

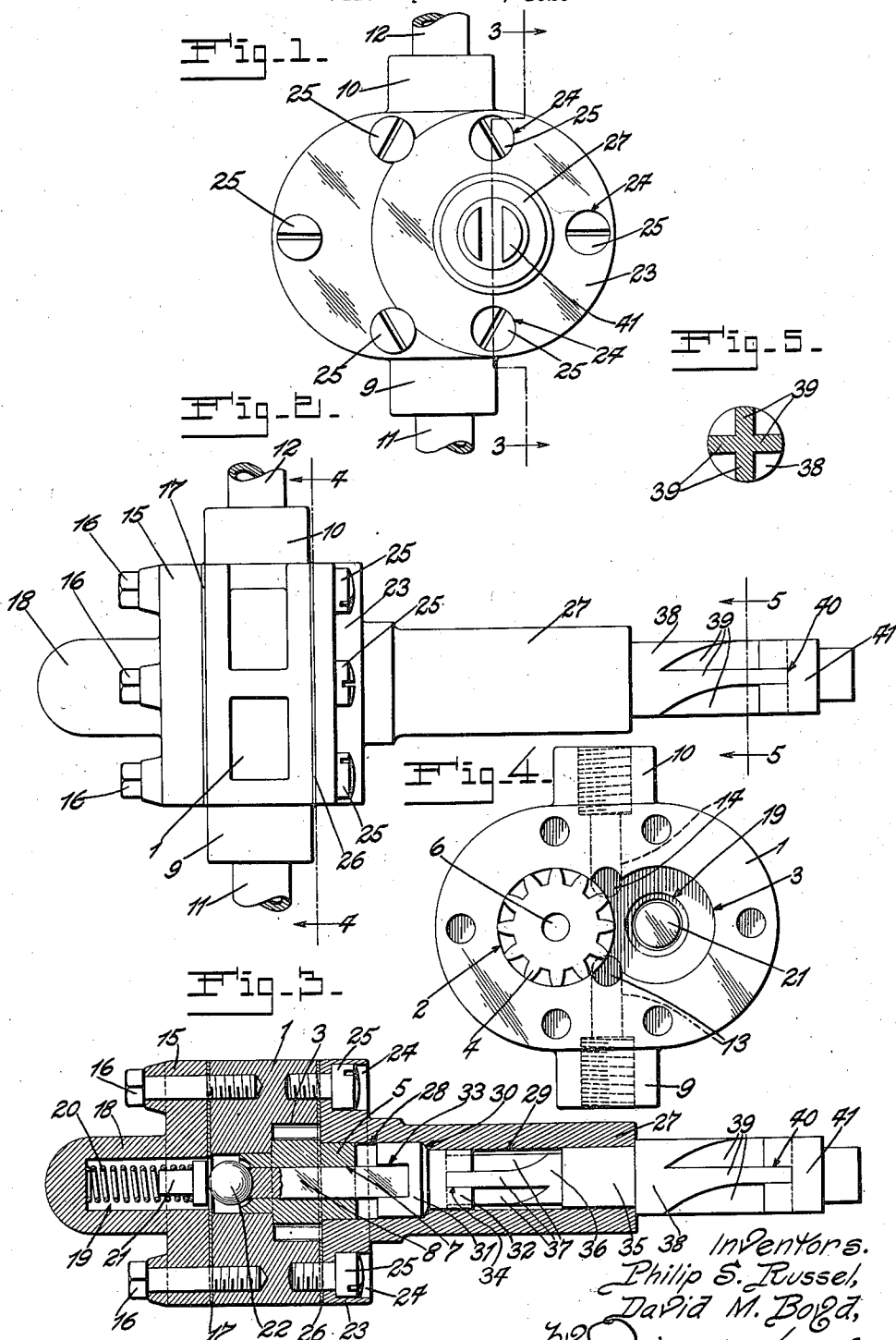
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PUMP

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PUMP.

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This invention relates to improvements in pumps, and consists in the novel construction hereinafter described.

5 An object of the invention is to provide a pump adapted for high speed operation for pumping the oil supply for oil burners, the water supply of a circulating system of an automobile, or for other similar and allied uses.

10 Another object of the invention is to provide a pump of the type described, with means for sealing the pumping chamber to provide against leakage between the operating shaft and the housing.

15 Another object of the invention is to provide a pump of the class described in which there are meshing gears, one of which is driven from a drive shaft, with provision for centering the drive shaft and driven gear in order to prevent wear and distortion of the gear axis.

Additional advantages of the construction will be apparent from the following detailed description thereof taken in connection with the accompanying drawing, in which—

Fig. 1 is a front elevation of a pump embodying the invention.

Fig. 2 is a side elevation.

30 Fig. 3 is a longitudinal section through the pump taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a cross section through the pump on the line 4—4 of Fig. 2.

35 Fig. 5 is a cross section on the line 5—5 of Fig. 2.

In the embodiment of the invention illustrated in the drawing the pump is shown as including a pump housing composed of a central casting 1 having circular intersecting cavities 2 and 3 formed therein, in which the pump gears 4 and 5 are respectively mounted. The gear 4 is loosely mounted upon a stud 6 and the gear 5 is formed with a rectangular central bore 7 in which a rectangular sliding pin 8 is mounted. The inner end of the pin 8 is concave as clearly shown in Fig. 3 of the drawing. The member 1 of the pump housing has an upper and a lower boss 9 and 10, respectively, said bosses being internally threaded to receive an inlet and a discharge conduit 11 and 12. Within the member 1 and in prolongation of the opening in the bosses 9 and 10 are vertically dis-

posed passage ways 13 and 14, said passage ways opening into the space formed by the cavities 2 and 3. 55

An end plate 15 is secured to the rear face of the member 1 by bolts 16, the space between the face of the member 1 and the face of the plate 15 being seated by a gasket 17. The plate 15 has an extension 18 arranged coaxially with the axis of the pin 8 and within the inner face of the extension 18 is a cylindrical cavity 19, said cavity 19 being in prolongation of the seat of the recess in which the gear 5 is mounted. Within the cavity 19 is an expansion spring 20 of the spiral type seating at its inner end against the base of the cavity 19 and carrying at its outer end a head 21. Between the head 21 and the inner face of the pin 8 is a ball 22. The construction just described provides for exerting resilient pressure in an outward direction against the pin 8. The edge of the inner shoulder of the opening 7 in the gear 5 is beveled to guide the ball 22, and to permit it always to exercise an endwise thrust on the pin 8, by the outward expansion of the spring 20. 65 70 75

Attached to the front face of the member 1 is an end plate 23 having a series of countersunk recesses 24 in its front face in which the heads of bolts 25 seat, said bolts screwing into threaded recesses in the member 1 and serving as a means of connecting the end plate to the forward face of the member 1. The joint between the end plate 23 and the member 1 is sealed by a gasket 26. 80 85

Extending forwardly from the end plate 23 is a cylindrical extension 27 constituting the drive shaft housing. A cylindrical opening 28 extends through the axis of the end plate 23 and for a distance into the extension 27, and a cylindrical opening 29 of relatively smaller diameter extends forwardly through the remaining section of the shaft housing 27. The shoulder 30 between the openings 28 and 29 is beveled forming a seat of a coupling member composed of the enlarged portion 31 and a reduced portion 32. The inner end of the coupling member has a rectangular recess 33 formed therein into which the outer end of the pin 8 projects, the cross area of the recess being slightly in excess of the cross area of the 90 95 100 105

end of the pin 8 so that there may be a slight lateral movement between the coupling and the pin, thereby preventing the gear 5 from distortion and at the same time permitting the portion 31 of the coupling member to center upon the shoulder 30. The outward pressure induced by the spring 20 serves to hold the coupling member firmly upon the seat 30 and as the coupling member is revolved a tight joint develops as the shoulder between the portions 31 and 32 of the coupling member grinds into the seat 30. Thus a sealed bearing for the coupling member that forms a part of the drive shaft is formed without the use of a stuffing box, thereby avoiding the friction ordinarily resulting where a stuffing box is provided, and, at the same time, a tighter seal is effected than would be possible with an ordinary stuffing box construction. Furthermore, distortion of the drive shaft does not affect a distortion of the axis of the gear 5, so that the gear 5 is always in true mesh with the driven gear 4 avoiding wear on the gear teeth.

The forward end of the portion 32 of the coupling member is formed with transverse recesses 34 and is adapted to receive the inner end of a drive shaft member composed of a central cylindrical section 35 that seats in the end of the drive shaft housing 27 and an inner cylindrical extension 36 having crossed ribs 37, said crossed ribs 37 extending at their inner ends into the recesses 34. The drive shaft member also has a forward enlarged cylindrical portion 38, the shoulder between the portions 35 and 38 seating against the end of the shaft housing. The cylindrical portion 38 is cut away at its forward end to form ribs 39 that seat in a recess 40 of a coupling device 41 that may be of material of a tensile strength less than that of the drive shaft member, the coupling device 41 being driven from the drive shaft of a motor. Inasmuch as the tensile strength of the coupling device 41 is less than the tensile strength of the drive shaft member and also of the shaft of the motor, if there is any accidental locking of the pump the device 41 will fracture without injuring the pump mechanism.

It has been found in practice that the best sealing effect is produced by making the housing and the member that seats against the housing of different metals.

We are aware that the invention may be modified in various particulars without departing from the spirit and scope thereof. We do not, therefore, limit ourselves to unessential details, but what we claim and desire to secure by Letters Patent is:—

1. In a device of the class described, the combination of a pump housing, a pair of intermeshing gears in said housing, a drive shaft, a coupling member arranged to seat

in the housing by outward pressure, a separate coupling member between said first named coupling member operable to align the first named coupling member with the driven gearing, and means for holding the first named coupling member to its seat in the pump housing.

2. In a device of the class described, the combination of a pump housing, a pair of intermeshing gears in said housing, a drive shaft, a drive shaft housing, and a loose coupling device between one of the gears and said drive shaft, said loose coupling device arranged in said housing to form a liquid tight seal.

3. In a device of the class described, a pump housing having intersecting circular cavities therein, gears mounted in said cavities and intermeshing with each other, an inlet and a discharge passage communicating with said cavities, end plates for said housing, one of said end plates having a cylindrical extension forming a drive shaft housing and having a shouldered cavity therein forming a seat, a drive shaft, and a loose coupling member between the drive shaft and one of said gears, said coupling member having a shoulder seating upon the seat in said shaft housing and thereby sealing the space between said coupling and said shaft housing.

4. In a device of the class described, a pump housing having intersecting circular cavities therein, gears mounted in said cavities and intermeshing with each other, an inlet and a discharge passage communicating with said cavities, end plates for said housing, one of said end plates having a cylindrical extension forming a drive shaft housing and having a shouldered cavity therein forming a seat, a drive shaft, a loose coupling member between the drive shaft and one of said gears, said coupling member having a shoulder seating upon the seat in said shaft housing, thereby sealing the space between said coupling and shaft housing, and resilient means for holding the shoulder of said member to its seat.

5. In a device of the class described, a pump housing having intersecting circular cavities therein, gears mounted in said cavities and intermeshing with each other, one of said gears having a rectangular central opening therethrough, an inlet and a discharge passage communicating with said cavities, end plates for said housing, one of said end plates having a cylindrical extension forming a drive shaft housing and having a shouldered cavity therein forming a seat, a drive shaft, a loose coupling member mounted in the shaft housing and having a shoulder seating upon the seat in said shaft housing, thereby sealing the space between said coupling and said shaft housing, a sliding pin mounted in the rectangular opening

in said gear connected with said coupling member, and means for resiliently forcing said pin against said coupling member.

6. In a device of the class described, a pump housing having intersecting circular cavities therein, gears mounted in said cavities and intermeshing with each other, one of said gears having a rectangular central opening therethrough, an inlet and a discharge passage communicating with said cavities, end plates for said housing, one of said end plates having a cylindrical extension forming a drive shaft housing and having a shouldered cavity therein forming a seat, a drive shaft, a loose coupling member mounted in the shaft housing and having a shoulder seating upon the seat in said shaft housing, thereby sealing the space between said coupling and said shaft housing, a sliding pin mounted in the rectangular opening in said gear connected with said coupling member, and means for resiliently forcing said pin against said coupling member, said means including an expansion spring and a spherical connecting device between the spring and said pin.

7. In a device of the class described, a

pump housing, intermeshing gears in said housing, a drive member, a housing for said member, and a device constituting a coupling between the drive member and one of said gears and also constituting a seal to seal the passage between the pump housing and the housing for the drive member.

8. In a device of the class described, a pump housing, intermeshing gears in said housing, a drive member, a housing for said member, a device constituting a coupling between the drive member and one of said gears and also constituting a seal to seal the passage between the pump housing and the housing for the drive member, and resilient means for holding said member to its seat.

9. In a device of the class described, the combination of a housing, a device in said housing for circulating liquid therethrough, said device having connected therewith a member sealing against the housing, and a drive shaft flexibly connected with said circulating means thereby permitting distortion of the drive shaft without breaking the seal between said device and said housing.

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