

J. WAREING AND A. HILL.
 IMPELLER FOR CENTRIFUGAL PUMPS.
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1,383,354.

Patented July 5, 1921.

Fig. 1.

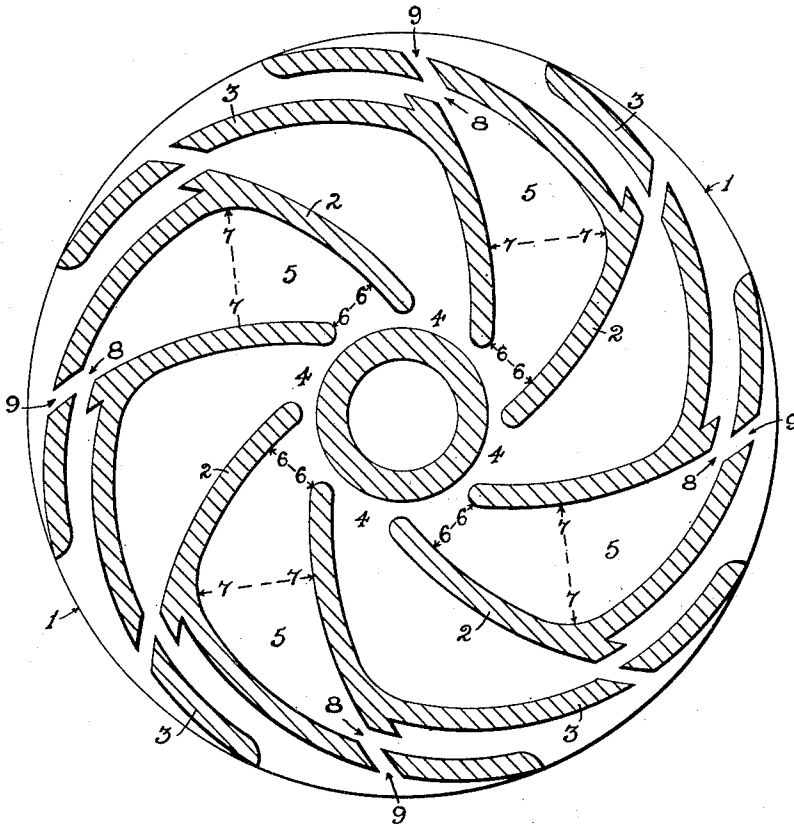
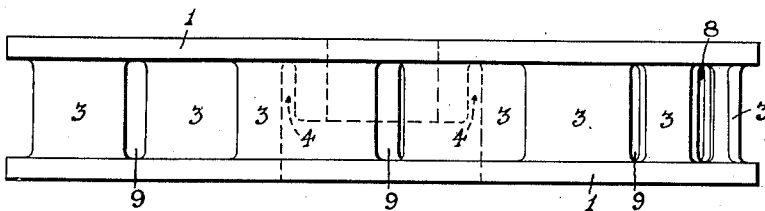


Fig. 2.



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UNITED STATES PATENT OFFICE.

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IMPELLER FOR CENTRIFUGAL PUMPS.

1,383,354.

Specification of Letters Patent.

Patented July 5, 1921.

Application filed February 17, 1921. Serial No. 445,792.

To all whom it may concern:

Be it known that we, JAMES WAREING and ADAM HILL, subjects of the King of Great Britain and Ireland, and residents of Rochdale, in the county of Lancaster, England, have invented certain Improvements in and Relating to Impellers for Centrifugal Pumps, for which I have filed an application for patent in England, August 1, 1919, No. 19,039, of which the following is a specification.

These improvements relate to impellers for centrifugal pumps, which impellers are usually in the form of arc shaped vanes and are cast on or otherwise secured upon one of the disks forming a side of the pump drum. The objects of the invention are to so form the vanes, as to their shape and juxtaposition within the pump drum, as to secure the maximum amount of efficiency from the pump.

In carrying the improvements into effect we provide a pump drum with arc shape vanes of the usual type, which act as guides and impellers for the liquid to be pumped, and which liquid enters the drum by a central inlet, as usual. Upon or near the outer extremity of each vane, that is, where it approaches the periphery of the pump drum, we cast or otherwise secure supplementary vanes, of arc shape, the chord of such arc being approximately at right angles to the cord of the arc of the principal vane. From this construction it follows that at the periphery of the pump drum the extremity of a supplementary vane approaches closely the extremity of the principal vane next in position, and chambers are formed within the drum which chambers gradually increase in area from the liquid inlet to a point between the junction of a supplementary vane with its principal vane and the highest point of the arc shaped principal vane next in position. From this point toward the outlet of the chamber the latter narrows until, at the outlet, it is much contracted, the outlet being bounded by the drum disks, as to two sides, and by the extremity of a supplementary vane and the next principal vane in position, as to the other sides.

We will now describe our improvements with reference to the accompanying drawings, wherein:—

Figure 1 shows the pump drum, with our improvements in vertical longitudinal section.

Fig. 2 is a side view of the same.

In the above drawing only the sides or disks of the pump drum are shown, with the improved arrangement of impellers. It is to be understood that the outer casing of the pump, the inlet for liquid, and driving means and other arrangements may be any usual construction.

Referring to the drawings Figs. 1 and 2, 1, 1, are the disks of the impeller drum, on which are cast the vanes 2, which are referred to herein, for the purpose of the description, as the principal vanes. 3 indicates supplementary vanes, cast on or attached in any convenient manner to the principal vanes, these supplementary vanes being approximately at the angle shown in Fig. 1. It will be noted that the position of these supplementary vanes is such that they form a shield against the static or head pressure during the pumping operation. 4, indicates the inlet point for liquid to the pump, the liquid entering chambers 5 formed by the two sides 1, 1, of the drum; by a principal vane and its supplementary vane; and by an adjacent principal vane.

The principal vanes are arranged as shown in the drawings the chord of the arc formed by each vane being tangential to the circular liquid inlet.

The cross sectional area of each chamber 5 increases from the point 6—6 to the point 7—7, where it is greatest, and from 7—7 it diminishes to the outlet 8. Liquid entering at 7—7 to any of the chambers has its kinetic flow transformed into pressure on its passage from point 7—7 to the outlet 8, where the liquid emerges under the head pressure.

The arrangement of the supplementary vanes with reference to the principal vanes is preferably that shown in the drawing Fig. 1, but the supplementary vanes may form continuations of the principal vanes and approximately at the angle shown.

Each chamber 5 is provided with two outlets, the extra outlet being provided by dividing each supplementary vane at the point 9. The liquid under pressure in the chamber 5 is therefore split into two streams, one emerging under the head pressure through outlet 8, and the other through outlet 9.

The principal and supplementary vanes may be of any convenient metal, and may be cast on with one or both of the disks of the pump drum, or otherwise secured within the drum.

We do not confine ourselves to the exact angle shown between the principal and supplementary vanes. It may be varied with consequent increase or decrease of the sectional area of outlet 8, but the cross sectional area of the latter, or the total cross sectional area of same and outlet 9, will always be less than the cross sectional area of inlet to a chamber at point 6—6.

10 What we claim as our invention and desire to secure by Letters Patent is:—

An impeller for a centrifugal pump, comprising two disks having principal vanes and supplementary vanes arranged between

them and at an angle to each other, the outer end portion of each supplementary vane being arranged to overlap the inner end portion of the supplementary vane next behind it, thereby forming a delivery passage, each supplementary vane being provided with an additional delivery passage at the angle formed between its middle part and the principal vane next behind it.

In testimony whereof we have hereunto set our hands.

JAMES WAREING.
ADAM HILL.