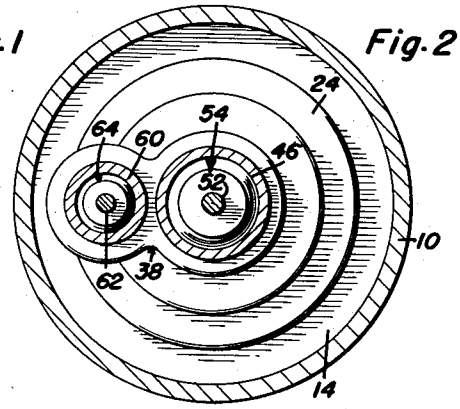



Fig. 3

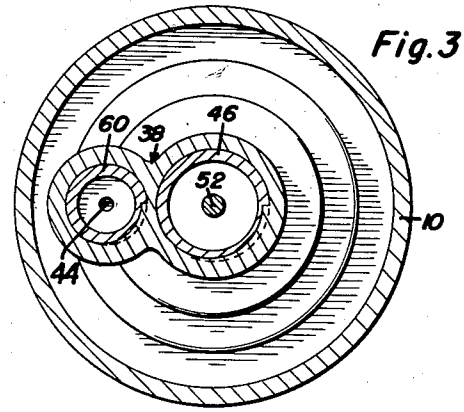
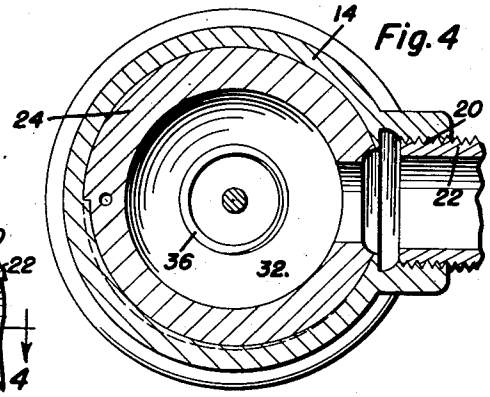



Fig. 4




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2,693,758

Patented Nov. 9, 1954



2,693,758

# DISCHARGE APPARATUS FOR PUMPS

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Application October 9, 1950, Serial No. 189,178

2 Claims. (Cl. 103—6)

The present invention relates to improvements in underground discharge apparatus for pumps, and more particularly to an improvement on my discharge apparatus for pumps, Patent No. 2,253,046 issued August 19, 1941.

An object of the present invention is to provide a pump apparatus which is easily installed in a working position and easily disconnected therefrom, whereby liquid may be discharged from the underground well into a pressure storage tank.

A further object of the present invention is to provide a structural arrangement wherein the liquid pump casing, the air pump tubular member and the coupling sleeve may be simultaneously removed from the well for repair or replacement of the parts.

Still another object of the present invention is to provide an air pump in combination with a liquid pump whereby air may be supplied along with the liquid to the pressure storage tank in order that the tank will not become water locked.

Another object of the present invention is to provide an underground discharge whereby the liquid from the well is supplied to a pressure storage tank which is located in a convenient place away from freezing where it is impractical to have a well pit at the well.

Various other objects and advantages will be apparent from the detailed description to follow.

The best form in which I have contemplated applying my invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view of the discharge apparatus of the present invention;

Figure 2 is a horizontal transverse sectional view taken substantially on the plane of line 2—2 of Figure 1;

Figure 3 is a horizontal transverse sectional view taken substantially along the plane of line 3—3 of Figure 1; and

Figure 4 is a horizontal transverse sectional view taken substantially along the plane of line 4—4 of Figure 1.

Referring more particularly to the drawings, wherein like numerals designate like parts throughout, numeral **10** designates generally the well casing in which the apparatus of the present invention is positioned. Numeral **12** is an extension of the well casing **10** which is connected to the well casing portion **10** by means of the outer coupling sleeve **14**, and the lower well casing **12** extends downwardly into the earth to the source of the liquid. The upper well casing **10** is secured to the outer coupling member **14** at **16** by any conventional means such as weld, and the lower well casing portion **12** is threadedly mounted within the threaded bore **18** of the coupling member **14**. The coupling member **14** is also provided with a transversely extending and internally threaded bore **20** in which is threadably mounted a discharge conduit **22** which is adapted to be in communication with a pressure storage tank, not shown.

Threadably mounted within the threaded bore **18** of the outer coupling member **14** is an inner coupling sleeve **24** provided with a transverse bore **26** allowing communication between the inner chamber **28** and the discharge conduit **22**.

The inner coupling sleeve **24** is provided with a vertical drain port **30** for a purpose to be hereinafter described.

The inner coupling sleeve **24** has threadably mounted therein a bushing element **32** which is provided with a central aperture having internal threads at **34** for threadably receiving the lower well tubing **36** rising from a conventional underground pump cylinder as in my Patent



No. 2,253,046, said cylinder forming part of a pump having oppositely acting check control valves as in Patent No. 1,214,902.

Threadably mounted within the upper open end of the inner tubular sleeve coupling member **24** is a common coupling sleeve **38** provided with a first and axially extending bore **40** having internal threads, and a second parallel and internally threaded bore **42** in an offset portion of the sleeve **38**. An air discharge duct **44** provides communication between the bore **42** and the chamber **28**, thus providing communication to the discharge conduit **22** and the pressure storage tank, said duct being of greatly restricted diameter as compared with that of the bore **42**.

Threadably mounted within the threaded bore **40** of the common coupling sleeve **38** is a liquid pump casing **46**. Fixedly secured to the upper end of the liquid pump casing **46** is a well tube **48**. The liquid pump casing **46** is also provided with a transversely extending aperture **50** adjacent its upper end whereby water may be drained from the pump casing down to the drain port **30**.

Reciprocably mounted within the liquid pump casing **46** is a sucker rod **52** having a pump piston **54** mounted thereon which is of the inverted cup type and adapted to exert pressure downwardly under the down stroke of the sucker rod **52**. The sucker rod **52** is provided at its lower end with a short sleeve coupling **56** whereby the lower sucker rod section **58** may be secured thereto, said section **58** extending upwardly out of the tubing **36** from said pump casing as in my before mentioned patent.

Reciprocably mounted within the air pump tubular member **60** which is threadably secured in the bore **42**, is an air pump rod **62** having a piston **64** mounted on its lower end of the downwardly acting flexible inverted cup type adapted to pass air from above said piston by the same during the upstroke of said piston so that air in said member **60** above said piston **64** may find its way below said piston during said upstroke.

From the foregoing, it is believed that the operation of the structure of the present invention will be readily apparent to one skilled in the art. The liquid is pumped on the upstroke of the sucker rod **58** from the well up the tubing **36** into the chamber **28** by means of the usual pump piston in said pump cylinder, not shown, and out of said chamber through the discharge conduit **22** during the down stroke of the sucker rod **58** by the pump piston **54** all as in my previously noted patent. Inasmuch as the air pump **64** is simultaneously operable with the liquid pump **54**, air will be pumped by the down stroke of the piston **64** through the discharge duct **44** and discharge conduit **22** whereby the pressure storage tank (not shown) will be supplied with both air and liquid under pressure. It will also be seen that back pressure against the piston **54** is relieved through the port **50** and drain port **30**, and any liquid leaking past the piston **54** into the upper casing section **10** will be drained out the drain port **30**. As will be seen, the duct **44** is greatly restricted in diameter as compared with the internal diameter of the member **60** so that water rising above the chamber **28** will find its way into the member **60** slowly and in small amounts, during the upstroke of the piston **64**, and will be prevented from filling the member **60** below the piston **64** by air in said member **60** below said piston **64** forming an air block. Hence, upon the downstroke of the piston **64**, it will be effective to force such water by air pressure out of the member **60** and duct **44** to pump a sufficient amount of air through the chamber **28** and conduit **22** for the purpose intended.

It is believed that from the foregoing a device has been provided which will accomplish all of the objects hereinabove set forth.

Having thus described my invention, what I claim to be new is:

1. In a well pump, an upper liquid pump casing, a lower well tubing, a sleeve coupling connecting said casing and tubing in spaced apart relation and forming a relatively larger diameter liquid receiving chamber therebetween for receiving liquid from said well tubing, said chamber having a side discharge port, a sucker rod reciprocable in said casing and tubing, a downwardly acting pump piston on said sucker rod operating in said casing for forcing liquid out of said chamber through said port, a vertical bore in said coupling at one side of said casing

and above said chamber, a tubular air pump casing rising out of said bore, a reciprocable air pumping piston in said air pump casing passing air thereby upon the upstroke thereof and acting to compress such air below the same during the down stroke of said air pumping piston, and a restricted duct leading from the bottom of said bore into said chamber for passing air compressed in said pump casing by said air pumping cylinder through said chamber and out of said port with the liquid forced out of said chamber by said first named piston.

2. In a well pump according to claim 1, said coupling including outer and inner sleeve sections with the inner sleeve section threaded into the outer sleeve section and said liquid pump casing and air pump casing being connected to said inner section for removal therewith by unscrewing the inner section out of the outer section.



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