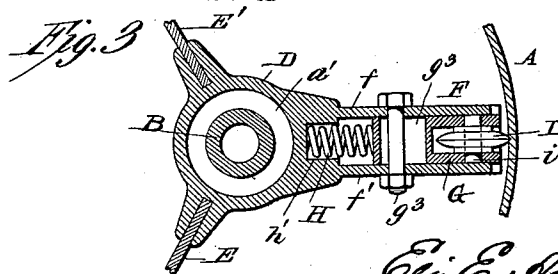
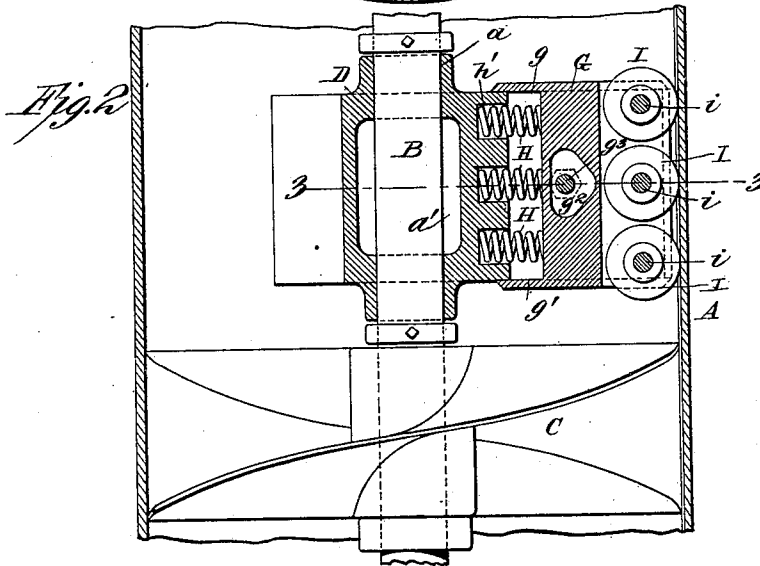
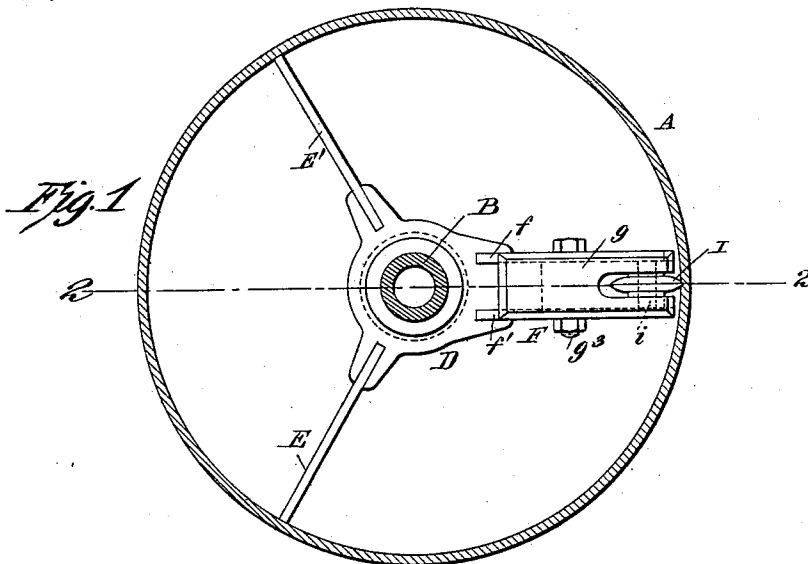


E. E. HENDRICK.

PUMP.

(Application filed Feb. 4, 1902.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

ELI E. HENDRICK, OF CARBONDALE, PENNSYLVANIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 711,966, dated October 28, 1902.

Application filed February 4, 1902. Serial No. 92,570. (No model.)

To all whom it may concern:

Be it known that I, ELI E. HENDRICK, a citizen of the United States, residing at Carbon-
dale, in the county of Lackawanna and State
of Pennsylvania, have invented a certain new
and useful Improvement in Pumps, of which
the following is a description.

This invention relates to that class of pumps
in which are employed a casing, either con-
tinuous or built up of sections, a power-shaft
within the casing, and screws or propellers
mounted on such shaft and caused to rotate
within the casing for the purpose of elevating
water or other material. In pumps of this
character it is essential that the shaft be pro-
vided at suitable intervals, preferably adja-
cent to the propellers, with bearings for the
purpose of assuring the operation of the shaft
in the longitudinal center of the casing. It
is also essential to provide means, which may
or may not be combined with such bearings,
for interrupting or breaking up the tendency
of the water or other material to swirl within
the pump-casing under the influence of the
rotating propellers. Heretofore the use has
been attempted of a combined shaft-bearing
and water-guide employing tangentially-dis-
posed curved resilient arms extending out-
wardly from the shaft-bearing and coacting
with the interior of the pump-casing. Many
difficulties have been experienced with such
a structure, among which may be mentioned,
first, that the accuracy with which the shaft
is located in the longitudinal center of the
casing depends upon the exertion of the same
degree of pressure by each of the several out-
wardly-projecting wings or arms, and, sec-
ond, that where the right degree of such pres-
sure is not exerted upon the interior of the
casing not only is the pump-shaft free, to
some extent, at least, to rotate out of such
longitudinal center, but the combined guide
and bearing is also caused to rotate with such
shaft. Whenever either of these difficulties
is experienced, the propellers, which to ob-
tain maximum efficiency should be but
slightly smaller than the interior of the cas-
ing, are permitted to operate against such
casing, thereby producing unnecessary fric-
tion and wear and materially reducing the
efficiency of the pump.

In the present invention I employ a water-
guiding mechanism which may or may not
be combined with a shaft-bearing, as desired.
Essentially it consists of a hub (which may
constitute the shaft-bearing) and outwardly-
extending arms coacting with the interior of
the pump-casing, certain of which arms are
rigid and of such predetermined dimensions
as that when their free ends are in contact
with the interior of the pump-casing the hub
or bearing will be accurately located in the
longitudinal center of the casing. Also co-
acting with the hub or bearing is a device
adapted to exert yielding pressure upon the
interior of the casing to assure contact be-
tween the rigid arms or vanes and the inter-
ior of the pump-casing opposite such de-
vice. In the present embodiment of the inven-
tion this device consists of a housing formed
integral with or connected to the hub or
bearing and extending outwardly toward the
pump-casing. Within this housing is mount-
ed a sliding block, with which coacts a spring
or springs having a tendency to force said
sliding block outwardly into contact with the
interior of the casing. Mounted in the free
end of said sliding block is a wheel or wheels
having, preferably, a sharpened periphery
or peripheries. The office of such wheel or
wheels is to coact, under the pressure of the
springs which operate against the sliding
block, with the interior of the pump-casing,
so as to firmly hold the hub or bearing and
its attached mechanism against displace-
ment—such, for instance, as turning under
the influence of the rotary shaft by means of
which the propellers are operated. If de-
sired, the peripheries of said wheels may be
toothed or serrated in order to secure more
efficient coaction thereof with the interior of
the casing. Also, if desired, the interior of
the casing may be grooved or channeled with
the same end in view.

In the drawings, Figure 1 is a transverse
section of a pump-casing having the com-
bined guide and bearing of this invention lo-
cated therein. Fig. 2 is a longitudinal sec-
tion taken on the line 2 2 of Fig. 1, but illus-
trating also (in elevation) the propeller at-
tached to the power-shaft. Fig. 3 is a trans-
verse section taken on the line 3 3 of Fig. 2.

Referring to the drawings, in which similar letters denote corresponding parts, it will first be observed that I have illustrated (and shall herein describe) the invention as embodied in a combined water-guide and shaft-bearing, although, as will be apparent, separate and distinct devices may be employed to meet these requirements, the structure so described being capable of use as one or the other or both.

A designates the pump-casing, within which is located the rotary shaft B, upon which is mounted the propeller C. Of course where water or other material is to be elevated a considerable distance a number of these propellers, suitably spaced, may be employed. Located, preferably, at points adjacent to the propellers (either above or below the same) are mounted combined water-guides and shaft-bearings, each consisting of a hub D, provided with a central orifice d , through which the power-shaft extends, and also, if desired, with an internal chamber or recess d' for the reception of a lubricant. Extending outwardly from the hub D is a series of wings or arms $E E'$, and of these there may be any desired number. These arms may be formed integral with the hub or bearing D (which is preferably cast) or may, as indicated in Figs. 1 and 3, be formed separable and secured thereto. I prefer the construction illustrated in said figures, in which the hub is cast about the inner ends of said arms. The arms $E E'$ are of such length as that when their free ends are in contact with the interior of the casing the pump or bearing D will be accurately located in the longitudinal center of the pump-casing.

In conjunction with the hub or bearing D and substantially rigid arms $E E'$, I employ a device for exerting a yielding pressure outwardly against the interior of the casing. In the present instance this consists, first, of a housing F, comprising side members $f f'$, either formed separable and secured to or cast integral with the hub or bearing D. The sides $f f'$ extend outwardly from said hub or bearing and terminate short of the interior of the pump-casing, as clearly shown in the drawings. Within the housing F is a sliding block G, here shown as provided with top and bottom plates $g g'$ of such size as to extend outwardly over the top of the sides $f f'$ of the housing F to maintain said block in position and permit it to slide upon said housing. Between the block G and the hub or bearing D, I locate means for pressing said block outwardly against the interior of the casing. In the present instance I have shown a preferred construction, although not desiring to limit myself thereto. This construction consists of three coiled springs H, the inner ends of which are received in recesses h' , formed in the hub or bearing D. Their outer ends bear against the inner surface of the block G. If desired, such surface may

also be provided with recesses h' similar to those formed in the hub or bearing D.

g^2 designates an orifice extending through the block G, and through this orifice extends a bolt g^3 , which passes also through the sides $f f'$ of the housing F, on the exterior of which it is secured by any suitable means. I prefer to make the orifice g^2 considerably larger than the bolt g^3 in order to allow the requisite amount of play for the adjustment of the block G.

The outer end of the block G is bifurcated, as best shown in Figs. 1 and 3, and within the recess so formed I mount the wheel or wheels I. A single one of such wheels may be employed, but I prefer the use of a series of such wheels, and have therefore illustrated three in the drawings. Each wheel is mounted upon a journal i , the ends of which are held in bearings in the sliding block G. Furthermore, as best shown in Figs. 1 and 2, the periphery of each of the wheels is sharp, so as to secure more efficient coaction thereof with the interior of the casing. If desired, such periphery may, as above indicated, be toothed or serrated. This, however, being such an obvious modification of the construction shown is not illustrated in the drawings. The wheels I being of the same size and their journals being located in the same plane in the block G it is apparent that under the influence of the springs H, which press the block G outwardly, the peripheries of said wheels will bear against the interior of the pump-casing with a degree of pressure determined by the strength of said springs. This pressure may be so great as to cause said wheels to cut a shallow groove in the interior of the casing, or prior to the assembling of the parts of the pump the casing may be provided with such a shallow groove for coaction with the wheels I when the parts shall have been assembled as herein described.

In assembling the parts of the pump and assuming that the casing is of the continuous character the shaft is introduced within the casing carrying the propeller and guide or series of such propellers and guides. In introducing the combined guide and bearing of this invention it is necessary to press inwardly the sliding block G and the wheels carried thereby. In forcing the mechanism down within the pump-casing and when the apparatus is brought to rest in the desired position the pressure of the wheels I against the interior of the casing assures intimate contact of the free ends of the substantially rigid arms $E E'$ with the interior of the casing opposite the point of the yielding pressure device. By this means the pump-shaft is accurately located in the longitudinal center of the casing, and the propeller carried by said shaft is prevented from contacting with the casing during its operation. Should the use of the pump develop a tendency to

rotate the guides and bearings, as well as the propellers, this will be resisted by the engagement of the wheels I with the interior of the casing, as hereinbefore explained.

5 What I claim is—

1. In a pump, the combination with a casing, of a shaft having propellers mounted thereon, hubs through which said shaft passes, arms extending from said hubs and
10 coacting directly with the interior of the casing, and means for exerting yielding pressure upon said hubs to maintain the same in the longitudinal center of the casing, said means including a wheel coacting with said casing,
15 substantially as described.

2. In a pump, the combination with a casing, of a shaft having propellers mounted thereon, hubs through which said shaft passes, arms extending from said hubs and
20 coacting directly with the interior of the casing, and means for exerting yielding pressure upon said hubs to maintain the same in the longitudinal center of the casing, said means including a wheel having a sharpened periphery coacting with said casing, substantially
25 as described.

3. In a pump, the combination with a casing, of a shaft having propellers mounted thereon, hubs through which said shaft
30 passes, arms extending from said hubs and coacting directly with the interior of the casing, and means for exerting yielding pressure upon said hubs to maintain the same in the longitudinal center of the casing, said means including a series of wheels coacting with said
35 casing, substantially as described.

4. In a pump, the combination with a casing, of a shaft having propellers mounted thereon, hubs through which said shaft
40 passes, arms extending from said hubs and coacting directly with the interior of the casing, and means for exerting yielding pressure upon said hubs to maintain the same in the longitudinal center of the casing, said means including a series of wheels having sharpened
45 peripheries coacting with said casing, substantially as described.

5. In a pump, the combination with a casing, of a shaft having a propeller mounted
50 thereon, a hub through which said shaft passes, arms extending from said hub and coacting with the interior of the casing, and a yielding pressure device coacting with said casing and with said hub, including a sliding
55 block, means for pressing the same outwardly, and a movable contacting device carried by

said block and adapted to be forced thereby into contact with the interior of said casing, substantially as described.

6. In a pump, the combination with a casing, of a shaft having a propeller mounted
60 thereon, a hub through which said shaft passes, arms extending from said hub and coacting with the interior of the casing, and a yielding pressure device coacting with said
65 casing and with said hub, including a housing, a spring-pressed block therein, and a member carried by said block and forced thereby into contact with the interior of the casing, substantially as described. 70

7. In a pump, the combination with a casing, of a shaft having a propeller mounted thereon, a hub through which said shaft
75 passes, arms extending from said hub and coacting directly with the interior of the casing, and a yielding pressure device coacting with said casing and with said hub, including a housing, a spring-pressed block therein, and
80 a wheel carried by said block and forced thereby into contact with the interior of said casing, substantially as described.

8. In a pump, the combination with a casing, of a shaft having a propeller mounted thereon, a hub through which said shaft
85 passes, arms extending from said hub and coacting directly with the interior of the casing, and a yielding pressure device coacting with said casing and with said hub, including a housing, a spring-pressed block therein, and
90 a series of wheels carried by said block and forced thereby into contact with the interior of said casing, substantially as described.

9. In a pump, the combination with a casing, of a shaft having a propeller mounted thereon, a hub through which said shaft
95 passes, arms extending from said hub and coacting directly with the interior of the casing, and a yielding pressure device coacting with said casing and with said hub, including a housing, a spring-pressed block therein, 100
means for retaining said block in position in said housing, and a wheel or wheels having sharpened periphery or peripheries adapted to contact with the interior of said casing, substantially as described. 105

This specification signed and witnessed this 27th day of January, 1902.

ELI E. HENDRICK.

Witnesses:

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