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F. R. FORREST

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CENTRIFUGAL PUMP

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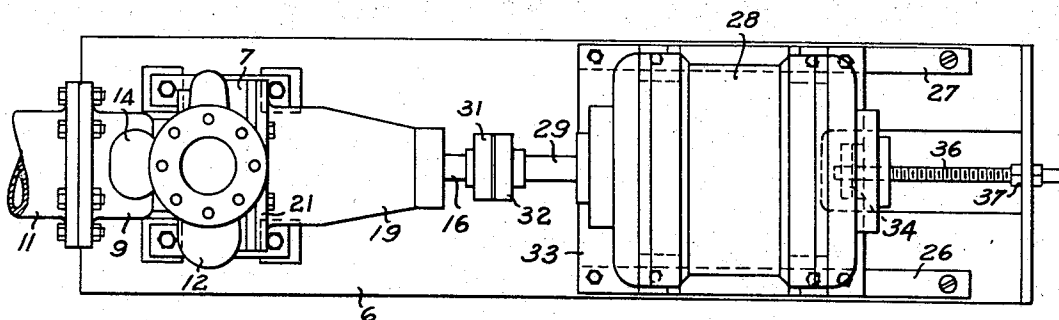


Fig. 1

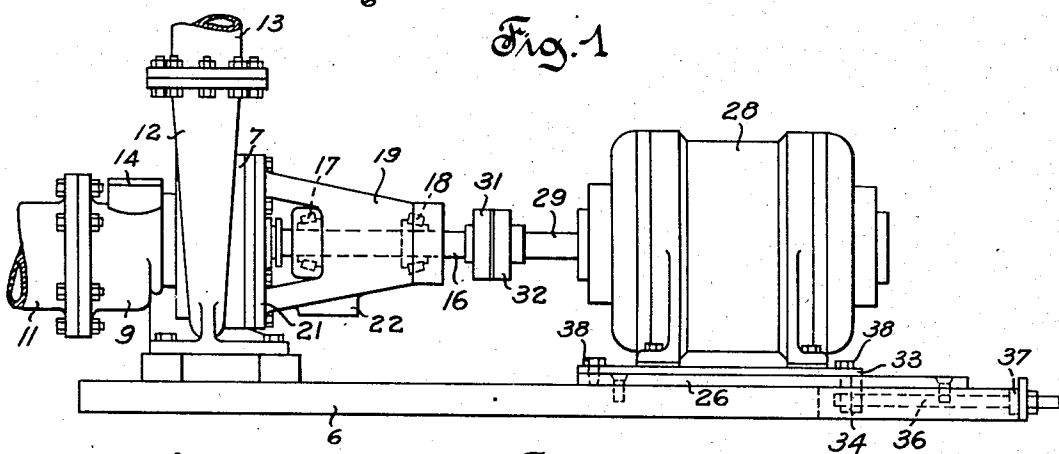


Fig. 2

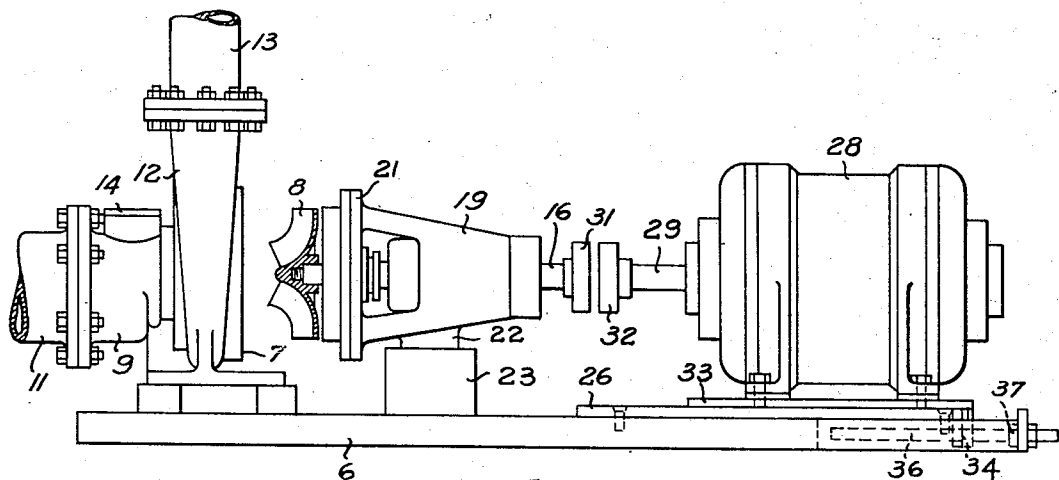


Fig. 3

Inventor
F. R. Forrest
by *G. J. Elwin*
Attorney

UNITED STATES PATENT OFFICE

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CENTRIFUGAL PUMP

Frank R. Forrest, Wauwatosa, Wis., assignor to
Allis-Chalmers Manufacturing Company, Mil-
waukee, Wis., a corporation of Delaware

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3 Claims. (Cl. 103—87)

This invention relates to improvements in pumping units and particularly to units in which a pump and its driving means are so mounted on a common base or bed plate as to permit ready removal of the pump impeller from the pump casing whenever desired.

Pumps for propelling fluids containing fibrous material which is not disintegrated in the fluid, as in the case of pumping sewage, paper stock made from waste materials, etc., require the provision of a pump in which such fibrous material may be readily removed from the impeller or from the spaces within the pump in which such material may collect and may be compacted into a mass which cannot be moved by the ordinary operation of the pump. Centrifugal pumps for the purpose above described are generally made as single stage pumps with a central inlet into the casing and impeller and with a peripheral discharge from the casing and impeller. Such pumps are preferably made with the casing divided vertically into several portions rather than the usual horizontal division of such casing, thereby reducing the weight and cost of the pump and simplifying the packing of the joints in the casing. It being highly undesirable to disconnect the intake and discharge pipe from the casing each time cleaning of the pump is necessary, some means must be provided for withdrawing the impeller from the casing on the side thereof opposite the inlet into the casing and adjacent the driving means. Sufficient space must therefore be provided to permit withdrawal of the impeller entirely from the casing even though it is highly desirable that the space required for the setting of a pumping unit should be reduced as much as possible. Heretofore, such space has been provided by interposing an extended spacer coupling between the adjacent ends of the pump impeller and the driving shaft. Such spacer coupling is not, however, entirely satisfactory and adds a material amount to the expense of the pumping unit.

It is therefore an object of the present invention to provide a pumping unit including a pump and a driving means therefor mounted on a common base plate, with means permitting the separation of the pump and the drive when the impeller is to be withdrawn from the pump casing.

Another object of the invention is to provide a pumping unit in which the pump and the driving motor shaft are separable at a coupling to allow retraction of the motor away from the pump on their common base plate.

Another object of the invention is to provide a

pumping unit having a pump and its driving motor mounted on a single base plate which is provided with ways slidably supporting the motors for movement into and out of position for coupling the shaft with the motor shaft.

Objects and advantages other than those above set forth will be apparent from the following description when read in connection with the accompanying drawing in which:

Fig. 1 is a top plan view of a pumping unit comprising a pump and a driving motor mounted on a common base plate provided with ways for sliding the motor into and out of position for direct connection of the pump and motor shafts;

Fig. 2 is a side elevation of the structure shown in Fig. 1; and

Fig. 3 is a side elevation showing the motor retracted, the shaft coupling disconnected and the impeller with its mounting withdrawn from the pump casing.

Referring more particularly to the drawing by characters of reference, reference numeral 6 designates a base plate on which is mounted a pump comprising generally a casing 7 and an impeller 8. Casing 7 has an inlet 9 extending from one side thereof for connection with a supply pipe line 11 and has a discharge 12 extending from the periphery thereof for connection with the discharge pipe line 13. Some collections of fibrous material within the runner or in the casing immediately ahead of the runner may be removed from the pump by working through a hand hole formed in the inlet 9 thereof and closed by a cover 14. Pump impeller 8 is mounted on a shaft 16 which is supported in suitable bearings shown as roller bearings 17 and 18 mounted in an extension 19 from the rear cover plate 21 of the pump casing. Extension 19 is provided with a pad 22 formed on the exterior of the extension in such position as to rest on a suitable block 23 which may be placed on the base plate 6 when the impeller is to be withdrawn. It will be noted that the opening in the casing which is to be closed by the cover plate 21 is of a size to allow the impeller to pass therethrough only if the impeller is withdrawn on the axis of the impeller and shaft.

Base plate 6 is provided with ways 26 and 27 which receive a driving means for the pump, which is shown as an electric motor 28. The ways 26 and 27 extend over the base plate for a sufficient distance to allow movement of the motor to bring the shaft 29 thereof into position for joining the coupling parts 31 and 32 and for permitting withdrawal of the pump impeller 8 from the casing 7 when the motor is retracted. Ways

26 and 27 are formed with a well finished plane upper surface to provide a level surface over the entire length thereof and with the adjacent inner surfaces finished to provide the same distance between such surfaces over the entire length of the ways. A plate 33 is formed with two of its under edges rabbeted to such size as to fit precisely on the ways 26 and 27 and the motor 28 is fixedly mounted on such plate. The base plate 6 is cut out along the central portion thereof from an end thereof to under substantially the central portion of the sliding plate 33 when it is in its shaft-connected position. A nut 34 is mounted on the bottom of the sliding plate 33 and extends into the cut out portion of the base plate 6 to receive a screw 36 extending through a nut 37 formed on the end of the base plate 6. Sliding plate 33 is normally retained in a predetermined position by dowel pins 38 extending through the plate into holes in the ways and base plate.

When it is desired to withdraw the pump impeller 8 from the casing 7, the bolts holding the cover plate 21 to the casing are released. The bolts holding the coupling parts 31 and 32 together are also released and dowel pins 38 are removed. A wrench or crank may then be applied to the end of the screw 36 extending beyond the base plate 6 for the purpose of rotating such screw and thereby retracting sliding plate 33 and motor 28 on ways 26 and 27 away from the pump. The coupling parts separate as the motor 28 is drawn away until sufficient space is provided between the end of the motor shaft and the end of the pump shaft to withdraw impeller 8 from the casing 7 to the position at which it may rest on block 23, whereupon access may be had to all portions of the casing 7.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. In combination, a motor, a pump compris-

ing a fixed casing closed by a detachable cover plate with a bearing supported therein and located on the side of said pump adjacent said motor, the bearing supporting an impeller rotatable within the casing, a separable coupling coaxially connecting said motor with the impeller of said pump, ways parallel with the motor axis for slidably supporting said motor, and a screw for axially retracting said motor on said ways for separating said motor from said pump at said coupling for a sufficient distance whereby the cover plate and the impeller may be withdrawn by motion of translation from the casing.

2. In combination, a motor, a pump comprising a fixed casing having inlet and outlet conduits connected therewith, respectively, the casing being closed by a separable cover plate with a bearing supported therein and located on the side of said pump adjacent said motor, the bearing supporting an impeller rotatable within the casing, a base for said motor and said pump, a separable coupling coaxially connecting said motor with the impeller of said pump, cooperative means on said motor and said base for guiding said motor for movement thereof relative to said pump in an axial direction only, and means for axially retracting said motor for separating said motor from said pump at said coupling whereby the cover plate and the impeller may be withdrawn successively axially and laterally from the casing.

3. In combination, a base plate, a motor, a pump comprising a fixed casing mounted on said base having inlet and outlet conduits connected therewith, the casing being closed by a detachable cover plate having an extension with bearings supported therein and located on the side of said pump adjacent said motor, the bearings supporting an impeller rotatable within the casing, a separable coupling coaxially connecting said motor with the impeller of said pump, ways extending longitudinally of said base for slidably supporting said motor, and a screw mounted longitudinally on said base for axially retracting said motor on said ways for separating said motor from said pump at said coupling.

FRANK R. FORREST.