

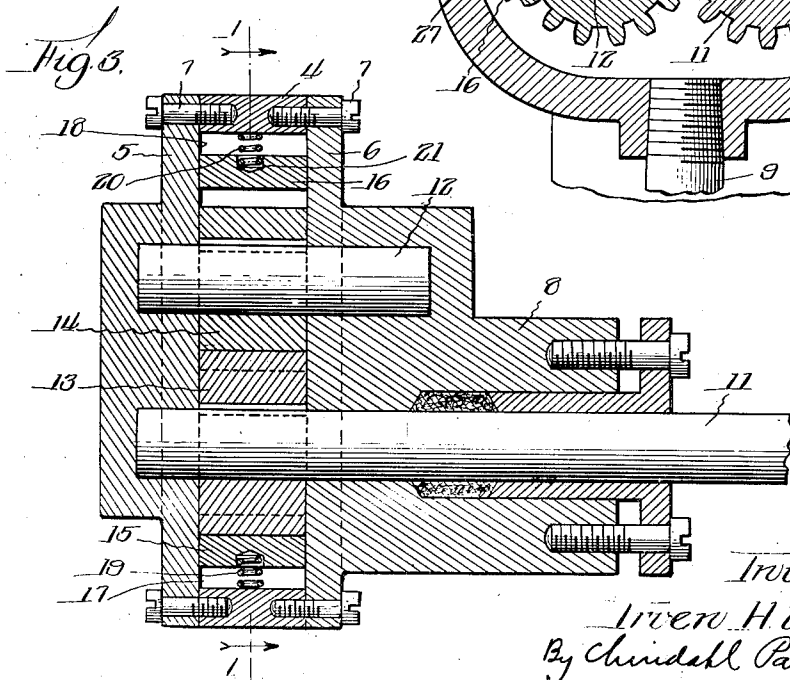
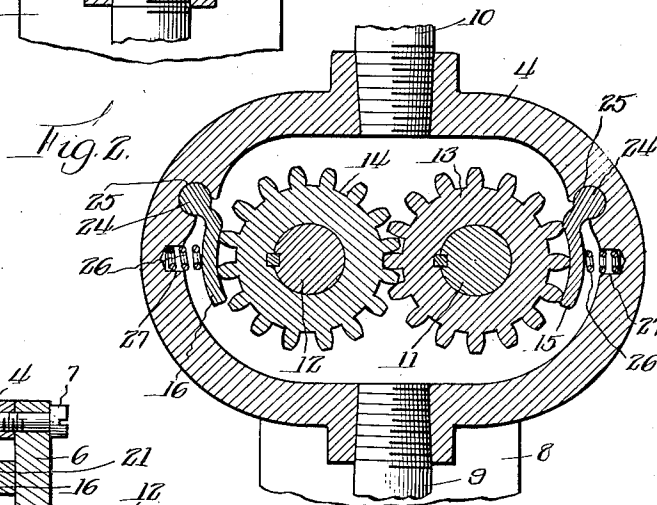
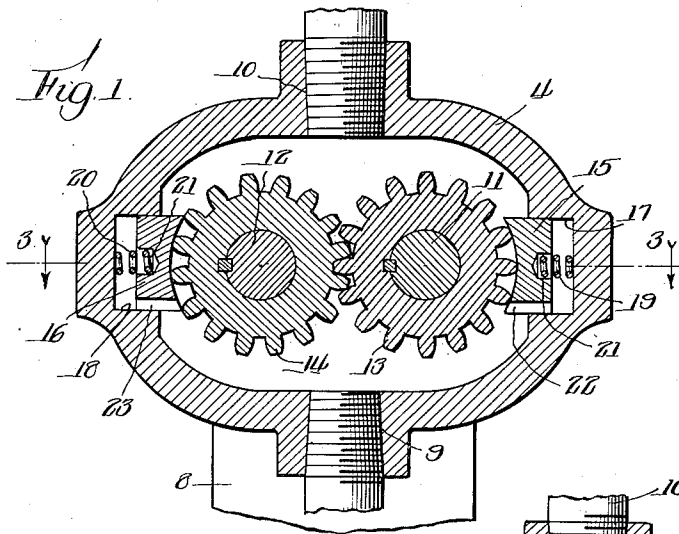
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SPUR GEAR PUMP

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UNITED STATES PATENT OFFICE

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SPUR GEAR PUMP

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The present invention relates to improvements in spur gear pumps, particularly such as are adapted for use as automobile engine oil pumps.

5 The primary objects of the invention are to provide a novel spur gear pump which has a high efficiency and a long life; which is adapted to handle liquids of different viscosities with equal efficiency; which will permit grit, dirt and other foreign particles to pass through without causing excessive wear; which in one manner of use will permit excessive pressures at the discharge port to be automatically relieved, thereby obviating the necessity of relief valves; and which is extremely simple and inexpensive in construction.

Another object resides in the provision in a novel spur gear pump of movable lands which are separate from the pump housing; which are self-seating and follow the contour of the gears; and which are highly resistant to wear.

Ancillary objects and advantages will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is a longitudinal sectional view taken along line 1—1 of Fig. 3, of a spur gear pump embodying the features of my invention.

Fig. 2 is a similar view of a modification.

Fig. 3 is a longitudinal sectional view taken along line 3—3 of Fig. 1.

While I have shown in the drawings and shall herein describe in detail the preferred embodiment of the invention, it is to be understood that I do not intend thereby to limit the invention to the construction disclosed, but aim to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring to the preferred embodiment illustrated in the drawings, the pump comprises an elongated hollow casing 4, the ends of which are closed by end plates 5 and 6 secured thereto by any suitable means, such as bolts 7. The end plate 6 preferably is formed integral with a suitable support 8. Formed in the elongated sides of the casing 4 and directly opposite each other are an inlet port 9

and a discharge port 10, said ports being adapted to be connected in any suitable fluid line (not shown).

Mounted respectively on shafts 11 and 12 in opposite sides of the casing 4 are two gear members 13 and 14. The gear members are preferably spur gears, and mesh at the center of the casing 4. The shafts 11 and 12 are journaled in the end plate 6, and the shaft 11 is adapted to be driven by any suitable power means (not shown).

A pair of opposed lands 15 and 16 are provided in the opposite short side walls of the casing 4, and engage the outer remote sides of the gears 13 and 14 in a plane midway between the ports 9 and 10. In Fig. 1, the lands 15 and 16 consist of blocks which are slidable in guideways 17 and 18 respectively, formed in the walls of the casing 4. The inner end surfaces of the lands 15 and 16 are shaped to conform to the curvature of the gears 13 and 14, and are pressed yieldingly into engagement therewith by coil springs 19 and 20, respectively. Each of these springs is disposed in a bore 21 in the back of one of the land blocks, and abuts at its outer end against the end of the associated guideway. The inner ends of the guideways 17 and 18 are vented respectively through passages 22 and 23 to the inlet chamber. Preferably, these passages are formed in the sides of the lands 15 and 16.

In Fig. 2, the lands 15 and 16 consist of curved plates pivoted in the walls of the casing 4. Each of the lands 15 and 16 is formed at one end with a cylindrical bearing 24 rotatably mounted in a cylindrical socket 25 in the casing 4. The backs of the lands are exposed to the pressure in the inlet chamber. Coiled springs 26 disposed in bores 27 in the walls of the casing 4 abut against the backs of the lands, and tend to hold said lands yieldingly in engagement with the gears 13 and 14.

In operation, assume that the gear member 13 is driven counterclockwise. This member will drive the gear member 14 in a clockwise direction. In moving past the lands 15 and 16, the gear members will carry fluid from the inlet chamber to the discharge chamber.

The movable lands 15 and 16 are self-seating and will find and maintain the proper film thickness for the particular liquid that is being handled. As a result, the pump will never cut the natural film thickness, and hence considerable saving of power will result. As the parts wear, the movable lands under the influence of the springs will always press against the gear members, thereby preventing leakage. Grit, dirt, and other foreign particles will pass through without causing serious wear.

The pressure acting against the back surfaces of the lands 15 and 16 is the inlet pressure plus the slight pressure of each spring. If the pressure in the discharge chamber exceeds a predetermined value, it will move the lands 15 and 16 away from the gears 13 and 14, thereby resulting in an automatic pressure relief by by-passing liquid from the discharge chamber past said lands into the inlet chamber.

If rotation of the gears 13 and 14 were reversed, the port 10 would become the inlet, and the port 9 would become the discharge, and the backs of the lands 15 and 16 would be exposed to the discharge pressure. The sealing effect of the lands would then vary in proportion to the pressure against which the pump would be operating.

It will be evident that I have provided a spur gear pump which is extremely simple and inexpensive in construction, and in which the objects set forth in the foregoing are clearly carried out.

I claim as my invention:

1. A gear pump having, in combination, a casing, an inlet passage, in one side of said casing, a discharge passage in the other side of said casing, a pair of gear members mounted side by side in said casing and meshing with each other, a pair of opposed guideways formed in said casing, a pair of lands slidably mounted in said guideways for engaging the respective peripheries of said gear members, vent passages formed in the sides of said lands for venting the ends of said guideways back of said lands to said inlet passage, and spring means tending to press said lands into engagement with said gear members.

2. A spur gear pump having, in combination, an elongated casing, a relatively low pressure inlet passage in one side of said casing, a relatively high pressure discharge passage in the other side of said casing, a pair of spur gears mounted in said casing and meshing with each other, a pair of rectangular opposed guideways formed in said casing in ends thereof, a pair of rectangular blocks constituting lands snugly and slidably mounted in said guideways for engaging the respective peripheries of said gears, vent passages formed in the sides of said blocks for venting the ends of said guideways back of

said blocks to said low pressure inlet passage, and spring means tending to press said blocks into engagement with said gears.

3. A gear pump having, in combination, a casing, a relatively low pressure inlet passage in one side of said casing, a relatively high pressure discharge passage in the other side of said casing, a pair of guideways in said casing, a pair of gear members mounted side by side in said casing and meshing with each other, a pair of lands movably mounted in said guideways and engaging the respective peripheries of said gear members, the fronts of said lands being partially exposed to the pressure in the discharge passage, the backs of said lands being exposed to the pressure in said inlet passage, and spring means tending to press said lands into engagement with said gear members.

In testimony whereof, I have hereunto affixed my signature.

IRVEN H. WILSEY.