J. H. SEBALD.

BALANCED CENTRIFUGAL PUMP.

APPLICATION FILED JULY 8, 1914.

1,197,155.

Patented Sept. 5, 1916.

Fig. 2.

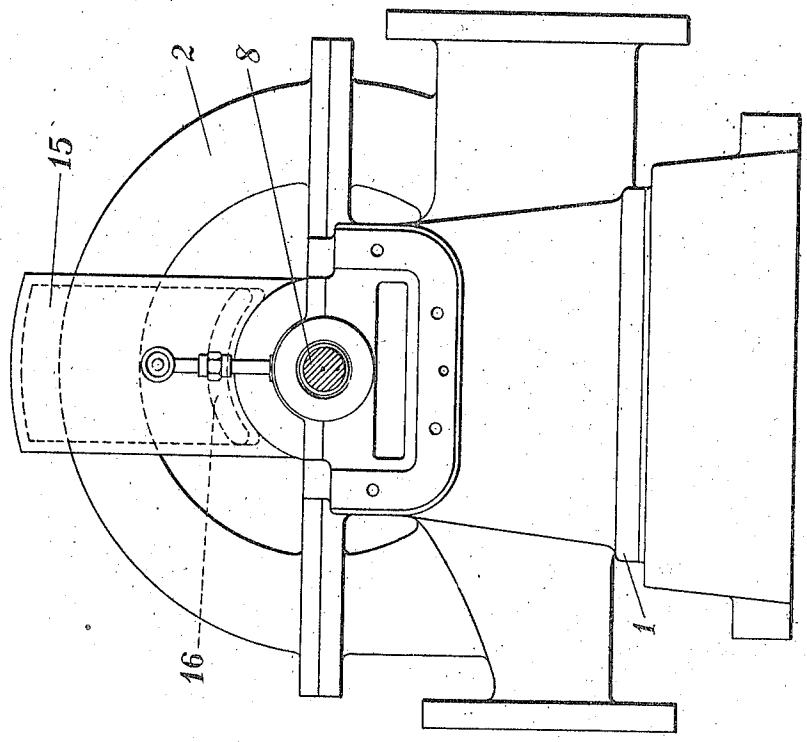
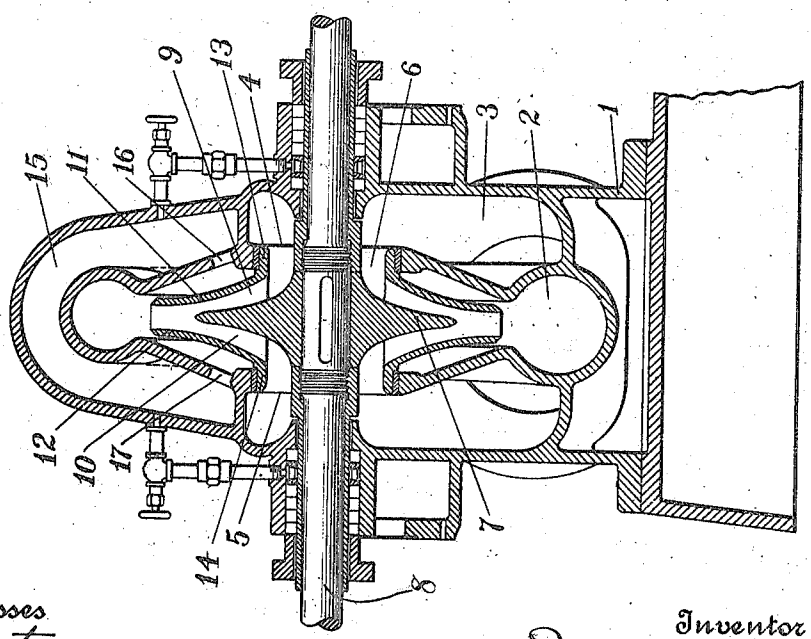


Fig. 1.



Witnesses
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UNITED STATES PATENT OFFICE.

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BALANCED CENTRIFUGAL PUMP.

1,197,155. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed July 8, 1914. Serial No. 849,629.

To all whom it may concern:

Be it known that I, JOSEPH H. SEBALD, a subject of the Emperor of Austria-Hungary, having taken out my first naturalization papers in the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a certain new and useful Improvement in Balanced Centrifugal Pumps, of which the following is a specification.

This invention relates to centrifugal pumps, and more particularly to means for balancing the end thrust in single stage pumps of the double suction type. In pumps of this type which have two opposite inlet openings discharging into a common outlet chamber the end thrust is balanced theoretically, but not practically, due to the impossibility of getting all the parts entirely symmetrical. There is usually a considerable end thrust in one direction or the other which has to be taken up by a thrust bearing, causing friction losses.

The object of this invention is to obviate this end thrust, and with this object in view a balancing arrangement has been devised, a practical embodiment of which is represented in the accompanying drawings, in which,

Figure 1 shows a longitudinal vertical section through the pump on the shaft line, and Fig. 2 an end elevation of the pump cylinder.

As shown in the drawings, the pump shown comprises a casing 1 in which is a volute discharge chamber 2 and an inlet chamber 3, the discharge chamber 2 having opposite circular apertures 4 and 5 opening into the discharge chamber 2. Rotating in the discharge chamber 2 is the impeller 6, which consists of a central disk 7 secured to the shaft 8, two sets of blades 9 and 10 on either side of the disk 7, these blades coming together at the outer edge of the disk, and coverings 11 and 12 which are secured to the outer edges of the blades and having cylindrical sleeve portions 13 and 14 which contact with the inner edges of the cylindrical openings 4 and 5. Surrounding the upper side of the discharge chamber 2 and formed integral with the casing is a by pass conduit 15 which has apertures 16 and 17 opening into the sides of the discharge chamber 2 adjacent to the outer faces of the covers 11 and 12 of the impeller. This by pass conduit and its openings 16 and 17 are of considerable size and allow a free flow of fluid from one side of the casing to the other.

In the operation of a pump of this type, the unsymmetrical construction of the impeller, which is unavoidable in commercial manufacture, almost invariably causes a considerably greater flow of fluid to one side of the impeller than to the other. The result is that the pressure of fluid on one cover of the impeller is considerably greater than on the other, forcing the impeller to one side or the other. It is impossible for this pressure to be equalized inside the discharge chamber as there is a solid wall of water coming out from the impeller and striking the inner face of the discharge chamber 2. This water wall prevents the passage of any fluid from one side of the impeller to the other. The by pass conduit 15 allows the fluid from one side of the impeller to flow freely to the other side, thus equalizing the considerable difference in pressure on the outer faces of the impeller covers and to a large extent eliminating the end thrust on the shaft. As it is often necessary for a large amount of water to pass through this conduit 15 it must be of considerable size.

It is to be understood that while the present showing and description discloses only one specified modification of the invention, other forms and modifications are included in the spirit and scope of the invention, as expressed in the claims.

What I claim is:

1. In a centrifugal pump, an impeller casing, a double suction impeller in said casing, said impeller having covers, and a free by pass connection for the pumped fluid from one side of said casing to the other to balance pressures on the covers of said impeller.

2. In a centrifugal pump, an impeller casing having a peripheral outlet chamber and opposite lateral inlet openings, an impeller having a central disk, and covers fitting said lateral inlet openings and projecting outwardly therefrom, and a free connection for the pumped fluid between the sides of said casing to balance the lateral pressures on said covers.

3. In a centrifugal pump, a double suc-

tion impeller having outer covers, and a casing surrounding said impeller, said casing having a peripheral outlet chamber for said impeller, lateral openings for the suction openings of said impeller, and an integrally formed by pass channel for the pumped fluid leading from one side of the casing to the other around said outlet chamber, said channel serving to convey fluid to balance pressures on the impeller covers.

In testimony whereof, I have hereunto set my hand.

JOSEPH H. SEBALD.

Witnesses:
ELLIS NATHAN,
OTTO K. JOHANNSEN.