

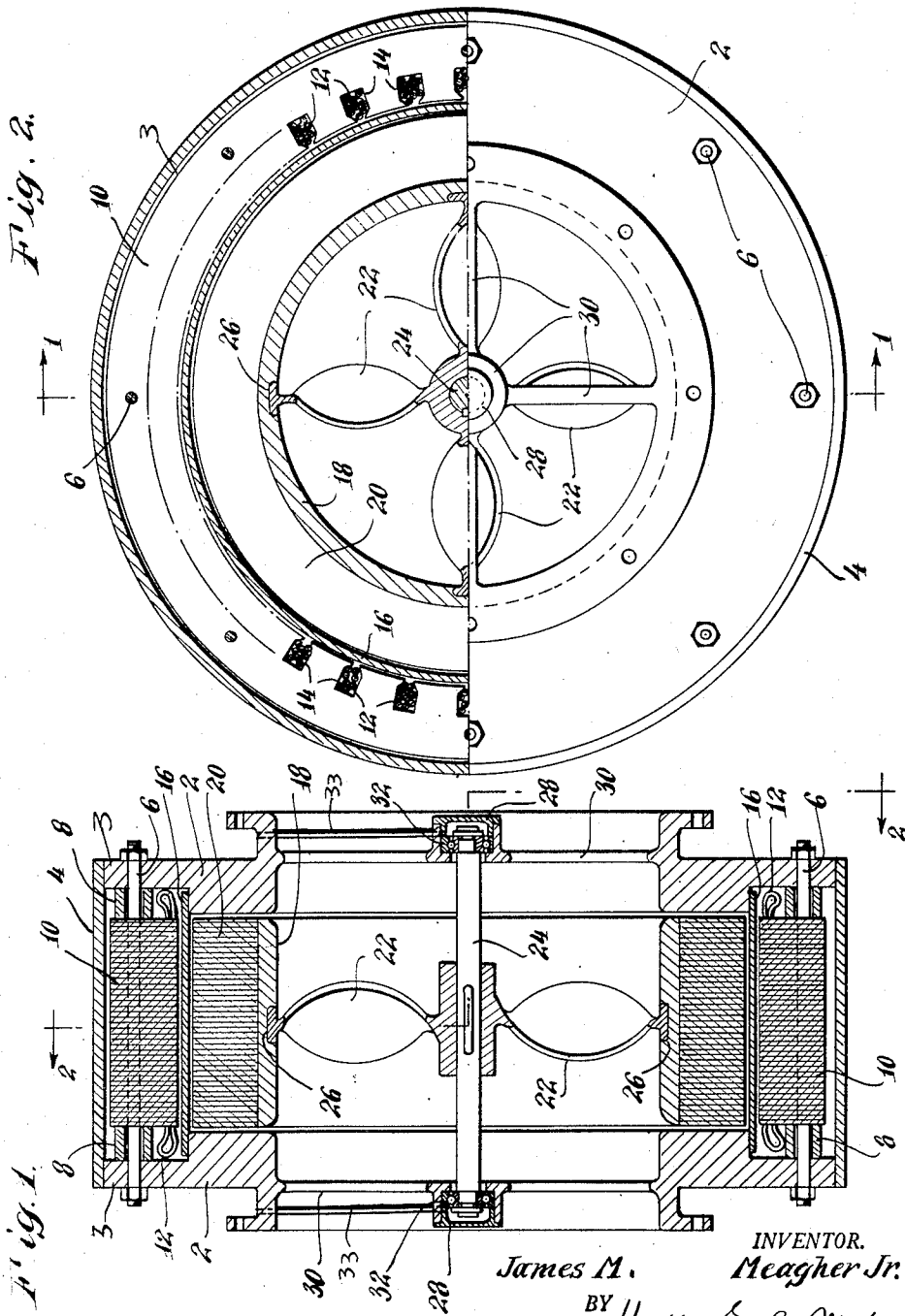
Dec. 28, 1954

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2,697,986

AXIAL FLOW GLANDLESS IMPELLER PUMP

Filed April 5, 1952



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2,697,986

AXIAL FLOW GLANDLESS IMPELLER PUMP

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Application April 5, 1952, Serial No. 280,726

1 Claim. (Cl. 103—87)

The present invention relates to improvements in impeller type booster pumps and, more specifically, to improvements of pumps of the type wherein a tubular rotor is provided in which the impeller is mounted, and the unit is adapted to be directly connected in a pipe line, such as disclosed by the Patent No. 2,485,408 dated October 18, 1949.

One object of the present invention is the provision of a device of the character described which has a propeller type impeller that is a separate part which can be detached from a hollow rotor, so that a wide variety of liquids or gases at a wide range of temperature and viscosity can be handled by one and the same pump unit when impellers most suitable for the purpose for which the pump is to be used have been inserted therein. This feature greatly reduces the cost of manufacturing and storing of these types of pumps because an exchange of impellers, without exchanging the entire rotor, will make a pump adaptable to various uses.

Another object of the present invention is the provision of a device of the character described which is of the least possible length, so that it can be bolted easily directly into a pipe line, eliminating pipe fitting and reducing to a minimum the changes required on a pipe line for inserting the device thereinto.

A further object of the present invention is the provision of a device of the character described which is so constructed as to have practically the same inner diameter as a pipe line to which it is connected, so that a free, equal flow of the fluid through the device will be attained, and which is well adapted for being provided with ordinary ball bearings that can be lubricated from the outer side of the device in an ordinary manner, although shaft glands and their maintenance are eliminated.

Yet still another object of the present invention is the provision of a device of the character described which is comparatively light in weight and simple in construction, but which is also sturdy, durable and well adapted for withstanding the rough usage to which devices of this type ordinarily are subjected.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing a preferred form of the invention has been shown.

In said drawing:

Figure 1 is a sectional view of a preferred embodiment of my invention on the line 1—1 of Fig. 2; and Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Similar reference characters refer to similar parts throughout the several views.

In the drawing the numeral 2 denotes the annular main portions of a pair of flange members, which are adapted for being interposed between and connected to a pair of flanged pipes (not shown). Each portion 2 has a reduced outer rim portion 3, preferably encompassed by a tubular member 4, and said flange members are connected to each other by means of cross-bolts 6. The latter extend through the rim portions 3 as well as through spacing members 8 and through an electric motor stator 10 (Fig. 1).

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The stator windings 12 are arranged in the usual manner in grooves 14, which extend crosswise through the inner portion of the laminated stator body. A non-magnetic cylinder 16, forming a hydraulic seal is extended between said flange members and has its end portions fitted tightly upon the main portions 2 adjacent the rim portions 3. A rotor ring 18, carrying the rotor laminations 20 is rotatable within the space confined by the cylinder 16 and said flange members. An impeller 22 secured to a shaft 24 has at the outer extremities of its blades cross-shaped rib portions 26, which are inserted into recesses at the inner side of the rotor ring 18. Since the impeller blades usually are resilient to a certain degree, the rib portions 26 can be inserted into and detached from said recesses of the rotor ring easily and quickly, so that impellers can be exchanged in a simple manner.

Closure members 28 inserted into hollow hub sections, which are connected by arm sections 30 to the inner sides of the main portions 2 of said flange members, form therewith housings in which are mounted bearings 32 carrying the ends of the shaft 24. In order to facilitate the lubricating of the bearings 32, I prefer to connect them by means of pipes 33 to the outer side of the flange members, as may be seen in Fig. 1.

The inner diameter of the rotor ring 18 and of the main portions 2 of said flange members preferably is the same as the inner diameter of the pipes to which the device is to be connected, so that there will be avoided as much as possible any obstruction or bottleneck action of the fluid passing therethrough. This is particularly important if several pumps are provided on several sections of a pipe line, so that the flow of the fluid will not be obstructed when one of the pumps stops operating.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:

An axial flow glandless impeller pump comprising a pair of flange members constructed and arranged for being interposed between and connected to a pair of flanged pipes whose inner diameter is the same as the inner diameter of the flange members and each flange member having an annular main portion and a rim portion whose outer diameter is larger than the outer diameter of the main portion and having also arm portions inwardly extending from said main portion toward its center and a hub portion at which said arm portions terminate, a non-magnetic cylinder interposed between the main portions of said flange members resting with its end portions tightly upon the peripheral sections of said main portions adjacent said rim portions of said flange members, a tubular member encompassing said rim portions and enclosing the space between said rim portions, an electric motor stator unit within said tubular member encompassing said non-magnetic cylinder, spacing members interposed between said rim portions and said stator unit, cross-bolts extending through said stator unit and said spacing members as well as through said rim portions connecting said flange members to each other, bearings mounted on said hub portions of said flange members, lubricant pipes radially extending from said bearings to the outer side of said flange members, a shaft rotatable in said bearings, an impeller secured to said shaft having blade portions whose outer extremities are formed as cross-shaped ribs, a ring member surrounding said impeller having on its inner side recesses into which said ribs of the blade portions of said impeller are inserted, and a hollow electric motor rotor mounted on the outer side of said ring member,

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