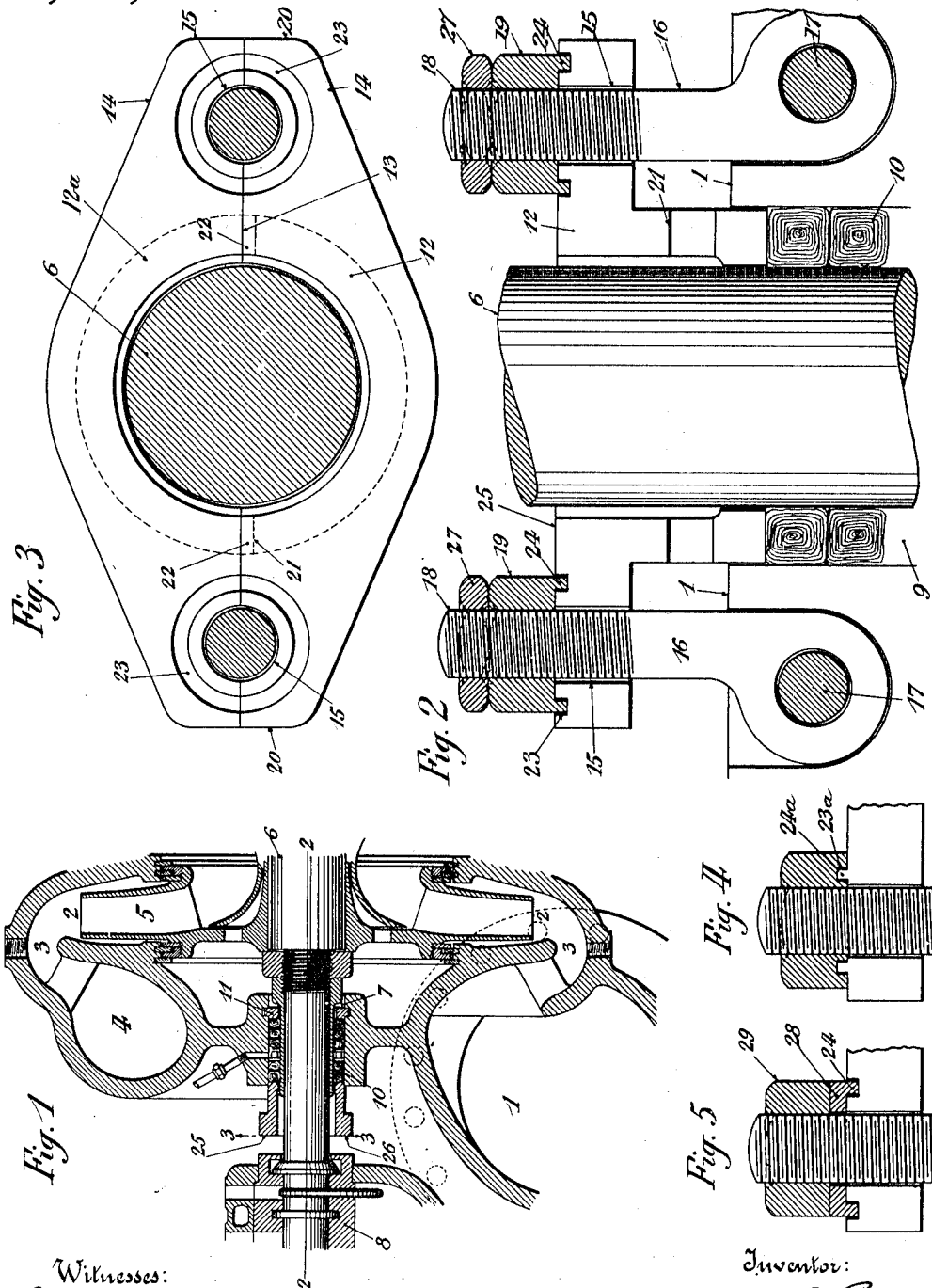


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STUFFING BOX FOR CENTRIFUGAL PUMPS.
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1,055,166.

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STUFFING-BOX FOR CENTRIFUGAL PUMPS.

1,055,166.

Specification of Letters Patent.

Patented Mar. 4, 1913.

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To all whom it may concern:

Be it known that I, ALBERT E. GUY, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have
5 invented a new and useful Improvement in Stuffing-Boxes for Centrifugal Pumps, of which the following is a specification.

This invention relates to glands or stuffing-boxes, and especially to such as are used in
10 connection with centrifugal or rotary pumps.

The object of the invention is to produce an improved gland or stuffing-box which provides ready access to the pump packing, and wherein the parts are easily applied to
15 and moved from around the rotating pump shaft.

A further object of the invention is to provide a gland or stuffing-box embodying a plurality of members, wherein the members
20 are normally prevented from separating from each other, either longitudinally or transversely with reference to the axis of the pump shaft, thereby preventing the stuffing-box from becoming accidentally opened and
25 the members of the gland from dropping out, either because of the yield or give in the parts themselves, or because of the vibration and jar of the pump when in operation.

The invention is designed particularly for
30 use with centrifugal pumps, especially of the type illustrated in my prior Patent No. 1,037,244, granted September 3, 1912, and is shown in the drawings as applied to such a pump. It will be understood, however, that
35 it is applicable to centrifugal or rotary pumps generally, and is not limited to the particular type of pump shown in the drawings.

In the accompanying drawings forming a
40 part hereof, Figure 1 is a sectional elevation of a portion of a centrifugal pump with my invention applied thereto, and showing the casing and impeller and impeller shaft rotating therein; Fig. 2 is a longitudinal section on the line 2—2, Fig. 1; Fig. 3 is a
45 cross section on the line 3—3, Fig. 1; and Figs. 4 and 5 are detail views of modified forms of the invention.

The general construction of the pump
50 may be of any preferred or approved form, the drawings merely illustrating sufficient of the pump to make the invention easily understood.

1 represents, for example, the left hand

or discharge end of the casing of the pump 55 shown in my prior patent referred to, 2 is the impeller chamber, 3 the return bend, 4 the discharge chamber and 5 the impeller. It will be understood, however, that the invention may be applied to either or to both
60 ends of the pump, and that the portion of the body or casing 1 illustrated may be either the suction or discharge end of the pump. 6 represents the usual impeller shaft carrying the impeller 5, which shaft 65 projects through an opening 7 in the wall of the casing 1 and is journaled in the bearing 8.

The opening 7 is of larger diameter than the shaft, thereby forming an annular space 70 9 around the shaft to receive the members of a packing 10, which is formed of some compressible material, such as flax fiber, as is usual. At one end of the annular space 9 the casing 1 is provided with an internal
75 annular shoulder or collar 11 against which the packing is thrust endwise to compress the same and form a tight seal. The packing 10 is compressed and held in place by a suitable gland, which is formed of two or
80 more mating members 12 and 12^a, which are cut away at the center, as at 13, to fit loosely around the impeller shaft 6. Members 12 and 12^a are provided on opposite sides of the impeller shaft with laterally extending
85 side flanges 14 which are provided with registering slots or apertures, as at 15, to receive the shanks of pivoted bolts 16, which swing on transverse pivots 17 in the casing wall 1, the arrangement being such that the
90 bolts can be swung toward and from the axis of the impeller shaft 6 to place them either parallel with or at an angle to the shaft 6. This prevents the bolts from being lost or
95 misplaced and also gives room for the insertion or removal of packing material. The outer ends of the bolts 16 are threaded, as at 18, to receive nuts 19, which nuts can be
100 tightened up on the bolts to force the gland into the annular space 9 to compress the packing and form a tight joint.

Heretofore in the art it has been customary to extend the slots or openings 15 laterally to the outer rims of the flanges 14, or, in other words, to make them open slots 105 so that the bolts can be swung into or out of proper position while the gland is in place. In practice it is found that with such

construction the outer surface of the gland may wear, or the flanges 14 may spring or give when the nuts are tightened up, so that in operation of the pump the vibration and jar thereof may either loosen the nuts on the bolts so that the gland is released, or the bolts 16 may accidentally swing outwardly from slots 15 and thereby permit the members of the gland to separate from each other and release the packing. The present invention has particular relation to the means for preventing the gland members from becoming accidentally displaced. In the first place, the grooves or slots 15 are closed at their ends by portions 20 of the flanges 14, which completely surround the bolts in the assembled structure and prevent accidental lateral displacement thereof. Furthermore, one of the gland members, as 12, is provided with one or more transversely extending grooves or sockets 21 to receive a rib or ribs 22 on the other member 12^a, said members, therefore, interlocking and when assembled being prevented from moving with reference to each other in the direction of the axis of the impeller shaft 6. Means is also provided for locking the members of the gland to the bolts 16. In the present instance the outer faces of the gland members are provided with circular grooves or slots 23, surrounding the inner portion of the slots 15 in the wings 14. The nuts 19 are provided with annular ribs or projections 24 of practically the same size as the grooves or slots 23.

To assemble the stuffing-box, the packing is first put in place and the bolts 16 are then swung inwardly until they lie parallel with the axis of the shaft 6. The members 12 and 12^a of the gland are then placed around the impeller shaft 6, with the ribs 22 projecting into the transverse grooves or slots 21. The inner end of the gland is then pushed into the outer end of the annular space 9. The nuts 15 are then threaded on the ends of the bolts 16 and are turned up thereon to cause the ribs 24 to enter the annular grooves or slots 23, the nuts on the oppositely disposed bolts being turned up equally to maintain the end surfaces 25 and 26 of the gland transverse or normal to the axis of the impeller shaft. In this manner the packing is tightened sufficiently to secure a liquid-tight seal. When the parts are fully assembled lock nuts 27 may be applied to the outer ends of the bolts to prevent accidental backward turning of the nuts 19, although in most cases such lock nuts are not essential and may be omitted.

The ribs 22 and grooves 21 prevent relative endwise movement of the gland members lengthwise of the impeller shaft. The ribs 24 and grooves 23 tie or bind the two members of the gland to each other and prevent lateral separation thereof. Moreover, the

same ribs and grooves also prevent the bolts 16 from accidentally swinging outwardly on their pivots 17, notwithstanding the jar or vibration of the pump itself, or any give or spring in the members of the glands or other parts. The nuts, therefore, not only lock the gland members to each other, but also lock the bolts to the gland. The construction is simple and secure and obviates all danger of accidental displacement.

Obviously, instead of forming the grooves 23 in the gland members and the ribs 24 on the nuts, the reverse construction may be used. That is to say, the grooves may be formed in the under portions of the nuts, as at 23^a, Fig. 4, and the ribs may be formed on the gland members 12 and 12^a, as at 24^a. This construction is diagrammatically illustrated in Fig. 4, and will be readily understood without further description.

Fig. 5 shows another modification in which the ribs 24 are formed on washers 28 placed beneath ordinary nuts 29. The effect here is the same as in the form first described, the only difference being that a standard nut may be used, thus decreasing the cost to some extent.

What I claim is:—

1. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of a gland comprising separable members and surrounding said shaft and provided with side apertures therethrough, bolts connected to said casing and projecting through the apertures in said gland, means movable on said bolts for forcing the gland members into said opening to compress said packing, and interengaging parts on said means and gland members for locking said bolts to said gland and preventing relative lateral movement between the bolts and gland and between said gland members.

2. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of separable gland members surrounding said shaft and provided with side flanges having apertures therethrough, bolts pivotally connected to said casing and arranged in one position to project through said flange apertures, means movable on said bolts for forcing the gland members into said opening to compress said packing, and interengaging parts on said means and gland members for locking said bolts to said gland and preventing relative lateral movement between said bolts and gland and between said gland members.

3. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of separable gland members surrounding said shaft and provided with interlocking portions arranged to prevent

relative movement lengthwise of said shaft between said gland members, said gland members being also provided with side apertures therethrough, bolts pivotally connected to said casing and arranged to swing laterally and in one position to project through said apertures, means movable on said bolts for forcing the glands into said opening to compress said packing, and interengaging parts on said means and gland members for locking said bolts to said glands and preventing relative lateral movement between said bolts and glands and between said gland members.

4. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of gland members surrounding said shaft and provided with side apertures, bolts pivotally connected to said casing and arranged to swing laterally and in one position to project through said apertures, means on said bolts for forcing said gland into said opening to compress said packing, said gland members being provided with annular grooves concentric with said apertures, and said means being provided with projections arranged to enter said grooves and lock said bolts to said gland members to thereby prevent relative lateral movement between said bolts and gland members and between said gland members.

5. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of gland members surrounding said shaft and provided with interlocking portions arranged to prevent relative movement lengthwise of said shaft between said gland members, said gland members being also provided with side apertures, bolts pivotally connected to said casing and arranged when in one position to project through said apertures, means movable on said bolts for forcing said gland into said opening to compress said packing, said gland members being provided with annular grooves concentric with said apertures, and said means being provided with projections arranged to

enter said grooves and lock said bolts to said gland members to thereby prevent relative lateral movement between said bolts and gland members and between said gland members.

6. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of gland members surrounding said shaft and provided with side openings, bolts pivotally connected to said casing and arranged to swing laterally and to project through said openings, means movable on said bolts for forcing said gland into said opening to compress said packing, said gland members being provided with annular grooves, and said means being provided with annular ribs arranged to enter said grooves and lock said bolts to said gland members and prevent relative lateral movement therebetween.

7. The combination with a casing having an opening therein, a shaft projecting through said opening, and a packing in said opening, of gland members surrounding said shaft, one of said members being provided with a transverse groove and the other member being provided with a transverse rib arranged to enter said groove and prevent relative movement of said gland members lengthwise of said shaft, said gland members being also provided with side openings, bolts pivotally connected to said casing and arranged to project through said openings, nuts on said bolts for forcing said gland into said opening to compress said packing, said gland members being provided with annular grooves, and said nuts being provided with annular ribs arranged to enter said annular grooves and lock said bolts to said glands to thereby prevent relative lateral movement between said bolts and glands and between said gland members.

In testimony whereof, I have hereunto set my hand.

ALBERT E. GUY.

Witnesses:

ELBERT L. HYDE,
WILLIAM P. LARKIN.