

No. 676,014.

Patented June 11, 1901.

F. B. WARRING.
CENTRIFUGAL PUMP.

(Application filed Aug. 25, 1899.)

(No Model.)

Fig. I

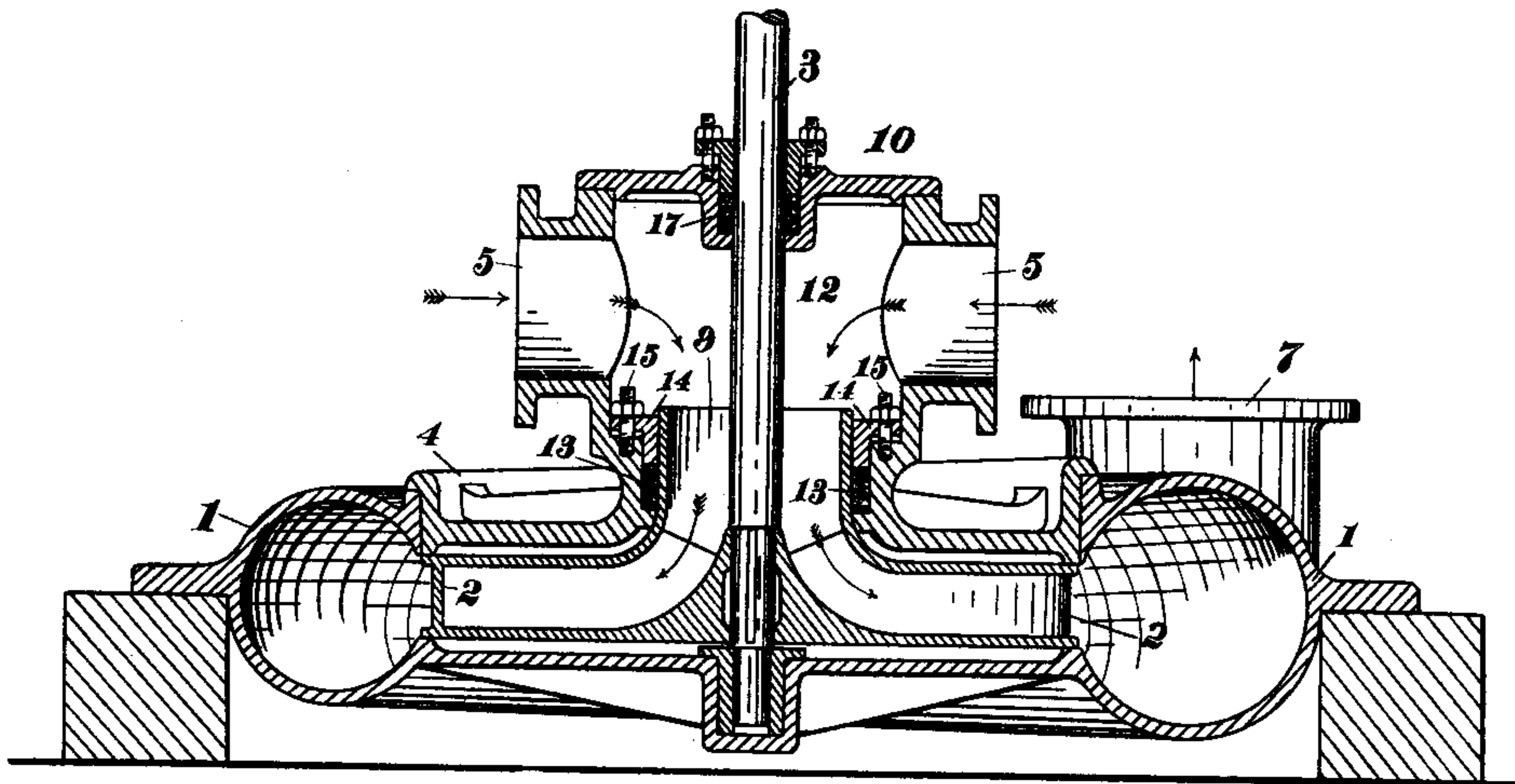
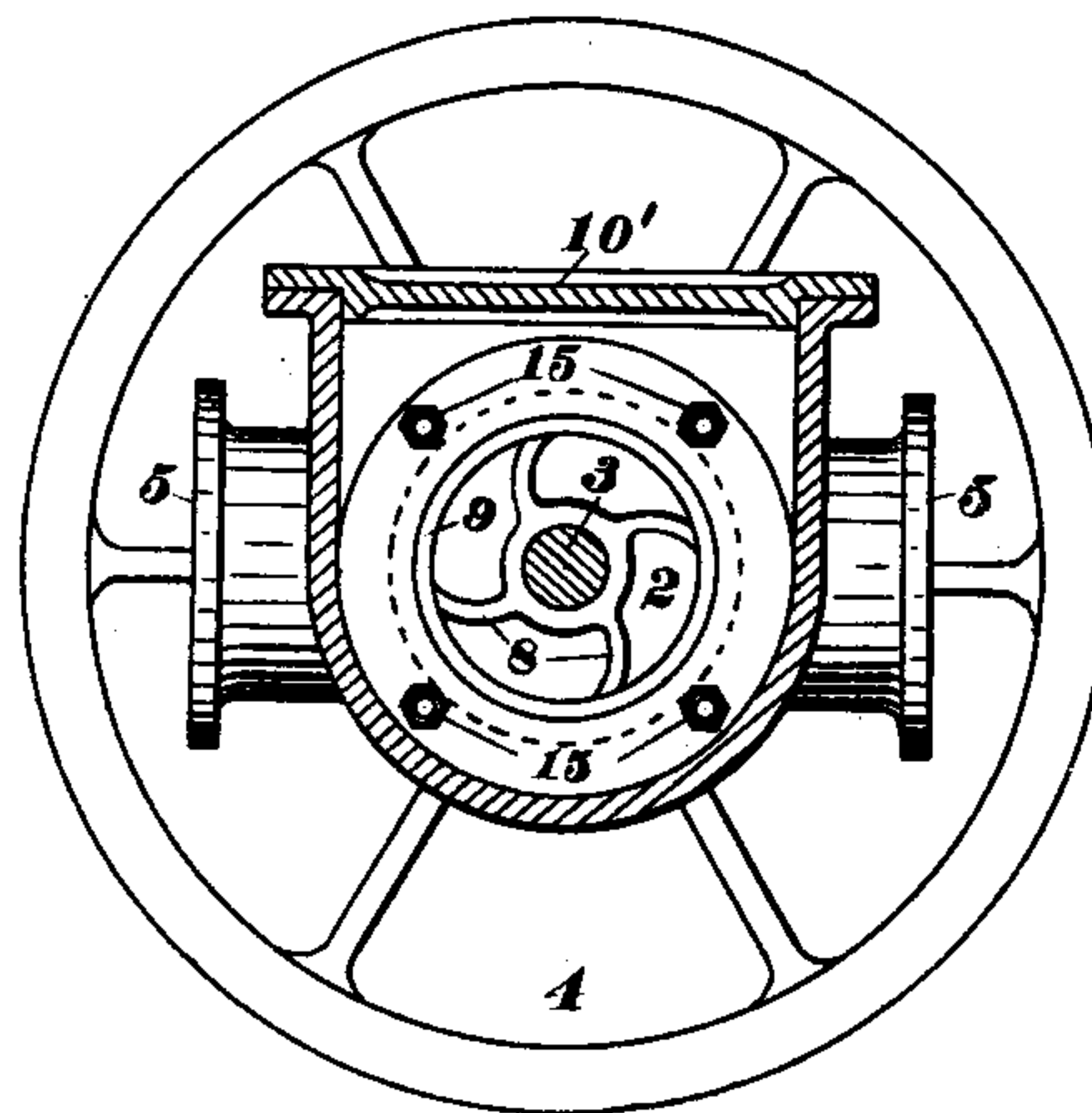


Fig. II



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CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 676,014, dated June 11, 1901.

Application filed August 25, 1899. Serial No. 728,472. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN B. WARRING, a citizen of the United States, residing at San Jose, county of Santa Clara, and State of California, have invented certain new and useful Improvements in Centrifugal Pumps; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to centrifugal pumps having incased impellers and to certain improvements therein.

My improvements consist in providing the inlet-nozzles of the impellers with packing and means to adjust the same accessible by removing a covering-plate at the side of the suction-chamber or around the driving shaft or spindle of the pump.

The objects of my invention are to prevent the circulation of water around and past the inlet-nozzles, and thus avoid the loss of power caused by such circulation, also to increase the efficiency or working capacity of such pumps. To these ends I construct centrifugal pumps as illustrated in the drawings herewith, forming a part of this specification.

Figure I is a vertical section through what is called a "pit" or "vertical" centrifugal pump with an inlet at one side of the impeller; and Fig. II, a plan view, partially in section, of the removable top plate and parts connected therewith.

Similar numerals of reference indicate like parts in both figures of the drawings.

To illustrate my invention in a case where its use is of most importance, I have chosen what is called a "vertical" or "pit" pump, such as is commonly operated against high heads and receives the supply-water on top.

In the present and in all centrifugal pumps having incased impellers and when the water-pressure is different within and at the sides of the impeller there is leakage and circulation of water around or past the inlet nozzle or nozzles. Such water while offering the same resistance and consuming the same amount of power as the discharged water remains in the pump, causing a loss in proportion to volume or the amount of leakage around the inlet-nozzles, and as these nozzles soon wear and permit a large portion of the

water to circulate my invention is one of much practical importance, especially in the case of high heads and pressures.

Referring to the drawings, 1 is the main casing, preferably of volute form.

2 is the impeller, 3 the driving spindle or shaft, and 4 a removable top or side plate, in this case formed integral with the inlet-nozzles 5.

7 is the discharge-nozzle, cast integral with the main casing 1.

The impeller 2 is of the ordinary incased type, provided with vanes 8 and an inlet-nozzle 9 for the entering water, as indicated by arrows in Fig. I.

10 is a removable plate, shown in Fig. I on the top and concentric with the spindle 3 and in Fig. II (10') at the side of the suction-chamber 12. Either of these arrangements permits free access to the impeller-nozzle 9.

Around the inlet-nozzle 9 I provide an annular chamber to receive elastic packing 13, which may be of any suitable material, preferably of a fibrous nature, and a movable gland 14, held and adjusted by the screws 15, as seen in Fig. I. The gland 14 and the screws 15 are accessible from the top or side, or both, by removing the plate 10, which is made large enough to admit the gland 14, thus giving access to the suction-chamber 12, so the packing can be adjusted to prevent the passage of water around the nozzle 9, but never so close as to cause appreciable resistance or friction on the nozzle 9.

The shaft or spindle 3 is provided with the usual packing at 17, and when the pumps are set in pits this shaft extends to the top and is there connected to the driving power in the usual manner.

It will be understood that while I have shown my improvement applied at one side only of the impeller 2 it is equally applicable on both sides when that form of construction is necessary.

Having thus described my invention, its nature, and objects, and illustrated an example of its application in practice, what I claim as new, and desire to secure by Letters Patent, is—

In a centrifugal pump, a main casing, an incased impeller therein, a shaft to drive said impeller, a packing-gland for said shaft, an

inlet-nozzle on said impeller surrounding said shaft, a packing-gland surrounding said nozzle, a suction-chamber having a fixed inlet, communicating with said nozzle, and a re-
5 movable plate opposite said nozzle, closing an opening in said suction-chamber, of the full size of the packing-gland surrounding

the nozzle, through which said gland may be adjusted, removed and replaced, substantially as specified.

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