

Feb. 19, 1952

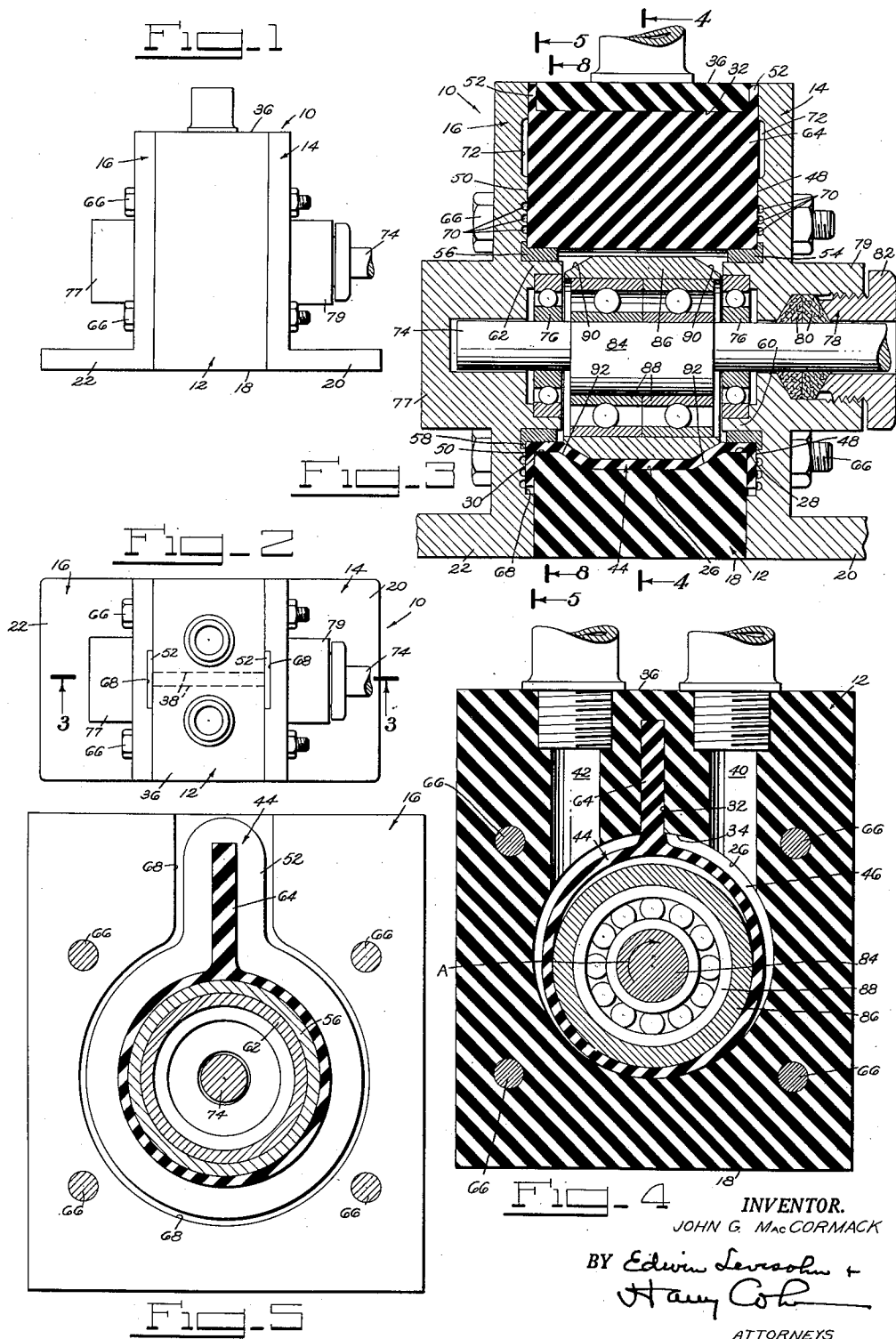
J. G. MacCORMACK

2,585,949

PUMP

Filed Aug. 17, 1949

2 SHEETS—SHEET 1



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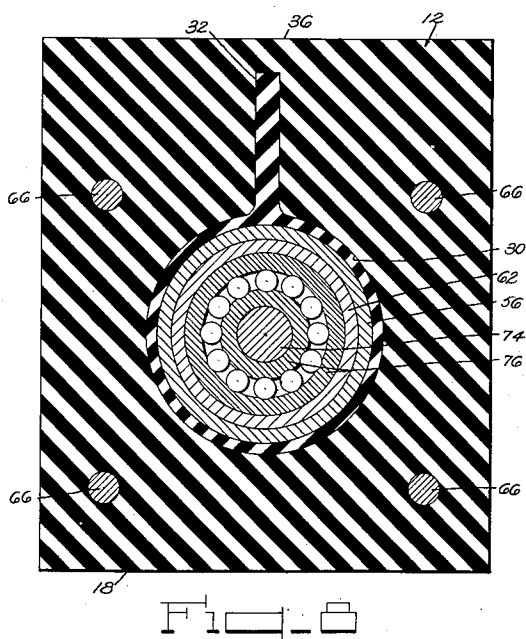
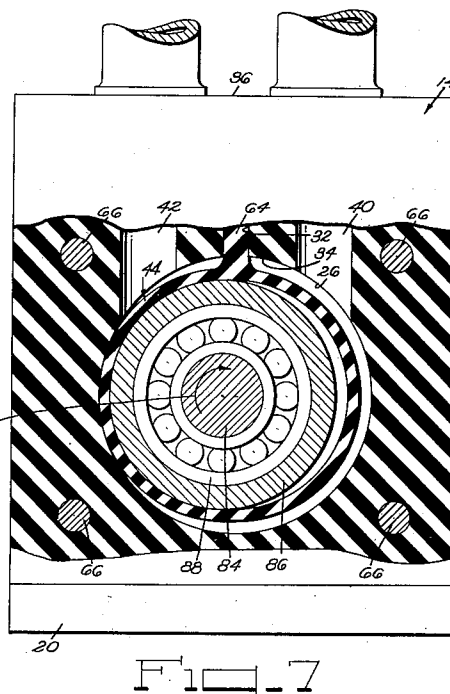
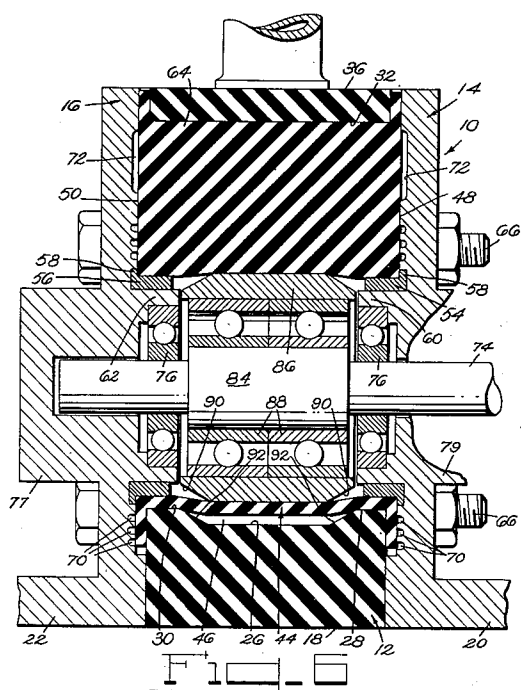
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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PUMP

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5 Claims. (Cl. 103—149)

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This invention relates to pumps or compressors, hereinafter referred to as pumps. While useful for other purposes, the pump of the present invention is especially well adapted for pumping various liquid chemicals.

The primary object of the present invention is the provision of a pump which is simple in construction and of improved leak-proof design.

Another object is the provision of a pump having means for facilitating the assembly parts thereof.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a side view of a pump embodying the present invention;

Fig. 2 is a top plan view of the pump;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a sectional view on the line 5—5 of Fig. 3;

Figs. 6 and 7 are views similar to Figs. 3 and 4, respectively, showing the rotor in a different position; and

Fig. 8 is a sectional view on the line 8—8 of Fig. 3.

Referring now to the drawings in detail, the pump 10 embodying the present invention, in the presently preferred form thereof, comprises a casing which includes the body 12 and the end plates or heads 14 and 16. The base of the casing is conveniently formed by the flat bottom part 18 of the casing body 12 and by the flat lateral extensions 20 and 22 of the end plates 14 and 16.

The casing body 12 has an inner cylindrical surface intermediate the circumferentially extending ribs 28 and 30, in outwardly offset relation to the latter, the inner surfaces of said ribs being cylindrical co-axially with surface 26. Said casing body 12 is preferably formed of hard rubber, although it can be formed of any other suitable material, for example but without limitation, Bakelite. As shown, said casing body 12 is provided, interiorly thereof, with a recessed portion 32 which extends longitudinally from the top portion 34 of said inner cylindrical surface to a point below the upper surface 36 of the casing body, said recessed portion extending transversely of said casing body for the full length thereof, as indicated by the broken lines 38 in

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Fig. 2. The inlet and outlet openings 40 and 42 are disposed at the opposite sides of the recess 32, it being understood that either of said openings may be the inlet opening and that the other of said openings may be the outlet opening, depending upon the direction of rotation of the rotor hereinafter referred to, as will be subsequently more clearly understood. Casing body 12 is preferably formed in one piece, the recess 10 being provided therein.

A resilient and flexible member or liner 44, which is preferably formed of rubber but which can be formed of any other suitable material, is disposed within the casing body 12 and defines with the cylindrical surface 26 of the latter an annular fluid passage 46 which extends laterally between ribs 28 and 30 and circumferentially of casing body 12 from the inlet 40 to the outlet 42. Said liner is provided with end portions 48 and 50 and with an annular rib 52 at each of said end portions. Coupling members or rings 54 and 56, preferably formed of aluminum, are positioned within each of said end portions 48 and 50, respectively, a flanged part 58 of said rings overlying the ribs 52 of the liner. The sides of the fluid passage are sealed by the end portions 48 and 50 of the liner which engage ribs 28 and 30, respectively, continuously thereof. Cylindrical metal projections 60 and 62 of plates 14 and 16, respectively, extend into rings 54 and 56, respectively, in interfitting relation therewith said rings being formed of metal for facilitating the coupling of said cylindrical projections into the rubber liner in the assembly of the pump. Direct communication between the casing openings 40 and 42 is prevented by the integral portion 64 of member 44 which is tightly fitted in recess 32 to prevent movement thereof, and said recess is closed at the top thereof by the upper surface 36 of the casing body, whereby leakage from the top of the latter is prevented.

The cylinder plates or heads 14 and 16, which are formed of metal, are secured to the casing body 12 by through-bolts 66. To improve the sealing relation between the peripherally extending side edges of member 44 and the adjacent parts of the pump casing, recesses 68 are provided in plates 14 and 16, respectively, the annular ribs 52 of member 44 being received with some clearance in said recesses and abutting the circular grooved portions 70 in said recesses. Said plates are also provided with the recesses 72 in the upper part thereof which extend upwardly from recess 68 in each plate. Said recesses 72 are adjacent the integral portion 64 of member 44.

It will be understood that when the plates 14 and 16 are tightly pressed against the casing body 12 by the nuts on bolts 66, the adjacent portions of member 44 disposed in recesses 68 are clamped into said grooves 70 and said recesses 72, to form a tight fluid-seal between the peripherally extending side edges of member 44 and the adjacent parts of the pump casing.

Provision is made to progressively press resilient member 44 against cylindrical surface 26 of the casing for the full width of said surface, the progression of said pressing action being in a direction extending circumferentially of the casing body 12 from the inlet 40 to the outlet 42. The means provided for this purpose comprises a rotary shaft 74 journaled in ball bearings 76 mounted in the cylindrical projections 60 and 62 of end plates 14 and 16, respectively, for rotation coaxially of the cylindrical surface 26. Said shaft is completely enclosed at one end by part 77 of plate 16, and the driven end of said shaft extends through a fluid seal 78 positioned in part 79 of plate 14 to prevent fluid from passing into the casing around the portion of the shaft extending through plate 14. The liquid seal device 78 may be of any suitable construction, being shown only for illustrative purposes as comprising a packing ring 80 disposed about the shaft and a gland 82 through which the shaft extends, said gland being threaded into part 79 of plate 14.

An eccentric rotor 84 is fixedly mounted on or integral with shaft 74 for rotation about an axis eccentric to the axis of the cylindrical surface 26. A cylindrical pressure-applying member 86 is mounted on rotor 84 with interposed ball bearings 88. Said pressure-applying member is provided with beveled marginal edge portions 90 which conform to the beveled portions 92 of ribs 28 and 30, respectively, to provide member 86 with an outer contour complementary to that of surface 26, whereby, when said member presses against the resilient member 44, the latter will be pressed tightly against all parts of the cylindrical surface 26 including said beveled portions of said ribs, as illustrated in Fig. 3.

In operation, shaft 74 is rotated by an electric motor (not shown), or in any other suitable way, for rotating the rotor 84 in the direction of the arrow (Figs. 4 and 7), when the openings 40 and 42 are the inlet and outlet openings respectively of the pump, or in the reverse direction when the openings 42 and 40 are the inlet and outlet openings, respectively. Pressure-applying member 86 is operated by rotor 84 to press the flexible and resilient member or liner 44 progressively against the cylindrical surface 26 circumferentially thereof for the full width of the latter. It will be understood that member 86 tightly engages the inner cylindrical surface of member 44 and that the rotor is moved in relation to pressure-applying member 86 during the rotation of shaft 74 whereby to accomplish the above described progressive pressing of liner 44 against the cylindrical surface 26 of the casing body 12.

It will be understood that various changes in details of construction and in the arrangement of parts may be made without departing from the underlying idea or principles of this invention within the scope of the appended claims.

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

1. A pump comprising a casing having an inlet and an outlet, said casing having a hollow body provided with an inner cylindrical surface, means including a flexible and resilient member having

integral ribs secured in said casing and defining with said surface of the casing a fluid passage extending circumferentially of said surface from said inlet to said outlet, a rotor mounted for rotation in said casing about an axis eccentric to the axis of said cylindrical surface, movable pressure-applying means operated by said rotor and operable on said resilient member to progressively press said resilient member against said surface of the casing circumferentially thereof in a direction from said inlet to said outlet during the rotation of said rotor, said casing having opposite side walls, rigid coupling members which interfit with said ribs, said opposite side walls of said casing having recesses adapted to receive said ribs and said coupling members, and means engaging said side walls and pressing said ribs and said coupling members into said recesses for closing said passage at the opposite circumferentially extending side edges thereof.

2. A pump comprising a casing having an inlet and an outlet, said casing having a hollow body provided with an inner cylindrical surface, means including a flexible and resilient member having integral ribs secured in said casing and defining with said surface of the casing a fluid passage extending circumferentially of said surface from said inlet to said outlet, a rotor mounted for rotation in said casing about an axis eccentric to the axis of said cylindrical surface, movable pressure-applying means operated by said rotor and operable on said resilient member to progressively press said resilient member against said surface of the casing circumferentially thereof in a direction from said inlet to said outlet during the rotation of said rotor, said casing having opposite side walls, rigid ring members which interfit with said ribs, said opposite side walls of said casing having recesses adapted to receive said ribs and said ring members, said recesses having a plurality of grooved portions adjacent to said ribs, and means engaging said side walls and pressing said ring members into said recesses and said ribs into said recesses and said grooved portions for closing said passage at the opposite circumferentially extending side edges thereof.

3. A pump comprising a casing having an inlet and an outlet, said casing having a hollow body provided with an inner cylindrical surface, means including a flexible and resilient member having integral ribs secured in said casing and defining with said surface of the casing a fluid passage extending circumferentially of said surface from said inlet to said outlet, a rotor mounted for rotation in said casing about an axis eccentric to the axis of said cylindrical surface, movable pressure-applying means operated by said rotor and operable on said resilient member to progressively press said resilient member against said surface of the casing circumferentially thereof in a direction from said inlet to said outlet during the rotation of said rotor, said casing having opposite side walls, rigid coupling members which interfit with said ribs, said opposite side walls of said casing having recesses adapted to receive said ribs and said coupling members, said side walls having a cylindrical projection which is adapted to be positioned in, and interfit with, said coupling members, and means engaging said side walls and pressing said ribs and said coupling members into said recesses for closing said passage at the opposite circumferentially extending side edges thereof, said side wall cylindrical projections pressing

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said coupling members against said ribs in a radially outward direction.

4. A pump comprising a casing body provided with a peripheral wall having an inner cylindrical surface, said body being formed in one piece and having circumferentially spaced fluid passages and a recess in said peripheral wall, said recess extending from said surface and closed at its outer end by said wall, said inner cylindrical surface having inwardly extending marginal edge portions at the opposite sides, respectively, of said body, a resilient and flexible annular member positioned within said body in engagement with said marginal edge portions thereof and having an integral part extending into said recess to provide a barrier between said fluid passages, side walls closing the opposite sides of said casing body, a shaft journaled for rotation in said side walls co-axially of said cylindrical surface, an eccentric rotor actuated by said shaft and operable to press said annular member progressively against said cylindrical surface between said inwardly extending portions thereof for pumping fluid from one of said passages through the other of said passages, each of said side walls having a recess, said annular member having outwardly extending end flanges positioned and clamped in said recesses of said side walls, respectively, and a metal ring fitted into the opening of said annular member at each side thereof, whereby said side walls press said metal rings against said end flanges in a radially outward direction to improve the fluid-tight seal between said annular member and said casing body.

5. A pump comprising a casing body provided with a peripheral wall having an inner cylindrical surface, said body being formed in one piece and having circumferentially spaced fluid passages and a recess in said peripheral wall, said recess extending from said surface and closed at its outer end by said wall, said inner cylindrical surface having inwardly extending mar-

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ginal edge portions at the opposite sides, respectively, of said body, a resilient and flexible annular member positioned within said body in engagement with said marginal edge portions thereof and having an integral part extending into said recess to provide a barrier between said fluid passages, side walls closing the opposite sides of said casing body, a shaft journaled for rotation in said side walls co-axially of said cylindrical surface, an eccentric rotor actuated by said shaft and operable to press said annular member progressively against said cylindrical surface between said inwardly extending portions thereof for pumping fluid from one of said passages through the other of said passages, each of said side walls having a recess and a cylindrical projection, said annular member having outwardly extending end flanges positioned and clamped in said recesses of said side walls, respectively, and a metal ring fitted into the opening of said annular member at each side thereof, said cylindrical projection fitting into said ring at the adjacent side of said casing body whereby said projections press said metal rings against said end flanges in a radially outward direction to improve the fluid-tight seal between said annular member and said casing body.

JOHN GEORGE MACCORMACK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,428,619	Douglas	Oct. 7, 1947

FOREIGN PATENTS

Number	Country	Date
583,578	Great Britain	Dec. 20, 1946
590,045	Great Britain	July 7, 1947
662,980	Germany	Dec. 7, 1934