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PUMP MOUNTING

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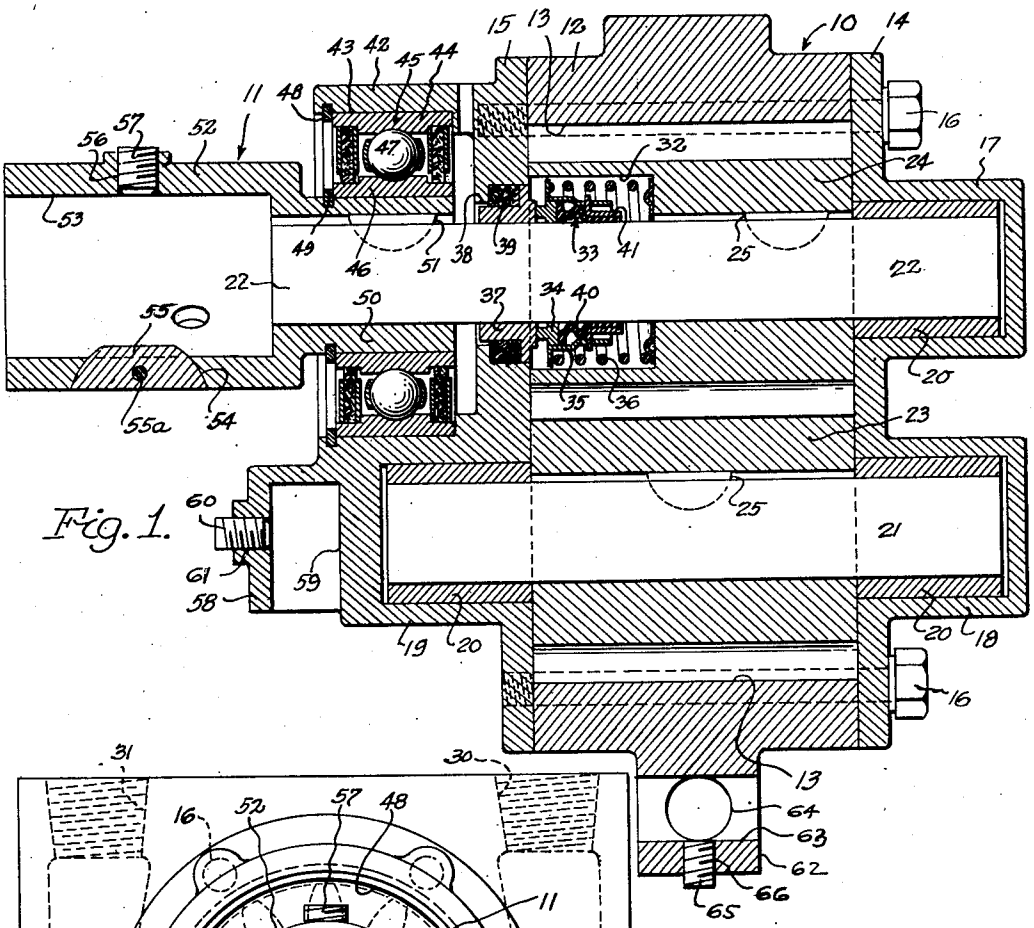


Fig. 1.

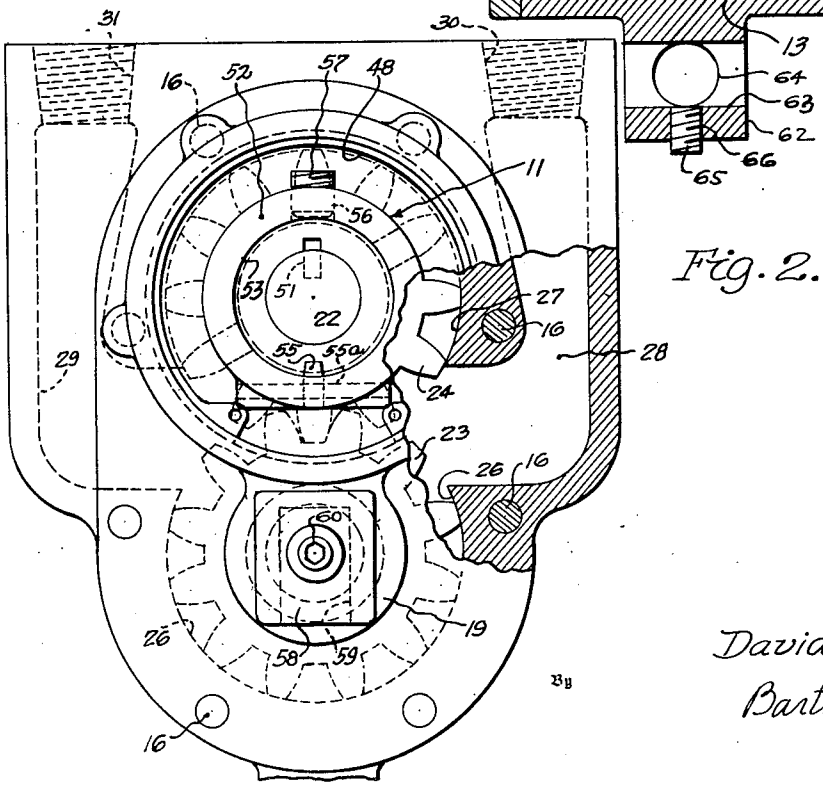


Fig. 2.

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PUMP MOUNTING

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12 Claims. (Cl. 103—218)

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This invention relates to pumps, and in particular to mountings for pumps.

One object of this invention is to provide an improved pump mounting wherein the weight of the pump is supported by the same shaft which drives the pump, such as, for example, the power take-off shaft of a tractor.

Another object is to provide an improved pump mounting including a coupling forming a unitary part of the pump assembly and not only driving the pump but also supporting it when the coupling is connected to a power shaft, without the necessity of providing other parts which might become detached and lost.

Another object is to provide an improved pump mounting of the foregoing character, wherein the pump and its mounting may instantly be attached to or detached from the power shaft by which it is driven and supported.

In the drawings:

Figure 1 is a central vertical section through a pump equipped with the combined mounting and drive coupling of the present invention; and

Figure 2 is a left-hand end elevation of the pump shown in Figure 1, with the casing partly broken away to disclose the internal construction.

Hitherto, in pumps which have been supplied for connection to the power take-off shaft of a tractor or other vehicle, it has been necessary not only to buy the pump but also to provide a mounting by which the pump may be supported on the tractor. Since various makes of tractors differ in their construction, it has been necessary, hitherto, for the buyer to buy not only a separate drive coupling and attach it to the pump and tractor power take-off shaft respectively, but he has also been obliged to provide a suitable support for the pump itself, these supports depending upon the particular tractor under consideration. Such pumps are frequently used by agriculturists for spraying trees and shrubbery to kill insects and fungi.

The present invention eliminates the necessity for providing separate couplings and supports for the pump by building the coupling into the pump itself and by causing the coupling to support the weight of the pump. No other support is necessary other than an external connection or anchor member to prevent rotation of the pump bodily when its input shaft is rotated.

Referring to the drawings in detail, Figures 1 and 2 show a pump, generally designated 10, having a coupling device, generally designated 11, which serves as a combined mounting and power connection in the manner described below. The

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pump 10 consists of a hollow casing 12 having a chamber 13 therein closed at its opposite sides by end plates 14 and 15 bolted or otherwise secured thereto, as at 16. The end plates 14 and 15 are provided with hollow bosses 17, 18 and 19 respectively containing bearing bushings 20 for the rotational support of parallel shafts 21 and 22 upon which are mounted inter-meshing pump gears 23 and 24 respectively. The gears 23 and 24 are keyed as at 25 to their respective shafts and rotate in partially cylindrical sub-chambers or pockets 26 and 27 respectively. Passageways 28 and 29 lead into and out of the chambers 13 and form intake and exhaust passageways terminating in ports 30 and 31 preferably threaded to receive the intake and discharge pipes respectively (not shown).

The hub of the gear 24 is provided with a counterbore 32 (Figure 1) adapted to receive a conventional resilient sealing device, generally designated 33, the details of which form no part of the invention. The sealing device 33 has a contact ring 34 connected to a collar 35 which is urged to the left by a coil spring 36 into contact with a collar 37 seated in an opening 38 in the end plate 15 and having a conventional packing 39 arranged therebetween (Figure 1). A resilient sleeve 40 of rubber or synthetic rubber is clamped to the shaft 22 by the clamping ring 41 and is bonded to the contact ring 34. As a consequence, when the shaft 22 is rotated, the contact ring 34 by reason of its engagement with the collar 37 through the action of the coil spring 36 prevents leakage and loss of liquid from the chamber 13.

The end plate 15 is also provided with a hollow cylindrical boss 42 having a bore 43 coaxial with the shaft 22 and serving to receive the outer race 44 of an anti-friction bearing unit, generally designated 45. The inner race 46 cooperates with the outer race 44 to rotatably support an annular arrangement of anti-friction bearing balls or rollers 47. The anti-friction bearing unit 45 is likewise conventional and its details form no part of the invention. It is held in position by snap rings 48 and 49, the cylindrical boss 42 being grooved to receive the snap ring or retaining ring 48. The inner race 46, on the other hand, is mounted upon a tubular hub or neck 50 which is keyed as at 51 to the shaft 22. The neck 50 forms an extension of a hollow cylindrical coupling 52 having a bore or socket 53 for receiving the end of the power take-off shaft of the tractor or other source of power (not shown).

The neck 50 is grooved to receive the retaining ring 49. The coupling 52 is provided with a hole

54 for receiving a driving key 55 held in position by the pin 55a, diametrically opposite which is a threaded hole 56 adapted to receive a screw plug 57. In order to prevent bodily rotation of the pump 10, when the shaft 22 is rotated by the coupling 52, the end plate 15 is provided with a stabilizing or anchoring device consisting of a boss 58 having a socket 59 adapted to receive an anchoring rod (not shown) engaging another part of the tractor and held in position by a set screw 60 threaded into a threaded hole 61. The bottom of the pump casing 12 is also provided with a second boss 62 having a bore 63 and cross bore 64 either of which may be used to receive an anchoring rod instead of the socket 59, in order to adapt the pump to different makes of tractor or to different installation conditions. A set screw 65 threaded into a threaded hole 66 serves as a clamping screw for the anchoring rod.

In the installation of the invention, the socket or bore 53 of the coupling 52 is slipped over the power take-off shaft of the tractor (not shown) and clamped in position by the driving key 55 and screw plug 57. The anchoring rod (not shown) is then clamped into one of the bores 59, 63 or 64 and the pump is ready to operate when the ports 30 and 31 have been connected to liquid intake and discharge pipes.

In the operation of the invention, the rotation of the coupling 52 in response to the rotation of the power take-off shaft (not shown) causes the shaft 22 to rotate and with it the gears 23 and 24 and the shaft 21. At the same time, however, the weight of the pump 10 is borne by the anti-friction bearing unit 45 and the cylindrical boss 42 so that no other support is necessary for the pump 10. In this manner, the pump is supported by the same coupling by which it is driven, thereby simplifying the design and increasing its versatility of adaptation to different tractors.

What I claim is:

1. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, and a tubular coupling drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft.

2. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, a tubular coupling drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to pervent bodily rotation of said pump.

3. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, a tubular coupling having a bored portion receiving and drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft.

4. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, and a tubular coupling having a bored portion receiving and drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a second bored portion drivingly engageable with said power output shaft.

5. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, a tubular coupling having a bore portion receiving and drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to prevent bodily rotation of said pump.

6. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, a bearing mounted in said bearing housing, a tubular coupling having a bored portion receiving and drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a second bored portion drivingly engageable with said power output shaft, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to prevent bodily rotation of said pump.

7. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, an anti-friction bearing having its outer race mounted in said bearing housing, and a tubular coupling drivingly connected to said rotor shaft and mounted in the inner race of said bearing, said coupling having a portion drivingly engageable with said power output shaft.

8. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, an anti-friction bearing having its outer race mounted in said bearing housing, and a tubular coupling drivingly connected to said rotor shaft and mounted in the inner race of said bearing, said coupling having a portion drivingly engageable with said power output shaft, said coupling having a pair of co-axial bores drivingly receiving said rotor shaft and said power output shaft respectively.

9. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, an anti-friction bearing having its outer race mounted in said

bearing housing, a tubular coupling drivingly connected to said rotor shaft and mounted in the inner race of said bearing, said coupling having a portion drivingly engageable with said power output shaft, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to prevent bodily rotation of said pump.

10. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a bearing housing connected to said pump casing and encircling said rotor shaft, an anti-friction bearing having its outer race mounted in said bearing housing, a tubular coupling drivingly connected to said rotor shaft and mounted in the inner race of said bearing, said coupling having a portion drivingly engageable with said power output shaft, said coupling having a pair of co-axial bores drivingly receiving said rotor shaft and said power output shaft respectively, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to prevent bodily rotation of said pump.

11. A combined driving and supporting device

for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a closure member for said casing having a bearing housing therein encircling said rotor shaft, an anti-friction bearing mounted in said bearing housing, and a tubular coupling drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft.

12. A combined driving and supporting device for detachably securing to a power output shaft a pump having a casing with a rotor shaft and a rotor driven thereby, said device comprising a closure member for said casing having a bearing housing therein encircling said rotor shaft, an anti-friction bearing mounted in said bearing housing, a tubular coupling drivingly connected to said rotor shaft and journaled in said bearing, said coupling having a portion drivingly engageable with said power output shaft, and an anchoring portion on said pump casing adapted to receive a stationary anchoring element whereby to prevent bodily rotation of said pump.

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No references cited.