

June 2, 1936.

W. B. HARSEL

2,042,784

PUMP

Filed Sept. 24, 1934

Fig. 1

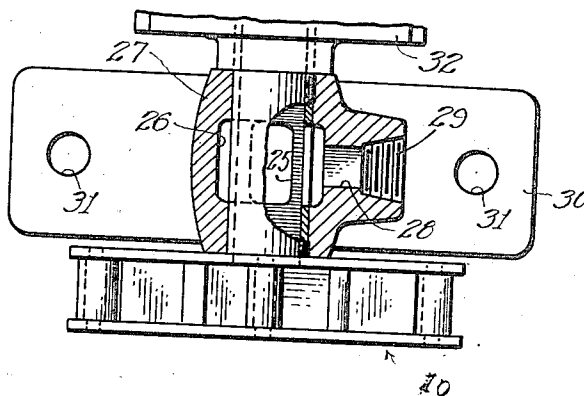


Fig. 2

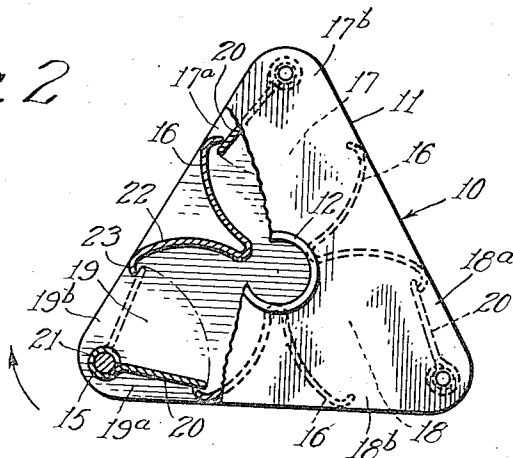
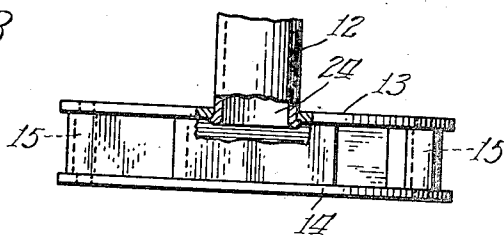


Fig. 3



INVENTOR
BY WILLIAM B. HARSEL
R. Trevor Jones
ATTORNEY

UNITED STATES PATENT OFFICE

2,042,784

PUMP

William B. Harsel, Indianapolis, Ind.

Application September 24, 1934, Serial No. 745,188

8 Claims. (Cl. 103—95)

This invention relates to pumps more particularly of the type in which centripetal action is availed of.

Among other objects, the invention aims to provide an improved pump of this type in which a casing is revolved in a fluid and having passages therethrough into which the fluid is directed by the rotative movement of the casing, the passages communicating with a common outlet duct through which the fluid is caused to flow by the centripetal action referred to.

An important object of the invention is to provide such a casing which is rotatable in either direction, and a further object is to improve the design of the casing to enhance the efficiency of the pump while at the same time maintaining it simple and economical in structure and operation.

With these and other objects in view, the invention comprises certain novel constructions, combinations, and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, showing an illustrative embodiment of the invention and forming a part of the specification—

Figure 1 is an elevational view of the illustrative construction with bearing means therefor shown partly in section;

Figure 2 is a plan view of the casing of Figure 1 partly in section; and

Figure 3 is an elevational view of the casing, similar to Figure 1, but omitting the bearing means and showing the casing partly in section.

Referring in detail to the illustrative construction depicted in the drawing, I have shown a casing 10 adapted to be rotated in a liquid or other fluid, this casing 10 comprising a generally flat impeller portion 11, which is usually arranged to be rotated in a horizontal plane by means of the upright central stem portion 12 which may advantageously provide a journal for the impeller portion 11.

In accordance with my invention, the impeller portion is of polygonal form in the sense that its perimeter presents a plurality of substantially straight sides and angles in the plane of rotation, for one purpose of offering greater resistance to rotation and thereby causing the fluid to be entrained therein under increased pressure. Both the impeller portion 11 of the casing and the stem portion 12, in this instance, are hollow, the impeller portion 11 being desirably formed of two metallic plates 13, 14 of triangular configuration, these plates being maintained in fixed spaced-apart relation by spacing rivets 15 to which the

plates are secured, these spacing rivets being advantageously located substantially at the apexes of the angles. Suitably secured between the plates 13, 14 also are a plurality of partitions 16 which jointly divide the interior of the hollow impeller portion 11 of the casing 10 into a plurality, in this instance three, transverse passages 17, 18 and 19. The passages 17, 18 and 19 may be caused to merge, as shown, at a common point such as at the rotative center of the impeller portion 11 of the casing, where they all communicate with the hollow interior of the journal or tubular stem 12.

Further in accordance with my invention, each of the passages 17, 18 and 19 has two openings through the perimeter of the casing, and either of these openings is arranged to be closed and the other opened by means automatically responsive to the pressure of the fluid, so that upon rotation of the casing in either direction, the opening facing in the direction of rotation will be automatically opened and the other opening closed, to direct the fluid into the passages.

In the present exemplification, I have shown such means in the form of a swinging deflector 20 pivoted to each of the rivets 15, and thus at the apex of each of the angles in the casing perimeter. The deflector may be a metallic blade of a vertical height to have snug but free movement between the plates 13, 14 and of sufficient length to slightly lap one of the partition walls 16 in either of the extreme swinging positions of the deflector, the deflector being readily hinged to the cylindrical rivet 15 by having a portion 21 bent thereabout in cylindrical form to provide a hinge knuckle.

In this instance, the partition walls 16 are advantageously somewhat V-shaped, being in the form of plates having a vertical height equal to the distance between the plates 13, 14 and being bent upon themselves so that their apexes are directed towards each other but spaced apart in the vicinity of the center of the casing. Each of these apexes is advantageously slightly rounded and the V-shaped sides of the partitions flare therefrom in concave curved walls 22, which terminate in somewhat inwardly directed ends 23 with which the deflectors may have close abutment.

So constructed and arranged, when the casing 10 is rotated, for example in the direction of the arrow shown in Figure 2, the pressure of the liquid or other fluid will swing the deflectors to the positions shown in full lines in Figure 2, to close the openings 17a, 18a, 19a into the passages

17, 18 and 19 facing away from the direction of rotation and to open the openings 17b, 18b, 19b facing in the direction of rotation. Thus the fluid is directed under pressure concurrently into each of the passages 17, 18 and 19, and each of the streams prevents the other streams from passing outwardly through the passages, but rather, taking the path of least resistance, the confluent streams meeting at the center of the casing will flow upwardly through the outlet duct 24 provided by the hollow interior of the tubular stem 12.

As shown in Figure 1, the tubular stem 12 may have a transverse opening 25 therein which communicates with an annular chamber 26 in the bearing member 27, in which the stem 12 is journaled. The fluid under pressure in the chamber 26 may be led off through the duct 28 to which any suitable coupling may be connected as by the screw threads 29. The bearing member 27 may be extended in a bracket portion 30 having the usual bolt apertures 31 therein by which the bearing 27, together with the casing 10, may be suitably supported in a fluid reservoir. I have indicated in general that the stem 12 may be retained in the bearing member 27 as by being extended upwardly therebeyond and keyed to a gear or pulley 32 by which the stem and casing may be rotated.

It will readily be understood, that upon rotation of the casing in the opposite direction, the deflectors will swing to their opposite position and uncover the openings 17a, 18a and 19a, while closing the openings 17b, 18b and 19b.

Obviously, the invention is not limited to the details of construction here shown for purposes of illustration, and such changes may be made as fall within the scope of the appended claims.

Having described my invention, I claim:

1. In a pump of the class described, the combination of a casing of triangular form adapted for rotation in a fluid, a plurality of passages through the casing, a common discharge duct communicating with the passages, two openings for each passage through the perimeter of the casing adjacent each angle of the triangle and on each side of the apex thereof, and a deflector pivoted at each apex and responsive to pressure of the fluid to close one of the openings for each passage and to open the other whereby the casing may be rotated in either direction.

2. In a pump of the class described, the combination of a casing of non-circular form adapted for rotation in a fluid and having a perimeter presenting a plurality of angles in the plane of rotation of the casing, a central discharge duct for the fluid from the casing, a plurality of passages in the casing communicating with said duct, each passage having a plurality of openings in the perimeter adjacent each of the angles of the perimeter and upon opposite sides thereof,

and a deflector swingable about the apex of each angle and responsive to the pressure of the fluid to close one of the openings for each passage and to open the other.

3. In a pump of the class described, the combination of a casing adapted for rotation in a fluid and having a perimeter forming a substantially straight-sided symmetrical polygonal figure, and a plurality of passages through the casing, each having two openings into the perimeter, one on each side of the apex of the angle formed by two contiguous casing sides, and means for selectively closing one of said openings for each passage whereby the casing may be rotated in either direction and the fluid will be directed into said passages through the other of the openings for each passage.

4. In a pump of the class described, the combination of a rotatable casing formed of two axially aligned parallel plates each having a perimeter of triangular form, walls spacing the plates apart and forming a plurality of passages through the casing, an opening in the perimeter between an adjacent pair of walls for each passage adjacent the apex of each of the angles of the triangle and facing in the direction of rotation of the casing, and means for deflecting a fluid received through said opening toward the center of the casing.

5. In a pump of the class described, the combination of a rotatable casing, a passage there-through, a plurality of openings into said passage from the perimeter of the casing, and a hinged deflector controlling said openings alternately to close one and open the other responsive to direction of rotation of the casing.

6. In a pump of the class described, the combination of a rotatable casing having a perimeter of polygonal form, a plurality of passages through the casing, two openings in the perimeter for each passage one on each of two adjacent sides of the polygon, and means for deflecting a fluid received through said opening toward the center of the casing.

7. In a pump of the class described, the combination of a rotatable casing formed of two centrally aligned parallel plates, cylindrical spacing rivets maintaining the walls in fixed spaced-apart relation, a swinging deflector hinged on each rivet, walls carried between the plates defining a plurality of passages through the casing, and entrances into each passage defined alternatively by a deflector and one of two of said walls adjacent thereto.

8. The structure of claim 7 wherein the walls are of sheet metal bent to somewhat V-shape and having inwardly directed ends adjacent each of said openings limiting the swinging movement of the deflectors within the casing.

WILLIAM B. HARSEL.