

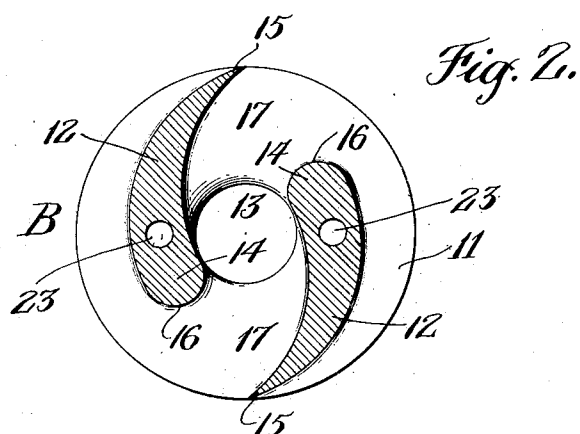
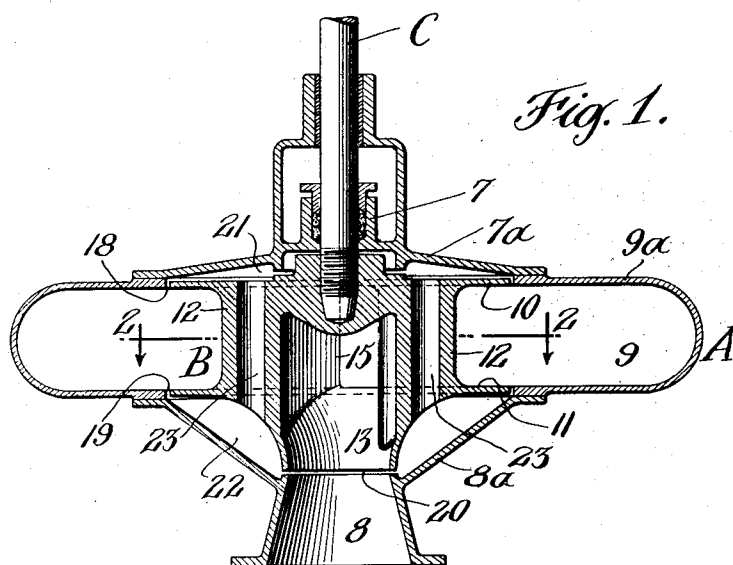
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CENTRIFUGAL PUMP

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CENTRIFUGAL PUMP.

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This invention relates to the balancing of pump impellers and is particularly useful in connection with centrifugal pumps.

One of the primary objects of my invention is to balance the pump in an improved, simple and effective manner.

Other objects and advantages will appear hereinafter in the specification of the preferred form of my invention illustrated in the accompanying drawings, wherein:

Fig. 1 is a cross section of the pump and Fig. 2 is a plan section of the pump impeller taken on the line 2—2 of Fig. 1.

Referring now to the drawings it will be seen that the pump comprises in general a pump casing A, an impeller B and an impeller shaft C, having its bearing at 7 in the pump casing A.

A central inlet opening 8 is provided in the casing which constitutes the suction inlet of the pump, thru which fluid is drawn by the impeller and delivered to the circumferential discharge or volute 9 of the casing.

For convenience in manufacture and assembling the pump casing A is made of several parts in this instance an inlet member 8^a, an outlet member 9^a, and a bearing member 7^a.

The impeller B is an enclosed impeller that is to say it consists of two walls or discs 10 and 11 spaced apart and connected by a plurality of impeller blades or vanes 12, 12 in this instance two being shown.

The fluid enters the impeller at 13 and is impelled by the blades 12, 12 into the circumferential discharge 9. The blades or vanes 12, 12 extend from a point 14 adjacent the fluid entrance 13 to a point 15 on the circumference of the impeller, said blades diminishing from a considerable thickness at 14 to but little at the periphery at 15 and being suitably curved to effectively impel the fluid and foreign substance through the pump with increasing velocity as it enters the chamber or outlet 9. It will be seen that the inner edges 16 of the blades 12, 12 are rounded as are the points of connection to the walls or discs 10 and 11 thus preventing to a great extent the lodging of foreign substances at these points.

It is further pointed out that the passages 17, 17 thru which the fluid is impelled increase in width toward the circumference of the impeller, the minimum width approximating the size of the fluid entrance 13. This further prevents lodgment of foreign

substances in the pump and the pump will pass anything that will enter the inlet, making it very useful for draining swamps and the like.

Owing to the clearances between the pump impeller B and the casing A at the points 18, 19 and 20, fluid leaks past these points into the clearance spaces 21 and 22 which without provision to the contrary would cause unbalanced strains on the impeller in an axial direction because of different pressure conditions in the spaces 21 and 22. In order to prevent such unbalancing I have provided the passages 23, 23 extending thru the discs 10 and 11 and blades 12, 12 whereby the fluid on either side of the impeller is in communication thus equalizing the pressure and consequently balancing the impeller.

It will be seen that by this arrangement the pressure on the discs 10 and 11 is equalized without wasting fluid or requiring its repumpage, thus improving the efficiency of the pump. The life of the pump is also materially increased because the amount of fluid and foreign substance entering the space 21 through the clearance point 18 is very much reduced whereby the consequent wear at the point 18 on the disc 10 and the part 7^a is much reduced.

It is to be observed that by employing impeller blades constructed in accordance with my invention I am enabled to conveniently locate the balancing passages 23, 23 in the thick portion of the blades, thus avoiding the necessity of providing bridges from disc to disc for said passages which would defeat the general purpose of this pump which is to combine efficiency with ability to pass anything which will enter the inlet.

In some instances it may well be that a single balancing passage 23 would suffice.

I claim:—

1. In a pump, the combination of a casing having a central inlet and circumferential outlet, an impeller within the casing comprising spaced discs and a plurality of impeller blades connecting said discs, a pump shaft on the end of which the impeller is carried whereby the inlet is unobstructed, there being a space between each end face of the impeller and the casing, clearance spaces between the impeller and the casing communicating with said end spaces whereby impelled fluid enters said end spaces, and a port extending through

a blade and connecting said end spaces, said port being located at the inner end of the blade and close to the inlet.

2. In a pump, the combination of a casing 5 having a central inlet and circumferential outlet, an impeller within the casing comprising spaced discs and a plurality of impeller blades connecting said discs, a pump 10 shaft on the end of which the impeller is carried whereby the inlet is unobstructed, the passages formed by the blades being of such size as will pass anything which will 15 enter the inlet, there being a space between each end face of the impeller and the casing, and clearance spaces between the impeller and the casing communicating with said end spaces whereby impelled fluids enters the 20 port being in close proximity to the entrance edge of the blade.

3. In a pump, the combination of a casing having a central inlet and circumferential outlet, an impeller within the casing 25 comprising spaced discs and a plurality of blades connecting said discs, the blades provided with forward ends which are thick and rounded and with rear ends occupying but little of the periphery of the impeller, 30 a shaft on the end of which the impeller is carried whereby the inlet is unobstructed, a space between each end face of the impeller and the casing, clearance spaces between the impeller and the casing communicating with the end spaces whereby impelled fluid enters 35 the latter, and a port extending through the thick end of each blade in substantial parallelism with the axis of the shaft and connecting the end spaces.

In testimony whereof, I have hereunto 40 signed my name.

ALBERT B. WOOD.