(No Model.)

H. W. BROWN.

CENTRIFUGAL PUMP.

No. 445,919. Patented Feb. 3, 1891.

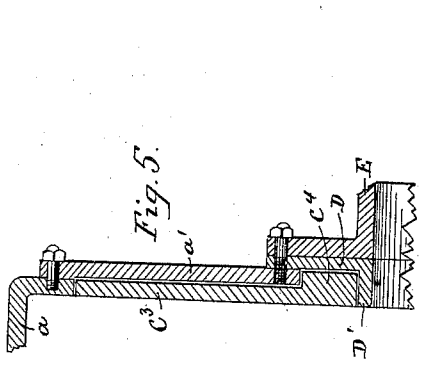


Fig. 5.

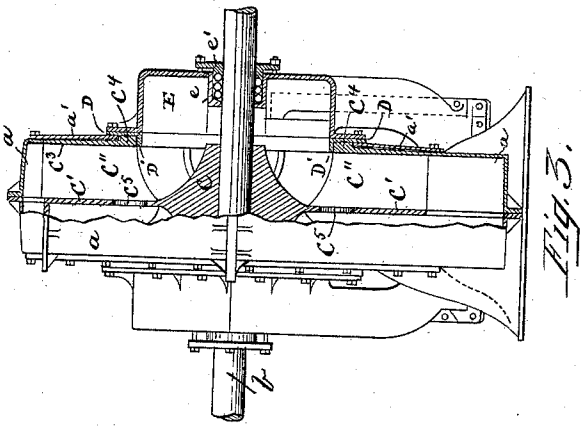


Fig. 3.

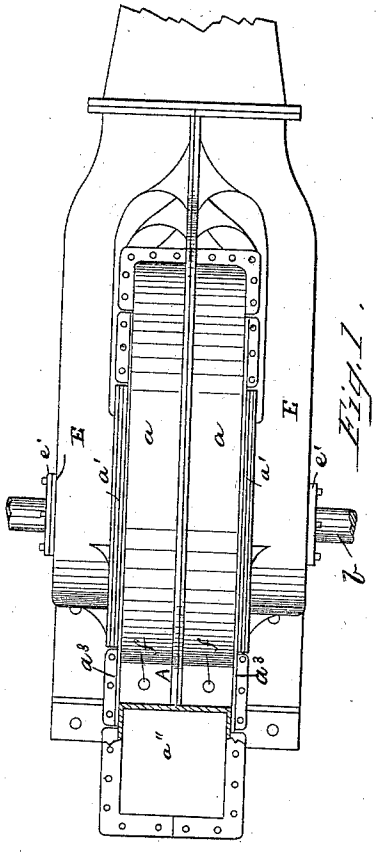


Fig. 1.

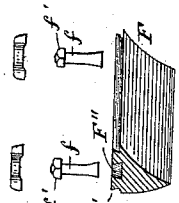


Fig. 4.

Fig. 2.

Witnesses.
Geo. W. White
Chas. A. Perkins.

Inventor.
Henry W. Brown
by Albert Andrews
his atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY W. BROWN, OF CAMBRIDGE, MASSACHUSETTS.

CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 445,919, dated February 3, 1891.

Application filed April 17, 1890. Serial No. 348,342. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. BROWN, a citizen of the United States, and a resident of Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Centrifugal Pumps, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in centrifugal pumps, and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a plan view of the improved pump. Fig. 2 represents a side elevation of the same, shown partly in section. Fig. 3 represents a partial end view and cross-section of the improved pump. Fig. 4 represents a detail view of the detachable cut-off and fastening device for securing it to the casing; and Fig. 5 represents a detail cross-section of the pump-casing shown as enlarged relative to the other figures.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In pumping water mixed or impregnated with mud, sand, or gravel, as occurs in what is termed "hydraulic dredging," it is very desirable that the gritty materials should be prevented from entering between the inside of the casing and the rotary runner of the fan, and thus preventing such surfaces from unnecessary wear, as well as preventing the accidental breakage of the fan runner or casing, and for this purpose my invention is constructed as follows:

a a represent the casing made in two halves, as usual, which are bolted together, as shown in Figs. 1, 2, and 3. *b* is the rotary fan-shaft, to which is secured within the casing the fan C, having a central web C′, and lateral buckets or wings C″ C″, connected at their outer extremities by means of annular rings or runners C^3 C^3, as is common in pumps of this kind.

a′ a′ are annular side plates, preferably made detachable from the casing *a a*, and secured to the outsides of the same by means of suitable fastening bolts or screws. Each runner C^3 is located in close proximity to such side plates without touching the latter, as shown in Figs. 2 and 5, and in such a manner that the inner surface of each runner forms a continuation of the inner surface of the vertical part of the casing, by which arrangement a proper joint is established between the outer periphery of the runners and the corresponding parts of the casing, for the purpose of preventing sand or grit from entering the space between the casing and runners at such places. Each runner is provided at its inner edge with an outwardly-projecting annular lip C^4, that projects through the circular central opening in the side plates *a′*, as shown in Figs. 2, 3, and 5, and said annular runner-lip is covered on the outside by means of a ring D, secured to the outside of the side plate *a′* of the casing. Each of such rings D is provided with an inwardly-projecting angular and annular lip D′, extending inward to or about the inside of the runner C^3, as shown in Figs. 3 and 5, by which a close joint is established between the inner edge of each runner and corresponding parts of the side plates of the casing for the purpose of preventing gritty particles from entering between the runners and the side plates of the casing at these places.

To the outside of each ring D is secured in a suitable manner the central portion of the respective suction-pipes E E, the outer ends of which are connected together and to a suction-pipe common to both, as is usual in pumps of this kind. The central part of each suction-pipe E is provided with a suitable stuffing-box *e* and removable gland *e′*, in which the rotary fan-shaft *b* is journaled.

In pumps of this kind it is very essential that there should be a free communication between the opposite sides of the central web C′ of the rotary fan, so as to obtain the full value or work of the said fan, in case one of the suction-pipes E should for any reason become clogged up, and for this purpose I make a number of perforations or equalizing-ports C^5 C^5 in the said central web C′, as shown in Figs. 2 and 3, by which an open communication is established between the spaces on opposite sides of said central web.

In centrifugal pumps the cut-off at the junction of the delivery pipe or orifice *a″* and narrowest portion of the casing is very liable to being worn out by sand or gritty substances passing through the pump with the water,

and it is very essential that such cut-off should be arranged in very close proximity to the outer edges of the rotary fan to obtain the full working power and effect of the pump, and for this purpose I make use of a detachable cut-off which when worn out can be replaced by another, as will hereinafter be more fully shown and described.

A is a transverse guide arranged at the narrowest portion of the casing, as shown in Fig. 2, said guide having preferably a dovetailed groove A′ on its under side, into which is detachably secured the cut-off F, preferably provided on its upper side with a dovetailed rib F′, adapted to be inserted in the dovetailed groove in the guide A, as shown in Figs. 2 and 4.

The detachable cut-off F is secured to the guide A by means of suitable fastening-bolts $f f$ and nuts $f' f'$, said bolts being preferably provided in their lower ends with dovetailed heads adapted to be inserted in a correspondingly-shaped dovetailed groove F″ in the upper portion of the detachable cut-off F, as shown in Figs. 2 and 4. After said cut-off has been put in place the openings at the ends of the casing, through which the said cut-off was introduced, are closed by means of covering-plates a^3 a^3. (Shown in Fig. 1.) It will thus be seen that if the cut-off becomes worn and useless it can easily be removed and another one put in its place, thus prolonging the life and utility of the pump.

What I wish to secure by Letters Patent, and claim, is—

1. In a centrifugal pump, the combination, with the fan-casing, of the flat side plate a', secured to the casing, the rotary fan having its runner C^3 arranged parallel with and in proximity to the side plate, the ring D, secured to the side plate and having an annular lip D′ extending inwardly through the runner to form a closed joint at the inner edge of the latter, and the suction-pipe E, communicating through the ring with the interior of the casing, substantially as described.

2. In a centrifugal pump, the rotary fan having its runners provided each with an outwardly-extending annular projection adapted to pass through the centrally-perforated casing side, combined with an annular ring secured to the outside of the casing and having an inwardly-projecting lip, substantially as and for the purpose set forth.

3. In a centrifugal pump, the combination, with the casing having opposite center orifices in its sides, of the two suction-pipes extending along the exterior opposite sides of the casing and communicating with the center orifices in the sides thereof, and the rotary fan consisting of a central perforated web provided at its opposite sides with lateral buckets, those at one side being coextensive in size with those at the opposite side and connected at their outer extremities by annular runners, substantially as described.

4. In a centrifugal pump, the combination, with a rotary fan and the casing having the narrow part at the delivery-orifice provided with a transverse guide A, of the cut-off F, detachably joined to the guide by a rib-and-groove connection, bolts and nuts $f f'$, securing the cut-off to the guide, and removable cover-plates A^3, covering the openings at the ends of the casing, through which the cut-off is applied, substantially as described.

5. In a centrifugal pump, the combination, with a rotary fan and the casing having the narrow part at the delivery-orifice provided with a transverse guide A, of a cut-off F, detachably connected by a dovetailed rib on one engaging a dovetailed groove in the other, the nuts and bolts $f f'$, securing the cut-off to the guide, and the cover-plates a^3, covering the openings at the ends of the casing, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 6th day of February, A. D. 1890.

HENRY W. BROWN.

Witnesses:
ALBAN ANDRÉN,
M. J. JACKSON.