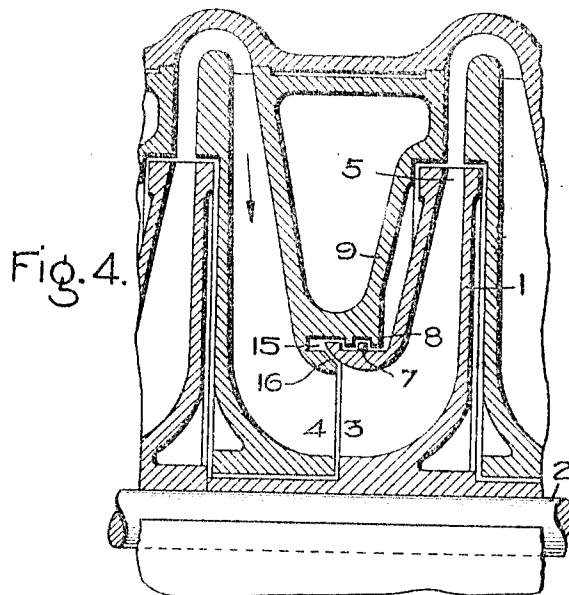
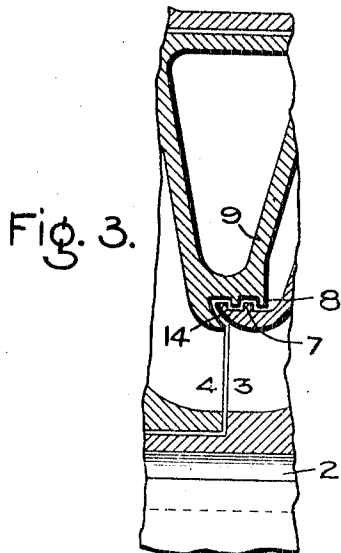
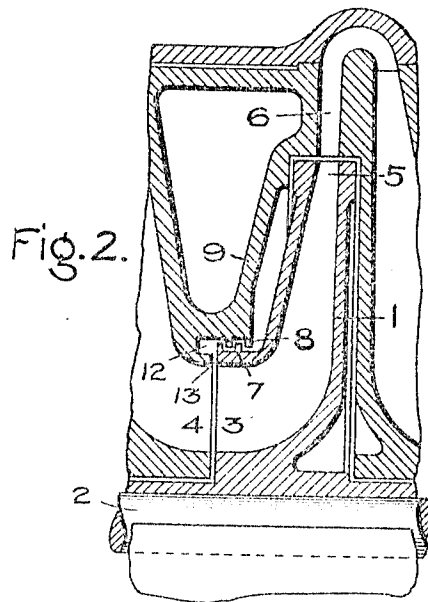
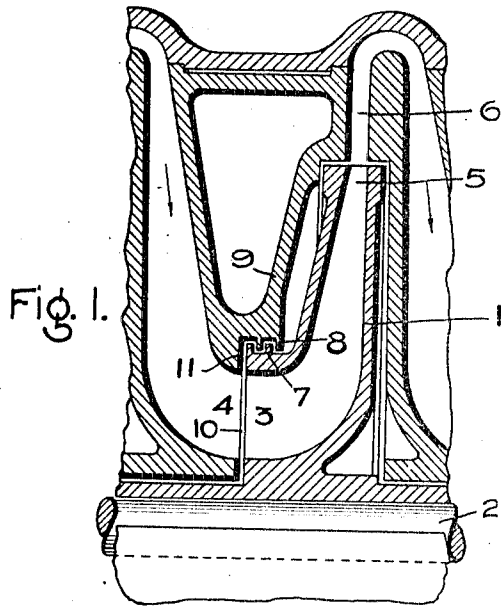


W. KIESER.
CENTRIFUGAL PUMP.
APPLICATION FILED JAN. 7, 1911.

1,090,073.

Patented Mar. 10, 1914.



Witnesses:

Marcus L. Bing
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Inventor,
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Att'y.

UNITED STATES PATENT OFFICE.

WALTER KIESER, OF BERLIN, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

CENTRIFUGAL PUMP.

1,090,073.

Specification of Letters Patent.

Patented Mar. 10, 1914.

Application filed January 7, 1911. Serial No. 601,421.

To all whom it may concern:

Be it known that I, WALTER KIESER, a citizen of Switzerland, residing at Berlin, Germany, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

This invention relates to centrifugal pumps in which the water or other fluid is conducted through a plurality of rapidly rotating throwing wheels or runners, from whose periphery the fluid is thrown into a circumferential stationary receiving channel. The joint between the edge of the runner and the entrance to the receiving channel is made as fluid-tight as possible, but in any event some of said fluid will fail to enter the channel and will pass back to the supply conduit or passage. This effect is checked as much as possible by interposing a labyrinth packing between the receiving end of the runner and the surrounding casing, but in spite of this more or less fluid leaks through.

The object of the present invention is to prevent this leakage fluid from producing any serious retarding effect upon the stream of fluid entering the runner. Heretofore this leakage fluid has entered the supply passage in a direction more or less at right angles to the flow of the fluid entering the runner, which tends to impede said flow, and also constitutes a load which must be overcome by the pump.

In order to avoid this difficulty, the present invention consists in a modification of the joint at the entering end of the runner, whereby the leakage fluid will run into an enlarged baffling chamber before entering the supply passage, said chamber being so formed that the leakage fluid when it escapes into said passage will no longer oppose any resistance to the flow of the main stream of fluid.

In the accompanying drawing, Figure 1 is a longitudinal section of a portion of the casing and runner of a centrifugal pump embodying one form of my invention; and Figs. 2, 3, and 4 show modifications of the same. Fig. 4 illustrating portions of two runners in a multistage pump.

The runner 1 is mounted on the shaft 2 and has an entrance opening 3 which registers with the end of the supply passage 4. The runner delivers the fluid at its periphery 5 to the circumferential receiving chan-

nel 6 from which the fluid passes to the next runner in a multistage pump, or to the final delivery pipe. The pressure at the outer edge of the runner and in the receiving channel 6 tends to force some of the fluid back, through the chamber in which the runner rotates, to supply or suction passage 4. This tendency is resisted to some extent by the labyrinth packing at the entrance to the runner, consisting preferably of ribs 7 on the runner alternating with ribs 8 on the adjoining portion of the casing 9. By my invention I provide a chamber to receive the fluid escaping through this packing, said chamber serving to baffle the flow of such leakage fluid. In Fig. 1 this baffling chamber is shown as a broad annular space 10 between the end of the runner and a broad flat wall 11 opposite thereto forming part of the casing. When the leakage fluid strikes this wall, it loses the greater part of its velocity by reason of the impact, by the change of direction ensuing therefrom, and by the width of the chamber. It still enters the supply passage at right angles thereto, but with such reduced velocity as to render it comparatively harmless. In Fig. 2, the fluid passes out of the packing into an annular groove 12 in the casing in which its direction is completely reversed, and from which it can escape only by a still further change of direction in order to flow through the gap 13 into the supply passage. In consequence of this, through the repeated and great changes of direction, taken in connection with the striking of the fluid on the different walls, and the comparatively large spaces available, the velocity of the fluid is completely broken.

In Fig. 3 the fluid escaping through the packing enters a broad annular chamber 14, whose walls extend forward in the direction of the main stream of fluid flowing through the pump, so that when the leakage fluid enters the supply passage it is moving in practically the same direction as that of the main stream, and thus offers no obstruction thereto. So in Fig. 4, the leakage fluid after being completely baffled by the annular chamber 15 leaves it by a forwardly curved annular passage 16.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider

to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a centrifugal apparatus, the combination of a casing, a runner having an inlet of relatively small diameter and an outlet of considerably larger diameter, a member carried by the casing that extends inwardly, surrounds said inlet and forms the walls of the supply passage, a labyrinth packing carried by said runner and member, the parts of which are out of contact, and an annular baffling chamber formed between a side face of the member and the face of the inlet end of the runner which is in communication with the passage through the packing, receives fluid therefrom and acts to change its direction of flow before discharging it into the inlet of the impeller.

2. In a centrifugal apparatus, the combination of a casing, a runner having an inlet of relatively small diameter and an outlet of considerably larger diameter, a member carried by the casing that extends inwardly, surrounds said inlet and forms the walls of the supply passage, a labyrinth packing carried by said runner and member, the parts of which are out of contact, an annular baffling chamber formed between a side face of the member and the face of the inlet end of the runner which is in communication with

the passage through the packing and receives fluid therefrom, and an annular passage which communicates with the chamber and inlet of the impeller, said passage being inclined inwardly and in the general direction of flow of the moving column of fluid to discharge leakage forwardly into it without substantial shock.

3. In a centrifugal apparatus, the combination of a casing, a runner having an axially extending portion of relatively small diameter and a radially extending portion of larger diameter, a member carried by the casing and extending inwardly, said member surrounding said axially extending portion, a labyrinth packing carried by said axially extending portion and the adjacent portion of said member, an annular baffling chamber formed in said member for receiving the fluid leaking through the packing, and an annular passage which extends forward from said chamber and communicates with the fluid inlet of the runner whereby the fluid leaking through the packing into said chamber has its direction changed and is discharged into the runner in the same general direction as that in which the main mass of the fluid is moving.

In witness whereof, I have hereunto set my hand this 22nd day of December, 1910.

WALTER KIESER.

Witnesses:

FRANZ SCHOCENOR,
HERMANN HILLE.