

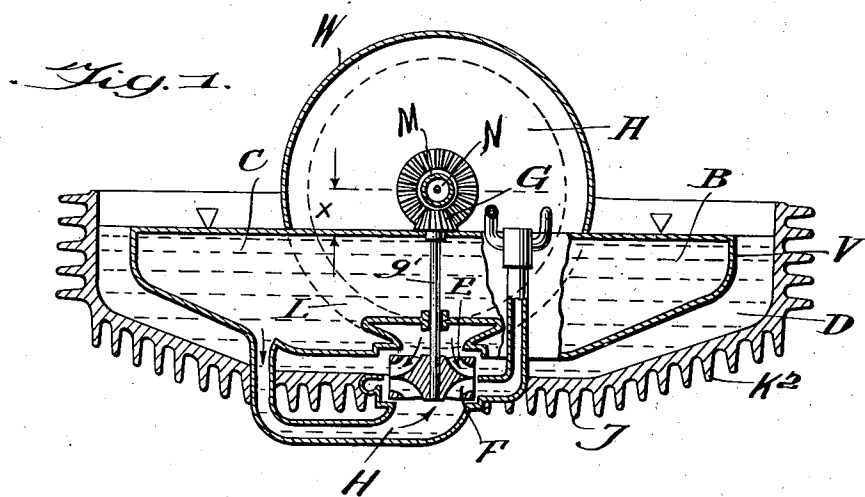
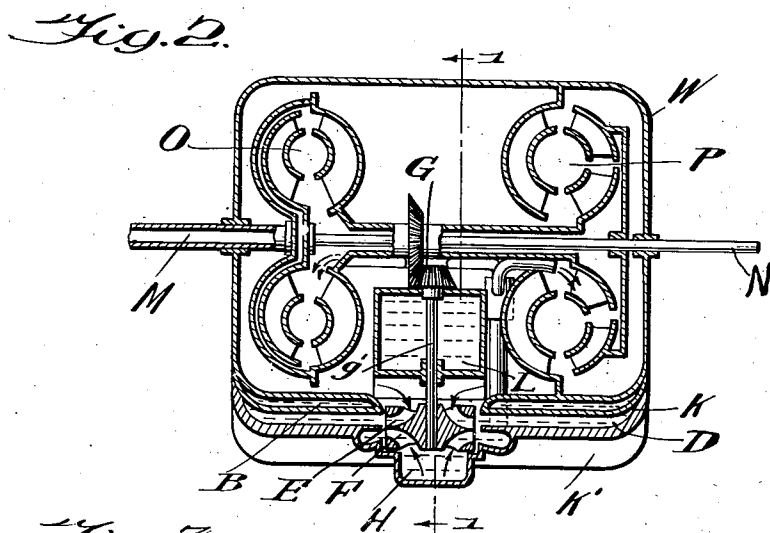
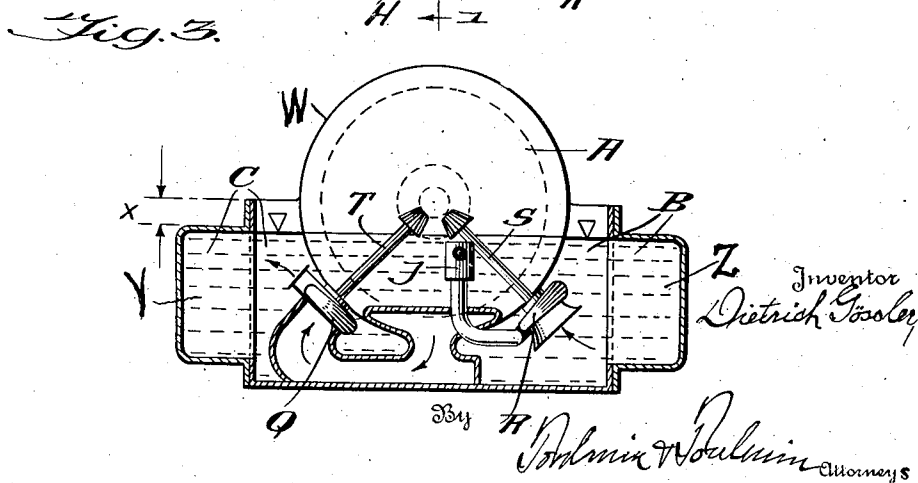
Nov. 30, 1937.

D. GÖSSLER

2,100,440

LATERAL FLUID CONTAINER FOR HYDRAULIC TRANSMISSIONS

Filed April 30, 1936



UNITED STATES PATENT OFFICE

2,100,440

LATERAL FLUID CONTAINER FOR HYDRAULIC TRANSMISSIONS

Dietrich Gössler, Heidenheim (Brenz), Germany

Application April 30, 1936, Serial No. 77,247
In Germany April 25, 1935

4 Claims. (Cl. 60—54)

This invention relates to hydraulic couplings, and has for its purpose a simplified fluid container arrangement which, before everything else, occupies the minimum space, and which in rail or street vehicles guarantees the necessary ground clearance in spite of a low driving mechanism arrangement.

In rail and street vehicles the space between the motor shaft and the rail, as well as the street, is decidedly limited since the motor and the driving mechanism must be arranged as low as possible in the vehicle frame, with a most favorable location of the center of gravity. By the use of hydraulic couplings as changing mechanism, it is not possible therein to arrange the container for the operating fluid underneath the coupling. During the jolts and rocking which frequently occur during operation, there exists, next to the already mentioned limited clearance, also the danger that the rotating parts of the coupling will be immersed in the fluid and will thereby consume unnecessary power.

A second solution of the problem of the limited clearance underneath, is that of locating the container over the coupling. In this case a leakage pump must pump the operating fluid from the lowest point up into the overhead container, from which the single stage of the hydraulic coupling would then be filled through the action of gravity. This solution of the problem, however, has the disadvantage that the leakage pump requires much power because it must pump the operating fluid rather high, as well as that the fluid supply in passing downwardly from above must be conducted through a special check arrangement, since otherwise the single rotor of the change speed coupling can never be empty.

All these disadvantages are avoided through the present invention, and the advantage of an especially effective cooling of the operating fluid obtained by reason of the novel container arrangement. The operating fluid is stored in one or more laterally arranged containers, and can be forced into and drawn out of the several chambers by two pumps, which can be either gear pumps or centrifugal pumps.

An increased cooling effect is obtained from an additional enlargement of the surface of the container casing, and from the forced circulation of the fluid against the casing walls. In order to be even more sparing in weight in vehicles, a part of the vehicle frame is formed as the fluid container, so that no additional space whatever will be required. In vehicles which have an especially low center of gravity, it is possible to

obtain a considerably lower arrangement through a separation of the two pumps, which normally lie together at the lowest point.

In the drawing are shown schematically several embodiments of the invention.

Figure 1 shows one embodiment shown partly as a transverse section along the line 1—1 in Figure 2.

Figure 2 is a longitudinal section along the line 2—2 in Figure 1.

Figure 3 shows a coupling in which the vehicle frame serves as a container, this being shown as employing two separated pumps.

Referring to the drawing in detail, Figure 1 shows a hydraulic coupling A provided with a housing W and also a casing K for the two balancing containers B and C with walls V, which receive the fluid pumped thereto through an over-flow conduit D from the leakage pump E. The casing K is provided with cooling fins K' on its outer surface. For supplying the coupling rotors O, as well as P, there is also provided a distributing pump F which draws the operating fluid out of the containers B and C through the conduit H and pumps it through the conduit J to the coupling. The pump drive, as shown in Figure 1, is common to the leakage pump E and distributing pump F, power therefor being transmitted thereto from the hydraulic coupling A through the bevel gearing G and the shaft g'. Through an interconnecting conduit L a balance between the containers B and C is made possible. The fluid level lies at about the distance X beneath the shaft axis. The power from the driving motor is conducted to the hydraulic coupling through the shaft M, while the shaft N delivers the power on the secondary side.

In Figure 3 the coupling A is so arranged in the vehicle frame that the two longitudinally-extending frame members Y and Z can be utilized simultaneously as the fluid containers B and C.

This arrangement is especially suitable for vehicles with rather deeply located motors and couplings. In Figure 3 the distributing pump Q and leakage pump R are shown as separated from one another, and operated by two separate drive shafts S and T. Instead of this arrangement, however, the pump driving arrangement of Figure 1 may also be used, if desired, with the lateral fluid containers B and C within the frame members Y and Z. The containers B and C of Figure 3 are interconnected, like the containers B and C in Figure 1, by fluid passages in front of and behind the casing of the distributing pump Q so

that fluid may flow between the two containers B and C.

I claim:

1. In a hydraulic transmission, a hydraulic circuit including a hydraulic power transmitter, an outer fluid container extending laterally of said power transmitter on opposite sides thereof, an inner fluid container arranged within said outer fluid container, a pump for pumping fluid between said outer container and said inner container, and a second pump for pumping fluid between said inner container and said power transmitter.

2. In a hydraulic transmission, a hydraulic circuit including a hydraulic power transmitter, an outer fluid container extending laterally of said power transmitter on opposite sides thereof, an inner fluid container arranged within said outer fluid container, a pump for pumping fluid between said outer container and said inner container, a second pump for pumping fluid between said inner container and said power transmitter, said inner and outer containers forming a fluid passageway therebetween in communication with one of said pumps, and cooling means associated with said outer container adjacent said passageway.

3. In a hydraulic transmission, a hydraulic circuit including a hydraulic power transmitter, an outer fluid container extending laterally of said power transmitter on opposite sides thereof, an inner fluid container arranged within said outer fluid container, a pump for pumping fluid between said outer container and said inner container, and a second pump for pumping fluid between said inner container and said power transmitter, the bottom wall of said inner container being disposed approximately at the bottom of said power transmitter.

4. In a hydraulic transmission, a hydraulic circuit including a hydraulic power transmitter, an outer fluid container extending laterally of said power transmitter on opposite sides thereof, an inner fluid container arranged within said outer fluid container, a pump for pumping fluid between said outer container and said inner container, and a second pump for pumping fluid between said inner container and said power transmitter, the lateral extent of at least one of said containers exceeding the vertical extent thereof.

DIETRICH GÖSSLER. 25