

E. M. R. WEINER AND P. G. BOGDANOFF.

CENTRIFUGAL PUMP.

APPLICATION FILED JAN. 3, 1920.

1,369,508.

Patented Feb. 22, 1921.

2 SHEETS—SHEET 1.

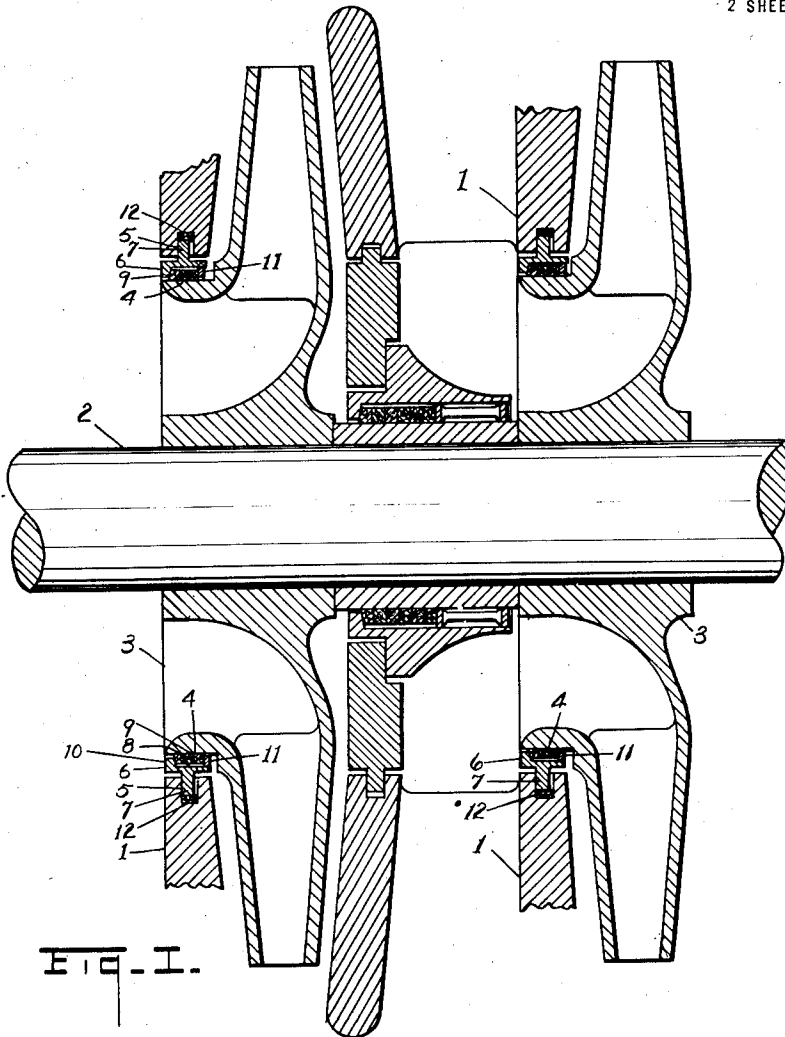


FIG. I.

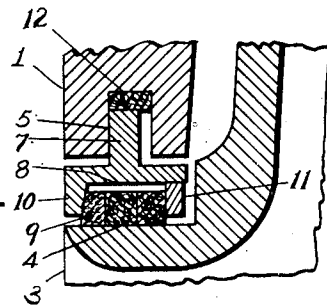


FIG. II.

Witnesses

Rena Gilman
Fred Ullrich

Inventors

Edwin M. R. Weiner
Paul G. Bogdanoff

By *Chappell & Co.*

Attorneys

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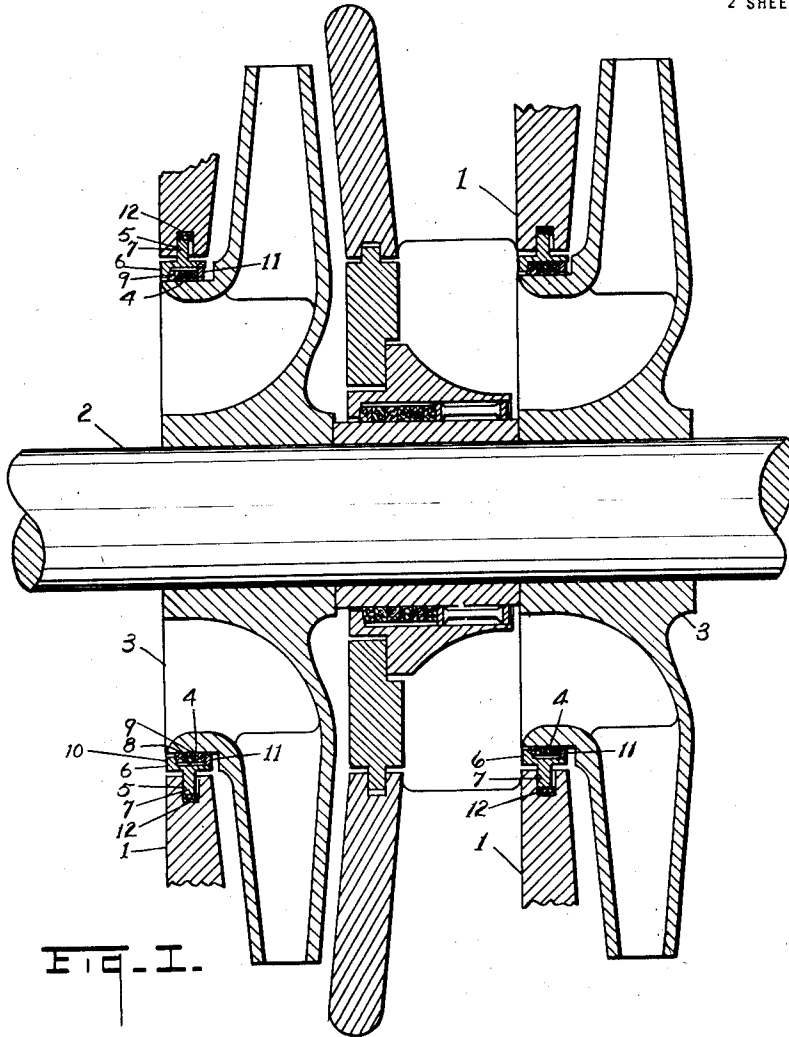


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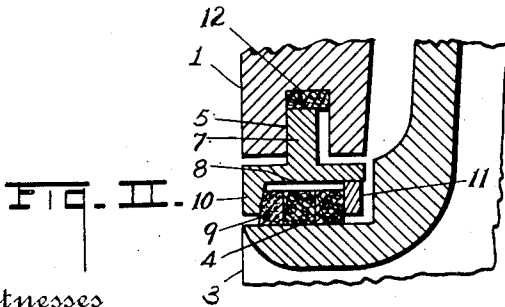


FIG. II.

Witnesses
Len Gilman
Fred Ulbrich

Inventors
Edwin M. R. Weiner
Paul G. Bogdanoff
By *Chappell & Earl*
Attorneys

UNITED STATES PATENT OFFICE.

EDWIN M. R. WEINER AND PAUL G. BOGDANOFF, OF BATTLE CREEK, MICHIGAN.

CENTRIFUGAL PUMP.

1,369,508.

Specification of Letters Patent. Patented Feb. 22, 1921.

Application filed January 3, 1920. Serial No. 349,268.

To all whom it may concern:

Be it known that we, EDWIN M. R. WEINER, a citizen of the United States, residing at Battle Creek, county of Calhoun, State of Michigan, and PAUL G. BOGDANOFF, a citizen of Russia, having applied for and taken out first citizenship papers in the United States, residing at Battle Creek, county of Calhoun, State of Michigan, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

This invention relates to improvements in centrifugal pumps.

The main objects of this invention are:

First, to provide a centrifugal pump of very high efficiency.

Second, to provide in a centrifugal pump an improved packing means which is very effective and at the same time simple and durable.

Third, to provide an improved centrifugal pump having these advantages which is simple and economical in structure.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of our invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a detail sectional view of a multi-stage pump embodying the features of our invention, only a portion of the pump being shown and the impeller shaft being shown in full lines.

Fig. II is an enlarged detail section through a packing of one of the impellers.

Fig. III is a detail section of a modification or adaptation of our improvements, the impeller shaft being shown in full lines.

Fig. IV is a detail section of another modification or adaptation of our improvements, the impeller shaft being shown in full lines.

Fig. V is a detail transverse section on a line corresponding to line 5—5 of Fig. IV.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawings, 1 represents the casing of our improved pump, a portion only being shown, 2 the impeller shaft, and 3 the impeller, there being a plurality of impellers in the structure shown in Fig. I, the same being of the multistage type.

The impeller 3 is provided with an annular flange-like packing seat or face 4 at its inlet end while the casing is provided with an opposed annular groove-like packing seat 5. We provide a floating annular packing member 6 having an annular rib 7 at its outer side disposed in the packing seat 5 of the casing. On its inner side the packing member 6 is provided with a packing seat 8 for the packing rings 9 of resilient material and which coact with the packing seat or face 4 of the impeller.

The packing seat 8 is provided with a fixed flange 10 at its outer end and a floating or follower ring 11 at its inner end, the follower ring being on the pressure side and being held against the packings 9 by the back pressure on the discharge side of the impeller, forcing the resilient packing rings against the coacting packing face of the impeller.

The gasket or packing 12 is arranged in the packing seat 5 of the casing to coact with the packing member providing a closing joint at this point. We find that these packings 9 and 12 may be of felt or similar material, that they are highly effective in preventing the escaping of the fluid, and that there is very little friction and wear on the parts, the pumps thus equipped being of very high efficiency.

In Fig. I, we show our improvements embodied in a multistage pump, only such parts of the pump being shown as are deemed necessary to show an application of our improvements.

In the embodiment shown in Fig. III, the packing seat 13 in the casing 14 is in the form of an annular shoulder. The packing seat 15 of the packing member 16 has the fixed flange 17 at each side of the packing member 18. The packing 19 is arranged in the seat 13 to coact with the floating packing member substantially as in the embodiment shown in Fig. I.

In the embodiment shown in Fig. IV, the floating packing member is made up of sections 20 and 21 connected by screws 22, the sections being provided with packing seat flanges 23 and 24, respectively. This per-

mits the assembly of the resilient packing rings or gaskets 25 and the floating follower or loose pressure ring 27 without splitting it. The follower ring is held yieldingly against the packings by the springs 28. We have found our improvements highly satisfactory without these springs when embodied as shown in Figs. I, II or III.

Our improved pump is of very high efficiency and it is also durable.

We have not attempted to illustrate or describe certain other modifications or adaptations which we contemplate as we believe the disclosure made will enable those skilled in the art to which our invention relates to embody or adapt the same as may be desired.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a centrifugal pump, the combination of a rotary impeller having an annular flange-like packing seat at one side, a casing having an annular groove-like packing seat opposed to said packing seat of said impeller, a floating annular packing member having an annular rib on its outer side disposed in said casing packing seat and a packing seat in its inner side provided with an integral flange at its outer end and a follower ring at its inner end, a resilient packing arranged in said packing member seat of said floating packing member between its said fixed flange and said loose retaining ring to coact with said impeller packing seat, and a resilient packing arranged in said casing packing seat to coact with the said rib of said packing member.

2. In a centrifugal pump, the combination of a rotary impeller having an annular packing seat at one side, a casing having an annular packing seat opposed to said packing seat of said impeller, a floating annular packing member having an annular rib on its outer side disposed in said casing packing seat and a packing seat in its inner side provided with an integral flange at its outer end and a follower ring at its inner end, a resilient packing arranged in said packing member seat of said floating packing member between its said fixed flange and said loose retaining ring to coact with said impeller packing seat, and a resilient packing arranged in said casing packing seat to coact with the said rib of said packing member.

3. In a centrifugal pump, the combination of a rotary impeller having an annular flange-like packing seat at one side, a casing

having an annular groove-like packing seat opposed to said packing seat of said impeller, a floating annular groove-like packing member having an annular rib on its outer side disposed in said casing packing seat and a packing seat arranged in said packing member seat of said floating packing member, and a resilient packing arranged in said casing packing seat to coact with said rib of said packing member.

4. In a centrifugal pump, the combination of a rotary impeller having an annular packing seat at one side, a casing having an annular packing seat opposed to said packing seat of said impeller, a floating annular packing member having an annular rib on its outer side disposed in said casing packing seat and a packing seat in its inner side, a resilient packing arranged in said packing member seat of said floating packing member, and a resilient packing arranged in said casing seat to coact with the said rib of said packing member.

5. In a centrifugal pump, the combination of a rotary impeller having an annular packing seat, a casing having an annular packing seat, a floating annular packing member engaging said casing packing seat and having a packing seat in its inner side opposed to said impeller packing seat and provided with an integral flange at its outer end and a loose follower ring at its inner end, a resilient packing arranged in said packing member seat of said floating packing member between its said fixed flange and said loose retaining ring to coact with said impeller packing seat, and a packing arranged in said casing packing seat to coact with said packing member.

6. In a centrifugal pump, the combination of a rotary impeller having an annular packing seat, a casing having an annular packing seat, a floating annular packing member engaging said casing packing seat and having a packing seat in its inner side opposed to said impeller packing seat, a resilient packing arranged in said packing member seat of said floating packing member, and a packing arranged in said casing packing seat to coact with said packing member.

In witness whereof, we have hereunto set our hands in the presence of two witnesses.

EDWIN M. R. WEINER.
PAUL G. BOGDANOFF.

Witnesses:

VADA E. MATER,
EDNA S. MAGUIRE.