May 4, 1943. P. I. NAGLE 2,318,254

FLUID IMPELLER HOUSING ASSEMBLY

Filed March 24, 1941

Fig. 1.

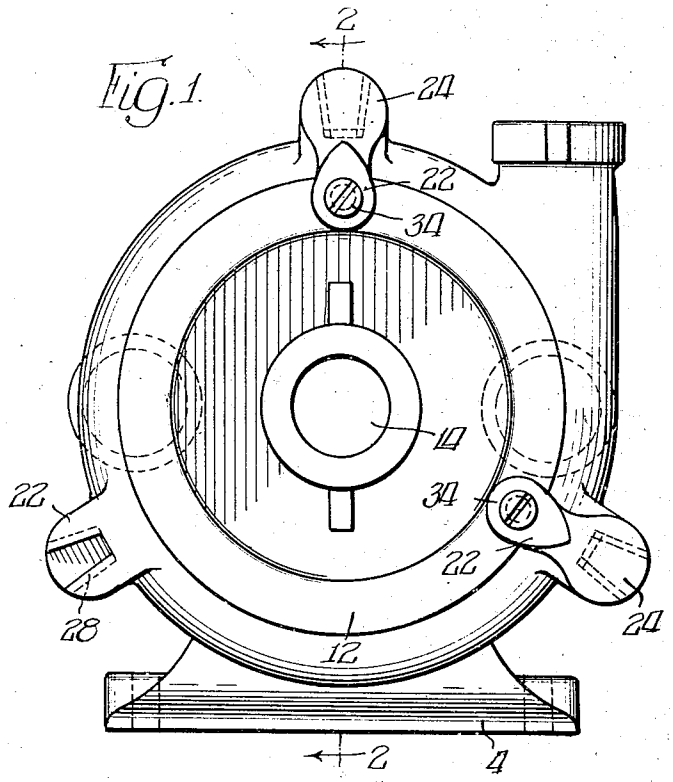


Fig. 2.

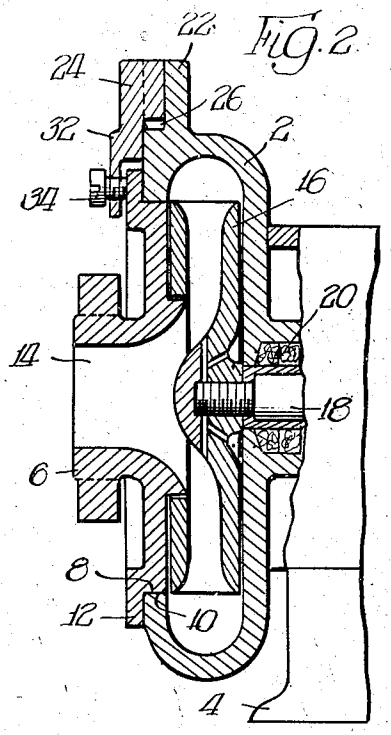


Fig. 3.

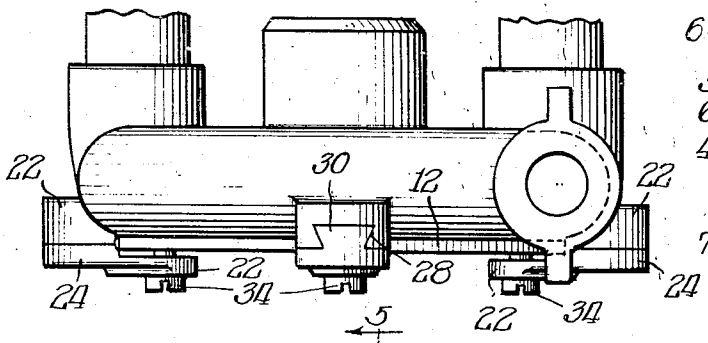


Fig. 5.

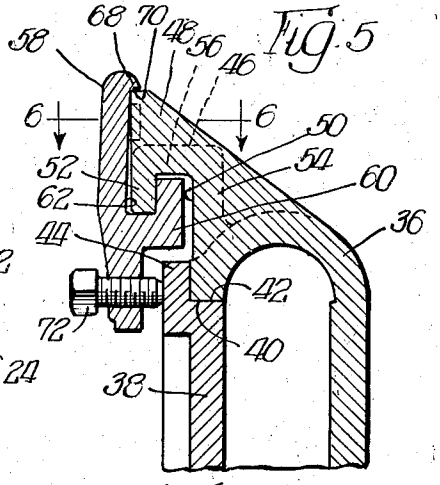


Fig. 4.

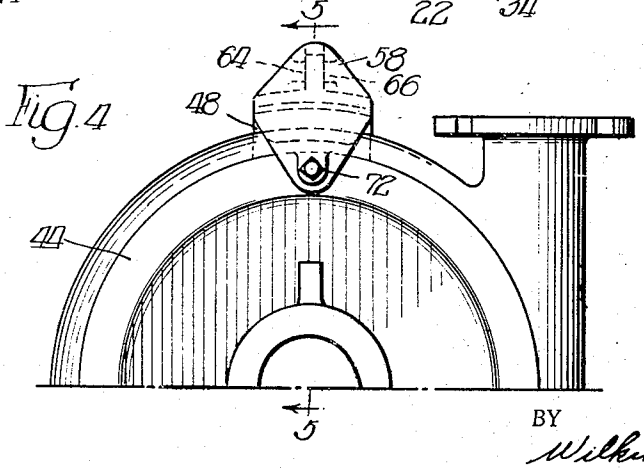
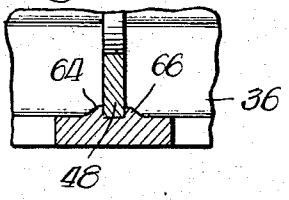


Fig. 6.



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UNITED STATES PATENT OFFICE

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FLUID IMPELLER HOUSING ASSEMBLY

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Application March 24, 1941, Serial No. 384,807

3 Claims. (Cl. 220—55)

The present invention relates to housing structures for fluid impelling devices and the like, and more in particular to novel detachable clamping means for holding a side plate assembly in operative position with respect to the impeller housing.

Among the objects of the present invention is to provide a novel, quickly detachable and readily replaceable clamping structure for holding a side plate assembly in operative position with respect to the housing for a fluid impelling device or the like.

Still another object of the present invention is to provide a novel clamping mechanism for the side plate assembly of a housing which will eliminate weight and machine work in the casing, yet one which will provide for the adequate securing of the side plate assembly in operative position with the housing at all times and which can be readily and easily manufactured and incorporated in a housing structure with ease and facility and at low cost.

The present invention, in one of its aspects, embraces the idea of providing in circumferentially spaced relation clamping elements having readily detachable connections to the housing for a fluid impelling device or the like, and which have adjustable means adapted to cooperate with the side plate assembly for said housing to securely lock and position the same in operative association with said housing, which means and connection provide for the quick opening of the housing by way of removal of the side plate assembly when desired, and likewise permit the ready and easy replacing of the clamps into operative position for locking said side plate assembly in said operative position.

The present invention, in one of its embodiments, contemplates the use of a dove-tailed joint for said clamping elements for securing the same in position with respect of the housing for the fluid impelling device or the like, which permits their ready assembly and disassembly at all times and which are further provided with means adapted to apply pressure to the side plate assembly for holding the clamps in position and exerting pressure on the side plate assembly for holding it in its operative relation to the said housing.

The invention comprehends in another of its embodiments the use of interfitting flanges or fingers, together with positioning means for holding the said clamps in their associated relation to the housing for the fluid impelling device, in addition to which is provided readily adjustable means in the form of a bolt or the like for applying pressure to the side plate assembly for holding the same in operative position with respect to the housing.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawing:

Figure 1 is a view in end elevation of a fluid impelling device embodying novel clamping means made in accordance with the present invention;

Figure 2 is a fragmentary view partly in cross section and partly in elevation, and taken substantially in the plane represented by line 2—2 of Figure 1 of the drawing;

Figure 3 is a fragmentary top plan view of the fluid impelling device shown in Figures 1 and 2 of the drawing;

Figure 4 is a fragmentary view in end elevation of a fluid impelling device incorporating in its structure another form of clamping mechanism made in accordance with the present invention;

Figure 5 is a fragmentary view in cross section taken in the plane represented by line 5—5 of Figure 4 of the drawing; and

Figure 6 is a fragmentary view partly in plan and partly in section taken in the plane represented by line 6—6 of Figure 5 of the drawing.

Referring now more in detail to the drawing, and particularly Figures 1, 2 and 3 thereof, a fluid impelling device embodying the present invention is disclosed as comprising an impeller housing 2 mounted upon a support or base 4 and provided with the side or suction plate assembly 6 stepped as at 8 to fit within an opening 10 formed in the side of the housing 2, and to provide an annular or marginal flange 12 adapted to overlie the housing 2 adjacent the said opening 10.

The suction or side plate assembly 6 is further constituted by a centrally disposed entrance or opening 14 communicating with the blades of an impeller 16 which is mounted for operation within the housing 2 and is driven by a shaft 18 extending laterally thereof through a stuffing box 20 and is mounted adjacent its other end by a bearing assembly which may take the form of the bearing assembly disclosed in a copending application Serial No. 384,806, filed March 24, 1941, for Bearing structure for fluid impelling devices and the like.

Circumferentially disposed and extending radially from the housing 2 are brackets 22, three being shown in the present illustration, which

provide means for receiving and holding clamping elements 24. Each of these clamp mechanisms is of similar construction, the bracket 22 being formed with an inwardly converging radially disposed recess 26 opening outwardly and being defined on its marginal sides by undercut surfaces 28 to receive the lugs 30 of substantially the size and shape of said recess and which extend inwardly from the clamp or plate member 32 extending radially inwardly and in overlapping and cantilevered relation to the marginal flange 12 of the side plate assembly. Mounted adjacent the inner end of the plate 32 is an adjustable bolt or set screw 34 adjustably engaging the side plate assembly adjacent the flange 12 whereby the flange can be properly seated, upon application of a turning movement to the set screw 34, with respect to the housing 2, thus providing a detachable connection for the side plate assembly. The joint between the side plate assembly and housing 2 may be rendered fluid-tight by the application of a gasket or the like between the housing and the flange 12, if so desired.

With the clamping mechanism made in accordance with the above disclosure provided on the housing structure for a fluid impelling device, the side plate assembly can be readily and easily removed from the housing to permit inspection of the impeller, and removal and replacement thereof if necessary because of wear or the like. These clamping mechanisms effectively hold the side plate assembly in operative association with the housing and eliminate machine work and tapping and other detailed finishing procedures which have been necessary heretofore where bolts, or similar elements, have been used for securing the side plate assembly to the housing, thus eliminating a large amount of machine work and greatly facilitating the placing of the side plate assembly in position and removal of the same when that becomes necessary.

While the above described structure embraces characteristics recommending its ready acceptance over present means for holding a side plate assembly in association with an impeller housing, nevertheless the invention, in one of its preferred forms, is disclosed in Figures 4, 5 and 6, embodying certain characteristics making it particularly adapted for use under the environment disclosed. The invention according to Figures 4, 5 and 6 is embodied in a fluid impelling device corresponding substantially to that shown in Figures 1 to 3, inclusive, and includes an impeller housing 36 with a side plate assembly 38, stepped as at 40, to fit within an opening 42 of the impeller housing and providing an annular flange 44 overlapping the housing 36, the said impeller housing enclosing an impeller corresponding substantially to that shown in Figures 1 to 3, inclusive, and operable in substantially the same manner.

In this embodiment, a plurality of clamping mechanisms may be disposed in circumferentially spaced relation about the periphery of the housing 36 and are of similar construction, one only being shown in the fragmentary views of Figures 4 to 6, inclusive. The clamping mechanism comprises a circumferentially extending bracket 46 having a centrally disposed and radially extending rib or web 48 extending outwardly therefrom, and which bracket is constructed to provide a circumferentially and inwardly disposed groove 50 formed between the opposed webs 52 and 54 and the transversely disposed connecting web 56 therebetween, the web 54 being directly connected to the housing 36 and the web or flange 52 depending from the web 56 and forming the overhanging structure according to the disclosure.

The clamping member is in the form of an outer plate 58 having an inwardly and upwardly extending leg 60 forming a longitudinal groove 62 between the said plate 58 and the upstanding portion of the inwardly disposed leg 60 adapted to receive, when the said clamp is in operative position with respect to the bracket 46, the downwardly depending or overhanging flange 52 thereof. The plate 58 is disposed in abutting relation to the bracket 46 and its positioning web or rib 48, and is provided with the spaced positioning lugs 64 and 66 laterally embracing the rib 48 and the positioning lug or overhanging projection 68 which is disposed in overlapping relation to the upper marginal edge 70 of said positioning rib 48. Threadedly mounted in the opposite end of the plate 58 is a bolt or cap screw 72 which has its end in engagement with the annular or marginal flange 44 of the side plate assembly which, when tightened, fixes the plate in operative association with the housing 36.

From the above description it will be apparent that the clamp is effectively held in operative position at all times by its interfitting and cantilevered relation with the depending flange 52 which provides an anchor resisting movement of the bolt 72 to effect a tight fit between the side plate assembly and the housing. The clamp is effectively positioned at all times by positioning lugs 64 and 66 and held in radial position between the leg 60 and the overhanging lug 68. It will be noted that the width of the groove between the plate 58 and leg 60 is somewhat greater than the thickness of overhanging flange 52 to permit the clamp to be placed into position and removed from association with the bracket 46. This type of clamp structure provides for quick manipulation of the side plate assembly either in the assembly or disassembly of the same with respect to the housing, yet provides for a decrease in weight in the entire structure and the elimination of machine work on the housing and side plate assembly which has heretofore been necessary to effect a connection therebetween. In this form of clamp structure, the bolt 72 is maintained at all times in proper operative association with the flange 44 to maintain proper assembled relation of the side plate and the housing, maintaining at all times a fluid-tight joint therebetween. As in the other embodiments, a gasket may be provided between the side plate and housing, if so desired.

While I have herein described and upon the drawing shown illustrative embodiments of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. In combination, an housing assembly having a side opening, a side plate assembly for said opening, said housing assembly having a plurality of bracket members extending therefrom each provided with an overhanging locking flange providing a groove having its side walls substantially parallel and disposed in planes substantially parallel to the plane of said opening, a clamping member for each of said bracket members, said clamping member comprising an outer plate portion adapted to overlie the said bracket and side plate assembly and provided with an intermediate

locking flange spaced from but in substantially parallel relation to said plate portion to provide an intermediate groove the side walls of which are substantially parallel, the locking flange of each of said clamping and bracket members fitting into the groove of the other member, and an adjustable pressure applying member carried by said clamping member and engageable with said side plate assembly for securing the same to said housing.

2. In combination, an housing assembly having a side opening, a side plate assembly for said opening, said housing assembly having a plurality of bracket members extending therefrom each provided with an overhanging locking flange providing a groove having its side walls substantially parallel and disposed in planes substantially parallel to the plane of said opening, a clamping member for each of said bracket members, said clamping member comprising an outer plate portion adapted to overlie the said bracket and side plate assembly and provided with an intermediate locking flange spaced from but in substantially parallel relation to said plate portion to provide an intermediate groove the side walls of which are substantially parallel, the locking flange of each of said clamping and bracket members fitting into the groove of the other member, each of said brackets having an upstanding positioning rib, each of said brackets having positioning lugs embracing said rib to prevent displacement of said clamping member with respect to said bracket, and an adjustable pressure applying member carried by said clamping member and engageable with said side plate assembly for securing the same to said housing.

3. In combination, an housing assembly having a side opening, a side plate assembly for said opening, said housing assembly having a plurality of bracket members extending therefrom each provided with an overhanging locking flange providing a groove having its side walls substantially parallel and disposed in planes substantially parallel to the plane of said opening, a clamping member for each of said bracket members, said clamping member comprising an outer plate portion adapted to overlie the said bracket and side plate assembly and provided with an intermediate locking flange spaced from but in substantially parallel relation to said plate portion to provide an intermediate groove the side walls of which are substantially parallel, the locking flange of each of said clamping and bracket members fitting into the groove of the other member, each of said brackets having an upstanding positioning rib, each of said brackets having spaced lugs laterally embracing said rib to prevent lateral displacement of said clamping member with respect to said bracket and a lug overhanging said rib to prevent uncoupling of said interlocking flanges, and an adjustable pressure applying member carried by said clamping member and engageable with said side plate assembly for securing the same to said housing.

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