L. A. MYERS.

CENTRIFUGAL PUMP.

APPLICATION FILED OCT. 7, 1918.

1,382,665.

Patented June 28, 1921.

Fig. 1.

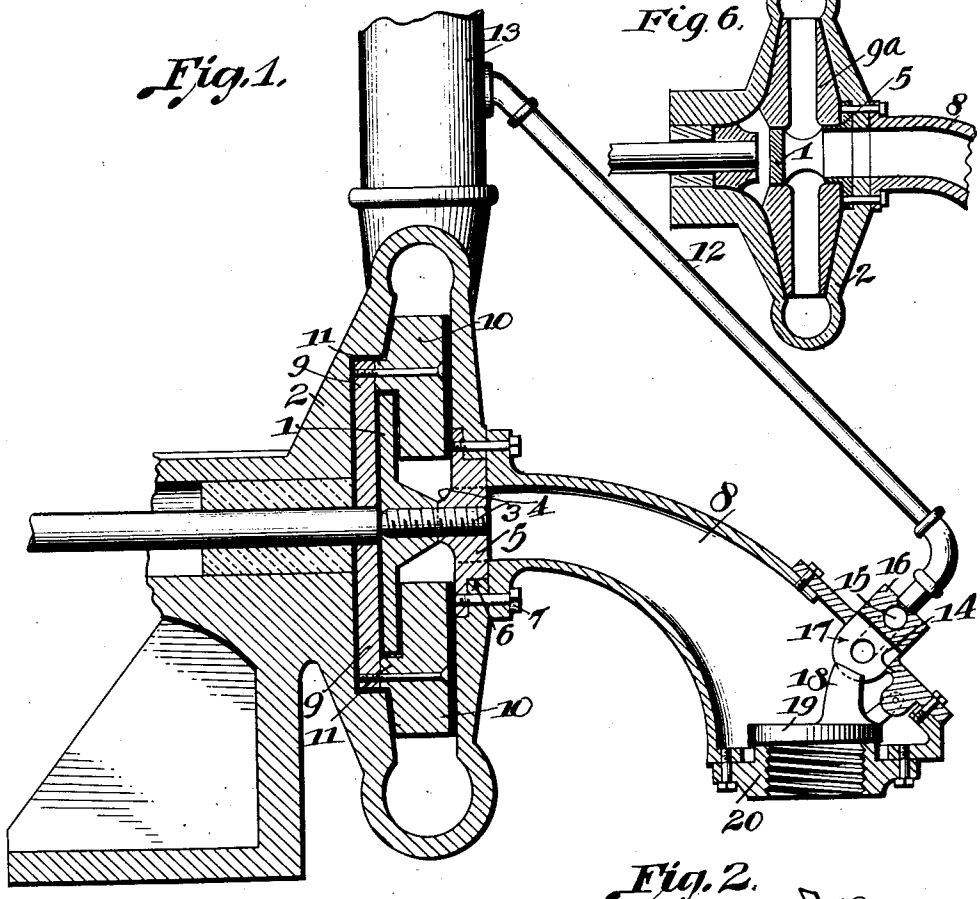
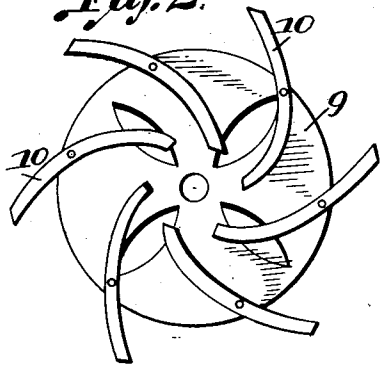


Fig. 6.

Fig. 2.



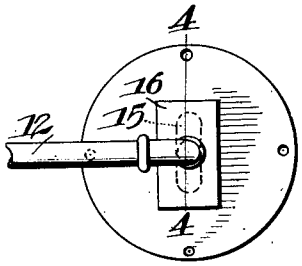


Fig. 3.

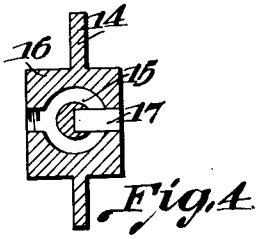


Fig. 4.

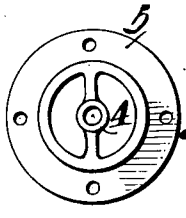


Fig. 5.

WITNESSES

J. T. Schrott

INVENTOR

Lawrence A. Myers.

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

LAWRENCE A. MYERS, OF VISALIA, CALIFORNIA.

CENTRIFUGAL PUMP.

1,382,665. Specification of Letters Patent. Patented June 28, 1921.

Application filed October 7, 1918. Serial No. 257,204.

To all whom it may concern:

Be it known that I, LAWRENCE A. MYERS, a citizen of the United States, and a resident of Visalia, county of Tulare, and State of California, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

My invention relates to improvements in centrifugal pumps, and consists in constructions, combinations and arrangements herein described and claimed.

One of the foremost objects of the invention is to provide a self-balancing runner for centrifugal pumps, this object being obtained by the use of a baffle plate for isolating the impeller disk or hub from the reduced pressure at the pump inlet, thereby leaving the runner to float freely in the pump case, and relieving end thrust thereon.

Another object of the invention is to provide a centrifugal pump of the character described, including as another novel feature, a self-priming valve.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 is a longitudinal section of a centrifugal pump constructed in accordance with my invention;

Fig. 2 is a face view of the runner;

Fig. 3 is a plan view of the valve case cap;

Fig. 4 is a cross section on the line 4—4 of Fig. 3;

Fig. 5 is a detail view of the baffle plates stay flange, and Fig. 6 is a longitudinal section of a centrifugal pump, showing the arrangement of the baffle in the closed runner.

As stated above, one of the foremost objects of the invention is to prevent the runner of the pump from being affected by the suction, thus leaving the runner free to float in the pump case and materially add to the efficiency of operation of the pump. One of the methods of carrying out the invention is to provide a baffle plate 1 which is fixed in position in the pump case 2 on a baffle plate stud 3.

The stud 3 is screwed into the central hub 4 which is supported by webs in the baffle plate stay flange 5. The stay flange 5 includes a boss which occupies the counterbore 6 in the water inlet of the pump casing. The bolts 7 which hold the stay flange 5 in position, also serve to secure the suction pipe 8 in place on the pump case. The member 5 allows the water to flow freely into the pump case, and at the same time provides a solid mounting for the baffle plate 1.

Located behind the baffle plate 1, is the runner plate 9 of the pump runner. The vanes or blades 10 are secured to the plate 9 in any suitable manner, and in places beyond the periphery of the baffle plate 1. Each blade 10 has a boss 11, by means of which the blade portion is offset from the plate 9. The blades are thus disposed in the central space of the pump bowl and the provision of the lugs forms a channel which is occupied by the fixed baffle plate 1.

A circular recess at one side, houses the runner plate 9. It should be observed that either an open or closed runner may be used. The plate 9 may have portions cut out as shown in Fig. 2, so as to create a spoke-like arrangement. End thrust is prevented in this pump by the provision of the baffle plate 1.

The baffle 1 is subject to some modification as for example, to fit in the closed runner 9^a in Fig. 6. The principal difference between the baffles, is that in Fig. 1 it is relatively large while in Fig. 6 it is relatively small. In either case the function of the baffle remains the same. By diverting the thrust of the water against the pump runner, a great deal of friction is avoided with the result that a perfect balance of the runner remains during the operation of the pump.

The "vacuum pull" usually present in a pump of this kind, has no influence on the runner because of the interposition of the baffle plate. At the same time, the structural arrangement shown in Fig. 1 is such that no vacuum is created in back of the baffle plate and at the hub of the runner, and thereby the tendency to draw in air through the bearing of the shaft is not present. This feature has the added advantage of avoiding the use of complicated packings.

This pump is self-priming. This is another important feature of the invention, and comprises the use of the water supply pipe 12 which leads from the outlet pipe 13 of the pump case 2 to the valve case cap 14. Here the pipe 12 communicates with a circular inlet port 15 in the enlargement 16 of the cap 14. The enlargement is in turn slotted transversely at 17.

The slot 17 accommodates the tongue 18 of the check valve 19. Under running conditions, the tongue 18 closes the circular port

15. The arrangement thus provided comprises a cut-off valve automatically actuated by the check valve, and by this means automatically controlling the flow of priming water into the valve chamber from a place above the pump. The check valve 19 controls the inlet 20 to the suction pipe 8.

Under normal running conditions, the check valve 19 is unseated, and the tongue 18 which performs the functions of a cut-off valve, occupies the slot 17 and closes the circular port 15. Water therefore can not flow from the pipe 12.

Should the pump for any reason cease to operate, or "lose its priming" as it is commonly called, the check valve 19 will drop to the seated position. The cut-off valve or tongue 18 is thus withdrawn from the slot 17 and the circular port 15 is opened. A free circulation of water is thus caused. This expels the air from the pump and primes the valve so that the operation is restored.

As soon as the pump is fully primed and its pumping capacity exceeds the carrying capacity of the supply pipe 12, the check valve 19 will again be raised, thus closing the port 15 and restoring normal running conditions. The advantages and mode of operation of the baffle plate 1 have already been fully brought out and are thought to require no additional explanation.

While the construction and arrangement of the centrifugal pump as herein described and claimed is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A centrifugal pump, comprising a pump case having a water inlet with a counterbore, a runner operating in the pump case and mounted on a shaft located co-axially of said inlet, said runner comprising a runner plate, a plurality of impeller blades with inside bosses offsetting the blades and leaving a channel adjacent to the runner plate; and means including a baffle plate supported over the water inlet occupying said channel and isolating the runner from the reduced pressure at the inlet, means spanning the water inlet for rigidly supporting the baffle plate; the support of said baffle plate comprising a portion occupying and secured in the counterbore.

2. A centrifugal pump, comprising a pump case having a water inlet with a counterbore, a suction pipe, and an opposite circular recess; a runner plate occupying the circular recess, with a plurality of blades including inside lugs offsetting the blades in the pump case and providing a channel adjacent to the runner plate; means for isolating the runner from the reduced pressure at the inlet including a baffle plate occupying said channel, a baffle plate stay flange spanning the inlet, with a portion lodged in the counterbore and having a stud fixedly supporting the baffle plate, and means including bolts for securing both the suction pipe and stay flange in position.

3. A self-priming centrifugal pump, comprising a pump case with a central water inlet and a tangential water outlet pipe, a suction pipe secured at one end over the water inlet and having a lateral opening near the other open end, a check valve with a tongue constituting a cut-off valve, operating at said open end of the suction pipe; a valve case cap closing the lateral opening and including an enlargement having a circular inlet port terminating in a transverse slot arranged to receive the tongue and thus close said circular port, and a water supply pipe leading from the pump outlet pipe to said circular inlet port, to prime the valve chamber when the check valve closes and the circular port is opened by the removal of the tongue.

4. A self-priming centrifugal pump comprising a pump casing with an outlet pipe and a suction pipe having a water inlet, a check valve controlling the water inlet, a priming water connection between the outlet pipe and the check valve chamber, and instrumentalities embodied in the check valve, receiving the end of the water connection and constituting a cut-off valve, said instrumentalities enabling the operation of the cut-off valve by the action of the check valve to regulate the flow of the priming water.

LAWRENCE A. MYERS.

Witnesses:
J. M. DYE,
LULA MYERS.