United States Patent

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[54] **HYDRAULIC PUMP MOUNTING ASSEMBLY**
3 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **417/313,** 417/364, 417/366, 418/200
[51] **Int. Cl.** **F04b 9/00** F04c 29/04
[50] **Field of Search** ..... 103/4, 126 B; 417/321, 364, 313, 366; 74/15.84; 418/200

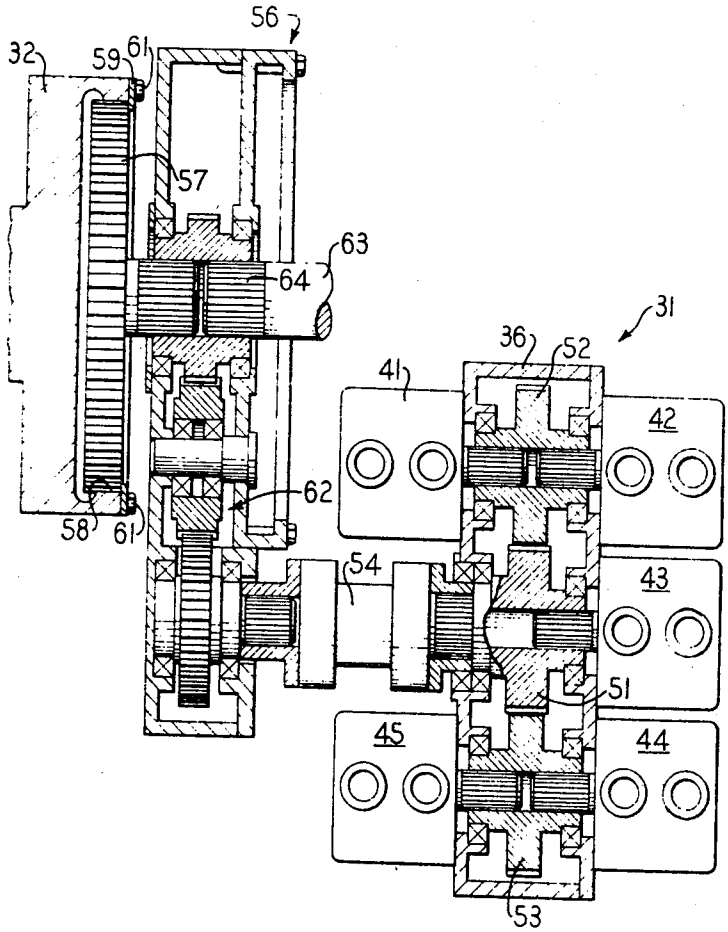
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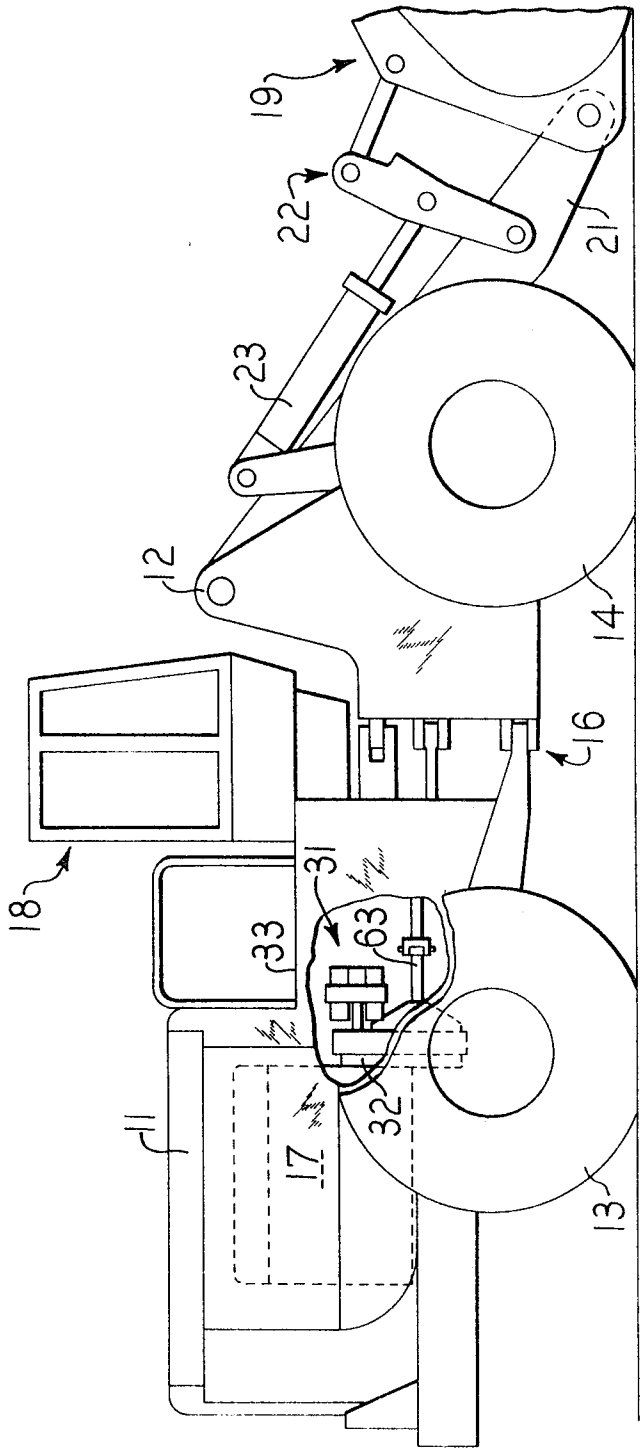
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ABSTRACT: A mounting and drive assembly for supporting a plurality of hydraulic pumps in a single location and including gearing through which the pumps may be operated by suitable motor means.



3 Sheets-Sheet 1

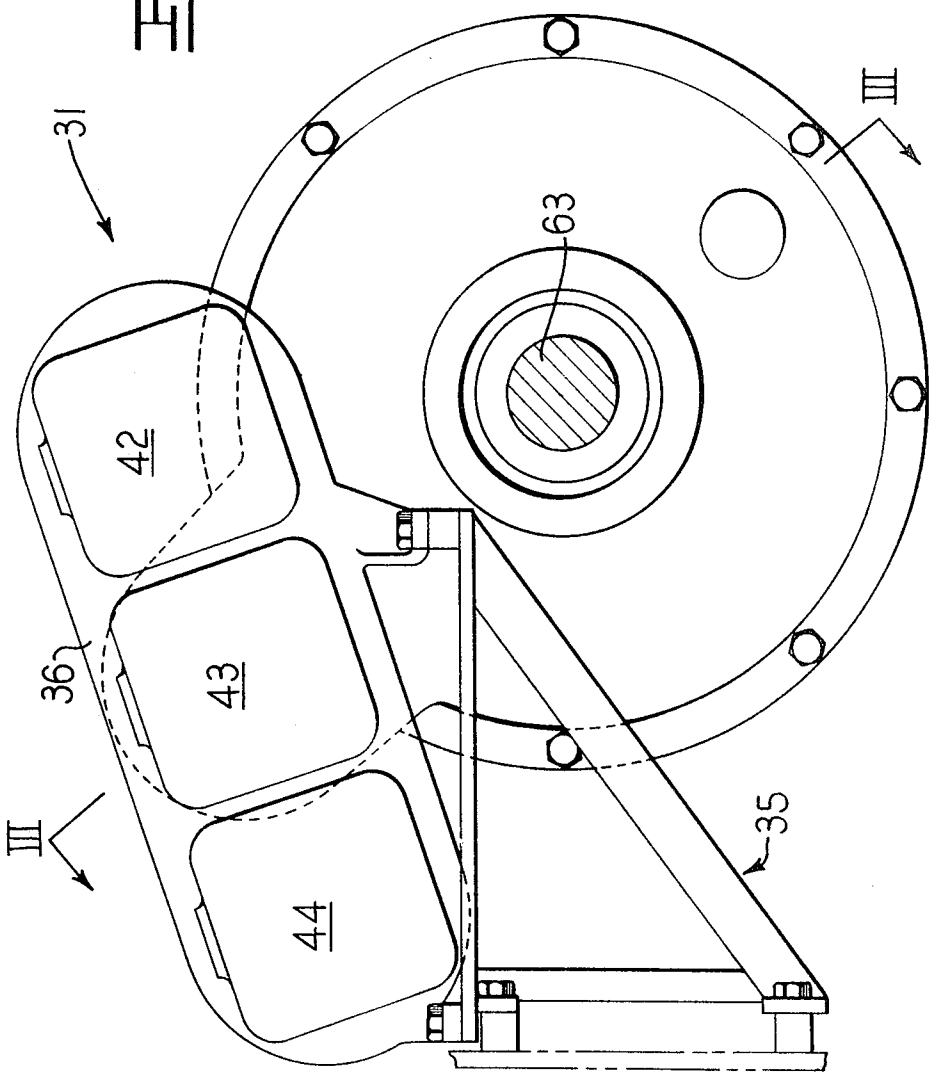
Fig. 1.



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FIG. 2



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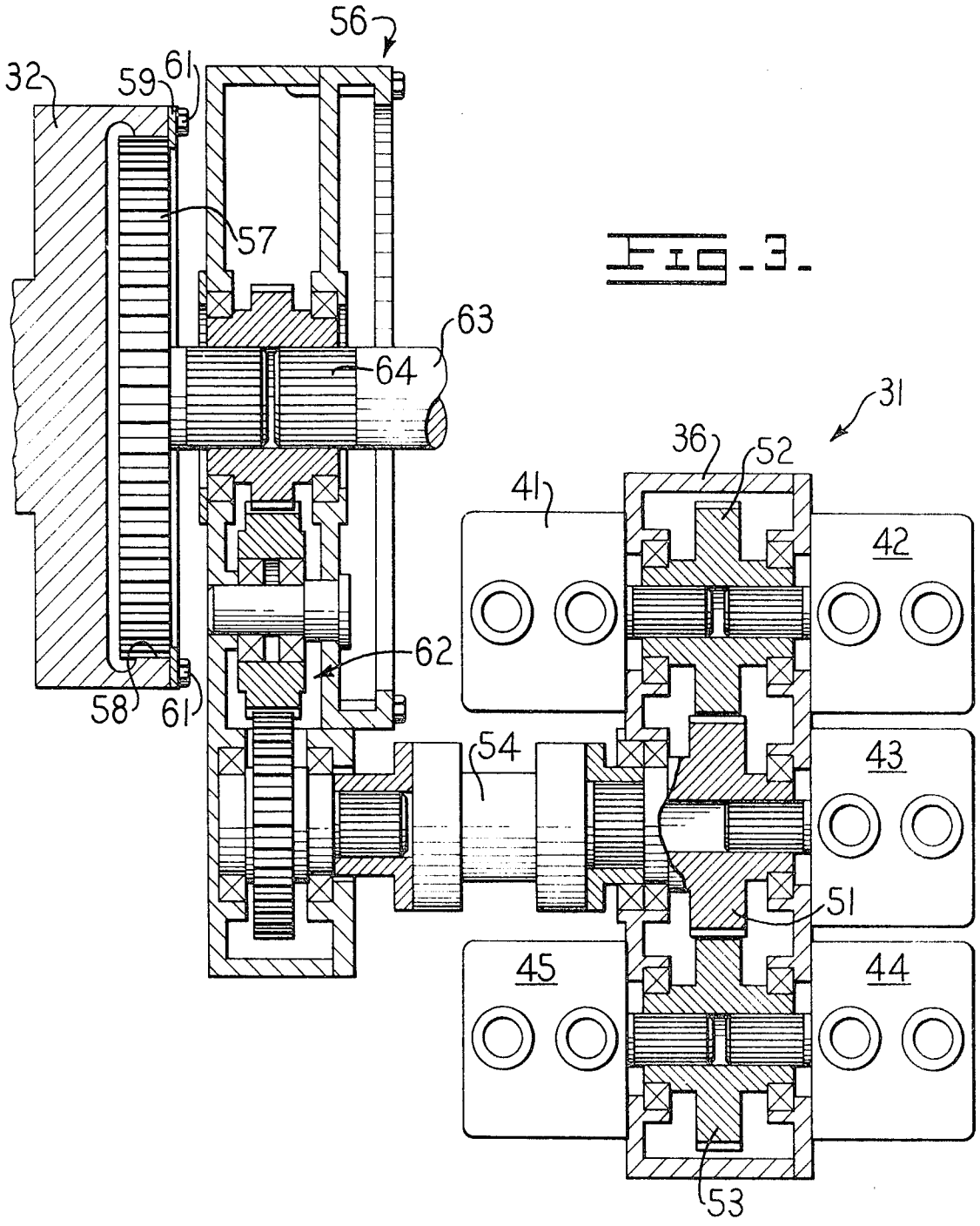


Fig. 3.

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HYDRAULIC PUMP MOUNTING ASSEMBLY

The present invention relates to means for mounting and driving a plurality of hydraulic pumps. In particular, the mounting and drive assembly is contemplated for use in vehicles, of the type employed, for example, in earthmoving operations with the assembly including gears for effectively coupling the pumps to the engine or motor means of the vehicle.

In the prior art, hydraulic pumps required in machinery of the type referred to above, have commonly been mounted at several different locations and in many instances have been mounted directly upon the engine to utilize existing gears for driving the pumps. With the pumps arranged in this manner, servicing of the pumps and various components of the engine may be difficult with disassembly of other vehicle components often being required to provide access to the pumps. Also, since the pumps are in close proximity with the engine, heat generated by the pumps is not readily dissipated into the surrounding atmosphere.

Further, in large machinery or vehicles of the type commonly employed in earthmoving operations, numerous hydraulic systems are employed within the vehicle and the hydraulic capacity of each system often requires separate pumps to handle the fluid requirements of each system.

It is a particular object of the present invention to provide a hydraulic pump mounting and drive assembly effective to overcome one or more of the above problems. To accomplish this object, the present invention provides a housing for mounting a plurality of hydraulic pumps with gearing being included for coupling the pumps to suitable motor means such as a vehicular engine. This arrangement permits location of substantially all of the pumps for a single machine or vehicle within a clustered group. The pumps may thus be made easily accessible for servicing and positioned to facilitate dissipation of heat generated by the pumps.

In a particular arrangement, the pump-mounting assembly is associated with a flywheel which rotates in association with a vehicular engine. Within such an arrangement, the gearing for driving the pumps may be coupled to the flywheel. The pump arrangement may then be located generally remote from the engine to facilitate cooling of the pumps. The above arrangement also permits the gear train which drives the pumps to be sized to provide optimum speed and horsepower requirements for the pumps. The location of the pump assembly in a manner such as described above not only permits better serviceability of the pumps, but also allows removal of the engine, for example, during overhaul, without disconnecting any of the hydraulic lines for the pumps.

Other objects and advantages of the present invention are made apparent in the following description having reference to the accompanying drawings.

In the drawings:

FIG. 1 is a side view in elevation of an earthmoving vehicle with parts shown in section to illustrate the present pump-mounting assembly;

FIG. 2 is an enlarged view of the pump assembly taken generally from the right end of the pump assembly as viewed in FIG. 1; and

FIG. 3 is a view taken along section line III–III of FIG. 2 with the gear housing and pump assembly being rotated about its central axis somewhat more than 90° in a counterclockwise direction as viewed in the drawing to bring the axes of all three gear sets into a single plane.

An exemplary environment for the present invention is a machine or vehicle such as the earthmoving bucket loader illustrated in FIG. 1. The vehicle includes forward and rearward articulated sections 11 and 12, each section being supported by a set of wheels, one wheel of each set being respectively indicated at 13 and 14. The vehicular sections are secured together by an articulated joint generally indicated at 16. The vehicle includes an engine 17 mounted upon its rearward section 11 and an operator's station also supported by the rearward vehicular section and generally indicated at 18. The forward vehicular section 12 supports a bucket assembly 19 by means of pivotal lift arms, one of which is indicated at 21. Positioning of the bucket 19 is accomplished by raising and lowering the bucket on its lift arm 21 and by pivoting the bucket through a tilt linkage generally indicated at 22 which includes at least one hydraulic motor such as that indicated at 23.

Such a vehicle includes numerous hydraulic systems. One system may include the hydraulic motors 23 of the bucket tilt linkage. Another system may include hydraulic jacks (not shown) for raising and lowering the lift arms 21. Still another system may include hydraulic motors (not shown) for positioning the two vehicular sections with respect to the articulated joint 16 and thus providing for steering of the vehicle.

The present invention provides a mounting and drive assembly for supporting the various pumps required to operate numerous hydraulic systems of the vehicle in a centralized and easily accessible location. The mounting and drive assembly is generally indicated at 31 in FIG. 1 and is shown in greater detail in FIGS. 2 and 3. The mounting assembly 31 is located forwardly of a flywheel 32 which is positioned at the forward end of the engine 17 and is driven in rotation by the engine. In this position, pumps mounted upon the assembly 31 tend to be unaffected by heat generated from the engine 17. Further, the mounting assembly 31 is arranged within the vehicle body beneath removable gratings which are indicated at 33 and form a deck adjacent the operator's station 18. Accordingly, the pump-mounting assembly is readily accessible by removal of the deck grating. Further, the gratings admit air to ventilate or cool the pumps supported upon the mounting 31.

The mounting 31 also includes suitable gearing described in detail immediately below, which permits selective driving of the hydraulic pumps from the flywheel 32. It will be noted that since the pump mounting 31 is associated with the flywheel 32 and not directly with the engine 17, the engine 17 may be readily removed from the vehicle, for example, during overhaul without first having to disconnect the hydraulic systems from the pumps.

The drive arrangement within the assembly 31 is best seen in FIGS. 2 and 3. Referring particularly to FIG. 3, the assembly 31 includes a housing 36 secured to a mounting bracket 35 for supporting a plurality of hydraulic pumps such as those indicated at 41—45. The housing 36 also rotatably supports an input gear 51 and additional driven gears 52, 53 which may be clustered about the input gear 51 as shown in FIG. 3. The pumps 41, 42 are coupled to the axial ends of the driven gear 52. The pumps 44, 45 are similarly coupled to the axial ends of the driven gear 53 while a single pump 43 is coupled to one end of the input gear 51. Since the driven gears 52, 53 mesh with the input gear 51, all of the pumps may be driven through the single input gear 51.

Means for coupling the input gear 51 to the flywheel 32 include a universal drive shaft 54 coupled directly to the input gear 51, a power takeoff assembly 56 coupled to the universal shaft 54. A floating gear 57 is coupled to the power takeoff assembly 56 and meshes with gear teeth internally formed at 58 upon the flywheel 32. The floating gear 57 is secured in place within the flywheel 32, for example, by means of an overlapping retaining plate 59 which is secured to the flywheel 32 by bolts or capscrews such as those indicated at 61.

The power takeoff assembly 56 includes reduction gearing generally indicated at 62 for establishing the operating speed of the hydraulic pumps 41—45 with respect to speed of the engine 17. Power from the engine is delivered through the flywheel 32 and floating gear 57 to a shaft 63 which axially extends from the floating gear 57 and is splined at 64 to the gear arrangement 62 within the power takeoff assembly 56. In addition to providing power for driving the hydraulic pumps, the shaft 63 extends forwardly and provides means for driving the vehicular wheels 13 and 14 to provide for locomotion of the vehicle.

We claim:

1. A hydraulic pump mounting and drive assembly for use in a vehicle including a body, a vehicle engine and flywheel means associated for rotation with the engine, comprising

a housing

an input gear rotatably supported upon the housing,

at least one driven gear notably supported upon the housing in meshing relation with the input gear,

a plurality of hydraulic pumps and means arranged upon the housing for supporting each of the pumps in coupled relation with the gears supported upon the housing,

a floating gear associated for rotation with the flywheel and providing a self-aligning connection for coupling the engine and flywheel means with a driven portion of the vehicle, the pump mounting and drive assembly being located

in a remote location relative to the engine, the vehicle body generally enclosing the mounting and drive assembly and having removable grating means to provide access thereto and to assist in cooling the pumps.

2. The pump mounting and drive assembly of claim 1 further comprising a plurality of driven gears meshing with the input gear, the hydraulic pumps being respectively coupled with the driven gears and with the input gear opposite its coupling with the power takeoff assembly.

3. The pump mounting and drive assembly of claim 2 wherein a pump is respectively coupled with each axial end of each driven gear.