F. NEUMANN.

CENTRIFUGAL PUMP.

APPLICATION FILED MAY 17, 1907.

931,636.

Patented Aug. 17, 1909.

Fig. 1.

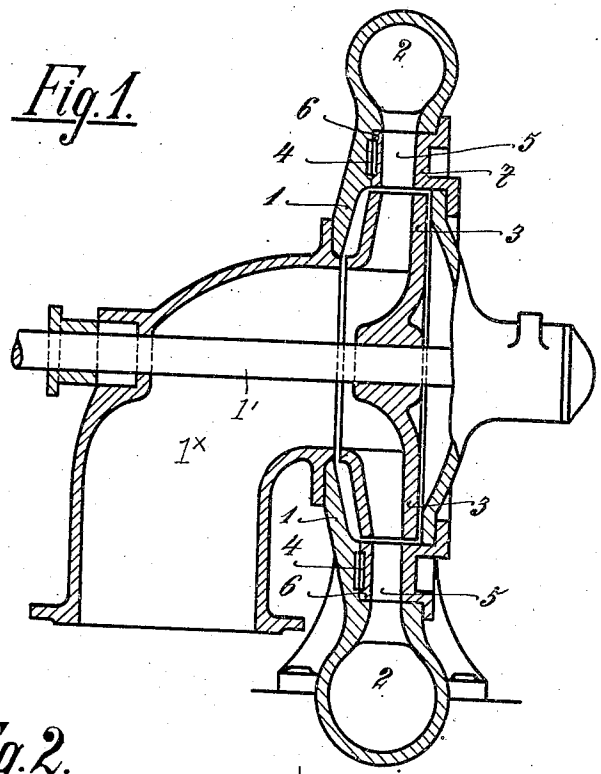
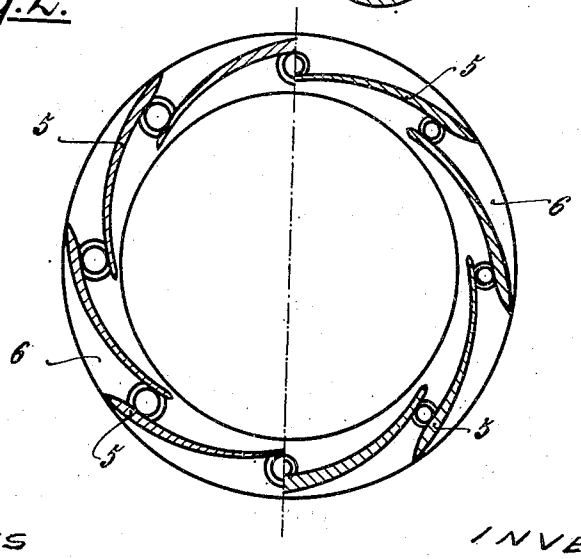


Fig. 2.



WITNESSES

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CENTRIFUGAL PUMP.

No. 931,636. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed May 17, 1907. Serial No. 374,272.

To all whom it may concern:

Be it known that I, FRITZ NEUMANN, subject of the German Emperor, residing at Nuremberg, Bavaria, Germany, have invented new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

A centrifugal pump, if the guide vanes are not displaceable, can only be regulated as regards the quantity of water pumped by a throttle valve. Such a regulation causes however considerable losses, so that the fall in the amount of power necessary for operating the centrifugal pump is hardly appreciable in spite of the reduced quantity of water delivered. If the centrifugal pump be only periodically regulated, that is to say if a different quantity of water from that for which the pump is normally regulated be required only for short intervals of time, this drawback is not so apparent, as if a reduced flow of water is required to be delivered by the pump for weeks and months together. This drawback, which produces an extremely low efficiency in centrifugal pumps when throttled, is in practice so deleteriously noticeable that centrifugal pumps are considered quite unsuitable for various operations.

Efforts have indeed already been made to construct centrifugal pumps so as to be capable of being regulated and to adjust the size of the guide apparatus and the normal admission of the guide vanes either by arranging pivotal guide vanes or displaceably mounting the rotor within guide apparatus lying side by side and varying in size. All these regulating devices however make the construction of centrifugal pumps very involved and expensive and may also easily give rise to interruptions of working.

Now this invention has for its object to construct centrifugal pumps so as to be partially regulatable and yet of very simple construction and applicable for purposes in which different quantities of water other than that for which the pump is normally designed are frequently required for long periods. This is attained by the pump being provided with a releasably mounted guide apparatus inserted in an annular passage adapted to be closed, which guide apparatus may be removed without taking a bearing apart and replaced for the purpose of regulating the quantity of water to be delivered by means of a guide apparatus provided with vanes or blades of the necessary width for delivering various quantities of water. A centrifugal pump of this kind is shown in the accompanying drawings:—

Figure 1 being a vertical longitudinal section; and Fig. 2 a front view of the halves of two guide apparatus with vanes or blades of different width with the vanes or blades in section.

The casing 1 of the pump is provided, between the pressure chamber 2 and the rotor 3, with a recess 4 arranged closely outside the latter and extending concentrically thereto, which recess extends in one vertical wall of the casing only to a portion of the thickness of the same, but passes entirely through the opposite wall. In this recess 4 the guide apparatus 5, 6, is inserted which consists of a ring 6 carrying blades or vanes 5 (Fig. 2). In order to retain the guide apparatus on the one hand in the pump casing 1, and on the other hand to be able to take it out without taking apart the bearings or other parts of the pump, the annular passage which passes through the wall of the casing, is closed by an annular cover 7 which bears against the free ends of the guide vanes or blades 5, and thereby shuts in or closes the guide apparatus on the side lying opposite to the ring 6.

1′ is the shaft of the rotor and 1ˣ the suction pipe which communicates with the central part of the rotor chamber on the side opposite to that on which the annular cover is secured and the shaft 1′ passes through this suction pipe; thus it will be seen that the cover may easily be removed as there are no parts on the cover side of the casing which will interfere with its removal.

Now for each centrifugal pump several guide apparatus are prepared in order to allow of the pump being regulated so as to deliver a given quantity of water for a long period of time, the dimensions of the rings of which guide apparatus are similar to one another, while the size of the admission orifices of the guide vanes in one guide apparatus differs from those of the other guide apparatus. According to the quantity of water to be delivered each time, after the annular cover 7 has been taken away and the guide apparatus contained in the pump removed, another guide apparatus is inserted, the width of the guide vanes of which corresponds to the quantity of water in question.

By the arrangement described the advan-

tage is obtained that the pump is adapted to work with the highest efficiency with either a smaller or a greater delivery than the normal quantity of water.

Instead of the guide vanes being provided with a separate ring, which is only held by the annular cover, of course the guide vanes may also be directly mounted on the annular cover, so that with the removal of the latter the guide apparatus is also removed.

I declare that what I claim is:—

1. A centrifugal pump comprising a casing having a rotor chamber therein and a pressure chamber, and an annular passage connecting the rotor chamber with the pressure chamber, said passage extending to the exterior of the casing, interchangeable guide blades adapted to be introduced into said passage, an annular removable cover for the passage, a rotor in the rotor chamber, a shaft therefor having one end mounted in the casing on the annular cover side thereof, and its other end extending through the other side of the casing, and a suction pipe communicating with the rotor chamber on the side opposite to that on which the annular cover is secured.

2. A centrifugal pump comprising a casing having a rotor chamber and a pressure chamber, and an annular passage connecting the two chambers together, a removable annular cover closing said passage, guide blades carried by said cover and extending into the passage, a rotor in the rotor chamber, a shaft therefor, and a suction pipe communicating with said rotor chamber, said suction pipe and shaft being located on the side of the casing opposite to that on which the annular passage is arranged.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRITZ NEUMANN.

Witnesses:

WILHELM ZACHER,

JUSTUS HAVEMANN.