

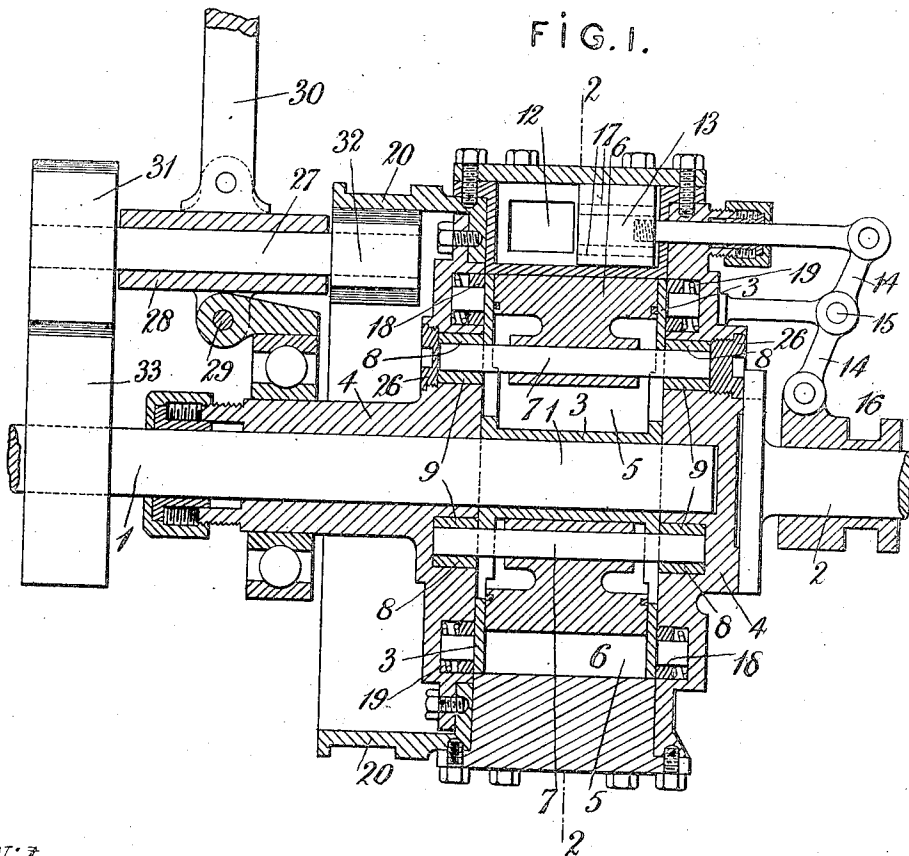
W. J. VINCENT & J. V. HARRISON.
HYDRAULIC CLUTCH.

APPLICATION FILED AUG. 12, 1910.

980,368.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.



Witnesses
E. B. Franzoni.
C. F. Early.

Inventors
W. J. Vincent
J. V. Harrison
By their Attorneys
Baldwin Wright.

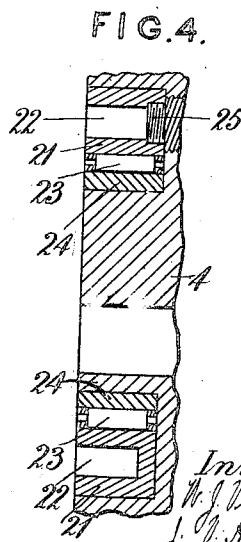
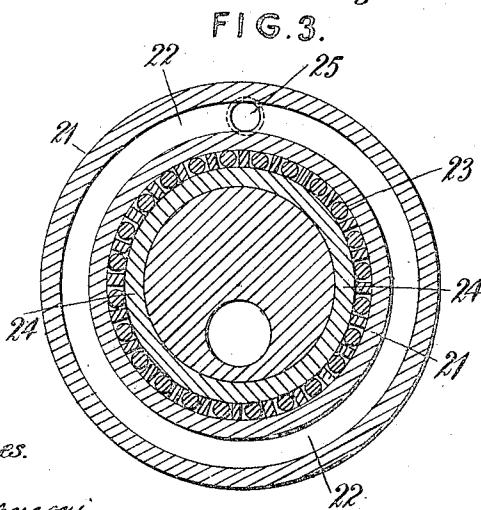
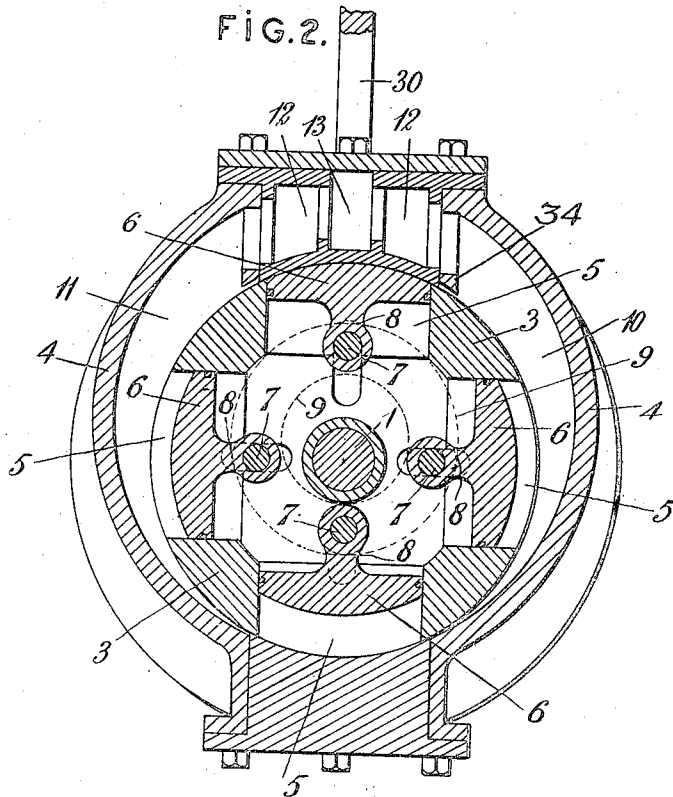
W. J. VINCENT & J. V. HARRISON.
HYDRAULIC CLUTCH.

APPLICATION FILED AUG. 12, 1910.

980,368.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 2.



Witnesses.

L. B. Langoni.

C. F. Early.

Inventors.

W. J. Vincent

J. V. Harrison

By their Attorneys

Baldwin & Wright

UNITED STATES PATENT OFFICE.

WILLIAM JOHN VINCENT, OF CARDIFF, AND JAMES VICTOR HARRISON, OF PENARTH,
NEAR CARDIFF, ENGLAND, ASSIGNORS TO THE ROTOPLUNGE PUMP COMPANY,
LIMITED, OF CARDIFF, ENGLAND.

HYDRAULIC CLUTCH.

980,368.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed August 12, 1910. Serial No. 576,874.

To all whom it may concern:

Be it known that we, WILLIAM JOHN VINCENT and JAMES VICTOR HARRISON, subjects of the King of Great Britain, residing, respectively, at East Bate Docks, Cardiff, and Fair View, Cwrt-y-vil Road, Penarth, near Cardiff, both in the county of Glamorgan, Wales, England, have invented new and useful Improvements in Hydraulic Clutches, of which the following is a specification.

This invention relates to hydraulic clutches of the type in which the driving and driven shafts are connected respectively to the two members of a rotary pump delivering liquid to its own suction past a valve so that by closing the valve more or less the relative speed of the two shafts can be varied.

The invention consists in the selection for this purpose of the type of pump described in the specification of British Letters Patent No. 10263 of 1908 and formed of an outer casing and a drum having in it cylinders with radially moving pistons. This type of pump is found to be peculiarly suitable to the purpose because there is little leakage from the delivery to the suction even when it is exposed to the high pressures which result from its use as a clutch whereas other types of pump which are fairly efficient when used as pumps leak seriously when used as clutches.

Figure 1 is a central longitudinal section of a clutch constructed according to this invention and Fig. 2 is a section on the line 2—2, Fig. 1. Figs. 3 and 4 show a modification of one of the details.

1 is the driving shaft and 2 the driven shaft the former having fixed to it the central cylindrical block 3 while the latter is fixed to the casing 4 of the pump which is free to revolve on the shaft 1. The block 3 has formed in it a number of cylindrical holes 5 which constitute the pump barrels.

6 are pistons in the barrels 5, their inner faces having fixed to them cross bars 7 the ends of which carry rollers 8 working in grooves 9 formed in the casing, these grooves being eccentric to the shafts so that as the shaft 1 revolves relatively to the casing 4 the pistons 6 move in and out radially.

In Fig. 2 the shaft 1 may be assumed to be rotating clockwise relatively to the casing 4, the right hand portion 10 of the space between the casing 4 and the block 3 being the

suction side of the pump and the left hand portion 11 the delivery side. These two spaces are separated by stops 34 on the casing but connected by the passage 12 which can be closed by the valve 13. This passage is however shown open in the drawings. In Fig. 2 the upper piston is at the end of its out-stroke, the right hand piston is moving inward, its cylinder being half full of liquid drawn in from the space 10, the bottom piston is at the end of its in-stroke, its cylinder being full of liquid which is imprisoned because the outer end of the cylinder is closed by the casing 4; the left hand piston is half out and half of the liquid has been expelled from its cylinder into the space 11. Since the valve 13 is fully open the liquid can pass freely from the space 11 to the space 10 and there is nothing to turn the shaft 2 which remains stationary while the shaft 1 revolves. When however the valve 13 is fully closed the pressure of the liquid in the space 11 against the left hand side of the valve carries the casing 4 around with the shaft 1 and the two shafts revolve together at the same speeds. By partially opening the valve 13 the pressure against its left hand face can be regulated and the speed of the shaft 2 relatively to the shaft 1 be controlled. The valve 13 is opened and closed by the lever 14 pivoted at 15 to the casing and having its end connected to the collar 16 free to slide on the shaft 2 and operated in the ordinary way by a fork (not shown). Passages 17 are formed through the valve so as to equalize the pressure against its two ends and thus allow it to be easily moved.

Tight joints are made against the flat sides of the block 3 by means of rings 18 situated in annular grooves in the casing 4 and pressed against the block by springs 19. A small clearance is provided so that liquid can get behind the rings, its pressure aiding the springs in making a tight joint.

20 is a brake drum fixed to the casing 4.

In the modification shown at Figs. 3 and 4, 21 is a ring having a groove 22 in it. A pair of these rings are placed in the annular grooves 9 in the casing 4 and the ends of the cross bars 7 are received in the grooves 22 the rollers 8 being dispensed with. In order to allow the rings 21 to revolve freely, live rings of rollers 23 are interposed between one side of them and the sides of the grooves

in the casing 4. 24 is a steel bearing ring on which the rollers run. 25 are holes, which can be closed by screw plugs, provided to enable the rods 7 to be put into place and 26 (Fig. 1) are corresponding screw plugs in the casing 4.

In order to reverse the direction of motion of the shaft 2 the following arrangement may be adopted:—27 is a shaft working in a bearing 28 pivoted at 29 and capable of being rocked by the handle 30. This shaft has fixed to it friction wheels 31 and 32 which when the handle 30 is moved to the left (Fig. 1) are pressed respectively against a friction wheel 33 fixed to the shaft 1 and the inner periphery of the brake drum 20. Or the same result may be obtained by making the portions of the casing 4 in which the eccentric grooves 9 are formed separate from the remainder of the casing and providing means whereby these portions of the casing may be turned through an angle of 180° relatively to the remainder. When they are so turned the space 10 becomes the delivery instead of the suction and the space 11 the suction instead of the delivery and the di-

rection of rotation of the shaft 2 is therefore reversed.

What we claim is:—

The combination of a casing, a drum eccentric to the casing and adapted to rotate within and in contact at one point with it, radial pump cylinders formed in the drum, pistons in the cylinders, stops on the casing dividing the space between the drum and casing into two parts, a passage connecting these two parts, a valve in the passage, means for regulating the opening of the valve, two shafts fast the one with the casing and the other with the drum, and means for moving the pistons in their cylinders when there is relative motion between the drum and casing in such manner that each piston is at its innermost position when the axis of its cylinder comes to the point of contact of the drum and casing.

WILLIAM JOHN VINCENT.
JAMES VICTOR HARRISON.

Witnesses:

JOHN HENRY MORGAN,
FREDERICK JAMES HANCOX.