

No. 859,087.

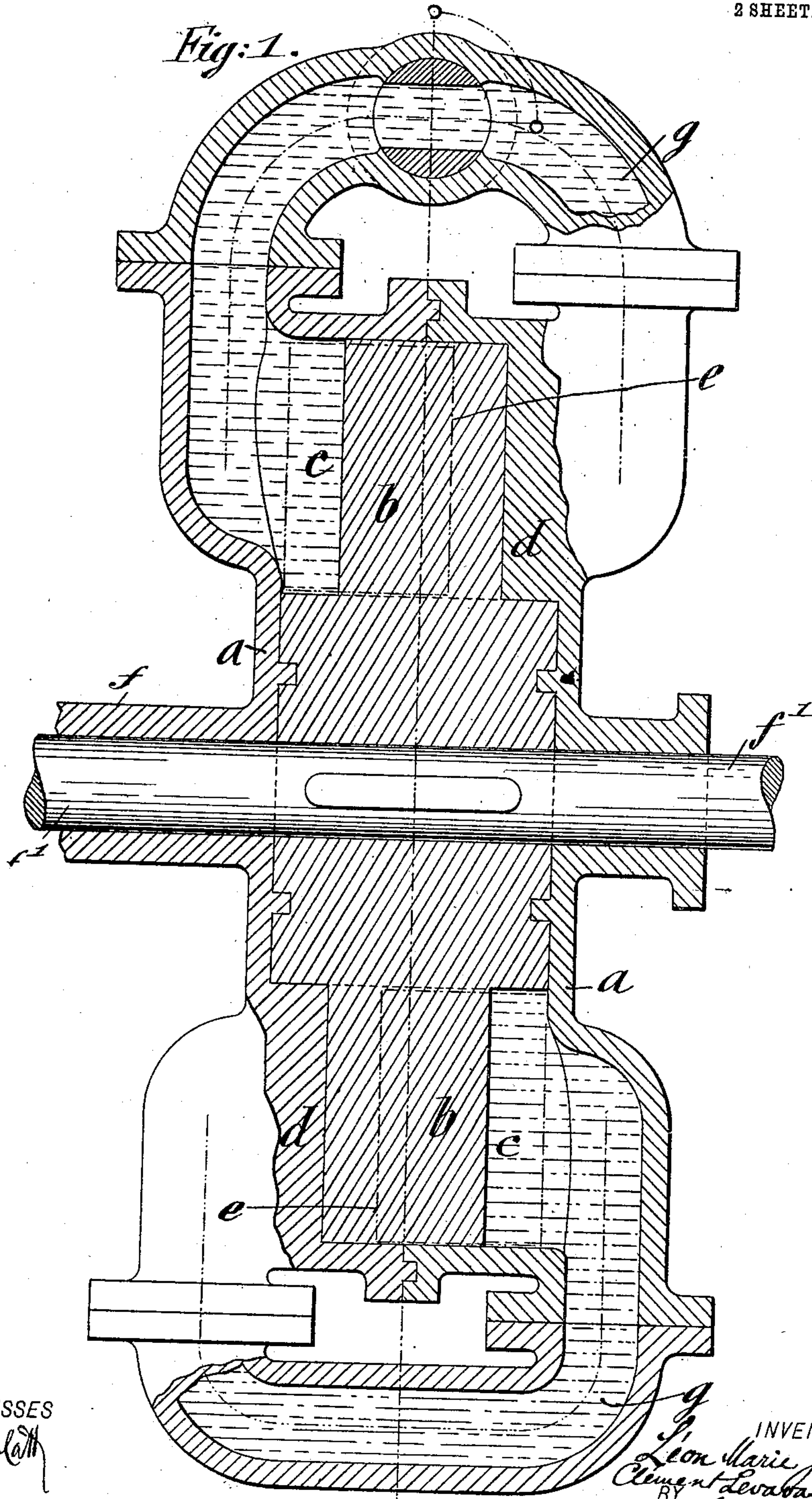
PATENTED JULY 2, 1907.

L. M. J. C. LEVAVASSEUR.
HYDRAULIC CLUTCH AND CHANGE SPEED DEVICE.

APPLICATION FILED FEB. 14, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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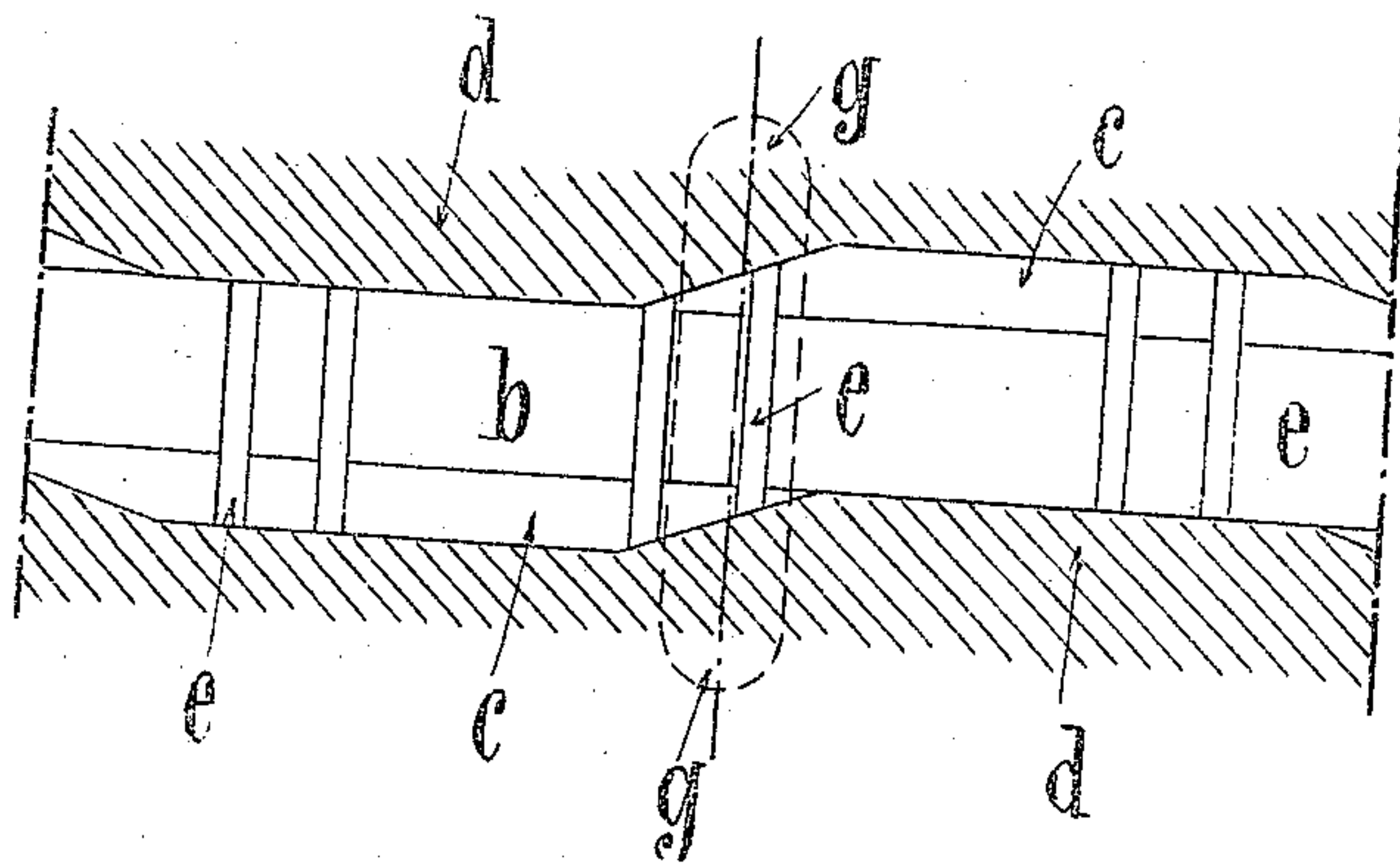
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2 SHEETS--SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

LÉON MARIE JOSEPH CLÉMENT LEVAVASSEUR, OF PUTEAUX, FRANCE.

HYDRAULIC CLUTCH AND CHANGE-SPEED DEVICE.

No. 859,087.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed February 14, 1906. Serial No. 301,019.

To all whom it may concern:

Be it known that I, LÉON MARIE JOSEPH CLÉMENT LEVAVASSEUR, a citizen of the Republic of France, and a resident of Puteaux, in said Republic, have invented
5 a new and useful Hydraulic Clutch and Change-Speed Device, of which the following is a specification.

This invention aims to provide a hydraulic clutch which is very simple in construction and effective in operation.

10 A further object of the invention is to provide a device of this character by which different speeds may be imparted to the driven member by very simple easily-operated means.

It is a further object of the invention to furnish a hydraulic change speed device which is adapted to serve
15 as a differential gear.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of a hydraulic clutch and change speed device constructed in accordance with the invention, and Fig. 2 shows a development illustrating the
20 disposition of the casing and of the central core carrying the pistons.

Referring to the drawings, and particularly to Fig. 1, *a* denotes the casing of the device, which is preferably
25 of cylindrical form, and is secured at one end to either the driving or driven shaft *f*. The other shaft *f*¹ is journaled in the casing *a* and passes transversely there-through, as shown. Each of the inner surfaces of the side-plates of the casing is provided with a circular series of depressions or pockets *c* which alternate with
30 reliefs or bosses *d* of equal volume. The depressions and bosses of one side-plate are arranged in staggered relation to those of the other side-plate, that is to say, the depressions of one side-plate are opposite the bosses of
35 the other side-plate, and vice versa. The depressions and bosses are provided with inclined sides, as clearly shown in Fig. 2. At its periphery and intermediately between the side-plates the casing is closed, as shown. Communicating with the outer part of each depression
40 *c* is a pipe or conduit *g* which leads to the outer end of the depression of the other side-plate which is in advance of said first-named depression. The pipes *g* extend radially from the casing in a series arranged parallel to the axis thereof and extending about the periph-
45 ery. One of these pipes is provided with a cock *h*.

Upon the shaft *f*¹ there is keyed a core *b* arranged within the casing *a* and extending to the periphery thereof, said core completely filling the space in the casing adjacent the shaft *f*¹ and being provided with an outer part
50 which passes freely between the opposing bosses of the side-plates. The core *b* is provided with a number of radial slots in which are movable, axially of the core, a number of pistons *e*. These pistons are in the form of blocks which closely fit within the slots of the core and
55 correspond in width to the space between each boss *d* and the inner surface of the opposite depression *c*. The

casing *a* is filled with a liquid of any kind, preferably an uncongealable liquid, which fills all the available space.

Supposing the shaft *f*¹ to be the motor-shaft, when the
60 core *b* is rotated the pistons will move laterally in their slots alternately to the right and left of the core and enter the depressions and thereby cause the liquid to be forced in front of the pistons. During this movement of the core the pistons readily pass from the depressions
65 to the adjacent bosses at the same side thereof by means of the inclined sides of the depressions and bosses over which said pistons ride. The liquid which is forced in front of the pistons finds an outlet through the pipes *g*, and hence traverses the casing at the same velocity at
70 which the core rotates in the casing, which remains stationary. When the core rotates in this manner and the cock *h* is open, no obstacle is presented to the movement of the liquid and the clutch is disengaged. However, by progressively closing the cock *h* the driven shaft *f*
75 will be rotated by the motor-shaft at speeds progressively increasing up to the limit of the speed at which the motor operates, which speed is obtained by completely closing the cock. This variation in the speed of driving is explained by the fact that the increasing
80 quantity of liquid which finds no outlet through the conduit in which the cock is arranged, which conduit is partly or wholly closed by the cock, transmits the pressure that it receives from the pistons to the casing, which accordingly begins to rotate. It is apparent that
85 the cock *h* may be operated by any suitable mechanism.

When the devices are used as differentials, each of the wheels is provided with an identical device the casing of which is made solid with the wheel, while the central core is connected with the axle, which in this case acts
90 as a support.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a hydraulic clutch and change speed device, the combination, with a casing having alternate depressions
95 and bosses on the inner surfaces of its side-walls, the depressions and bosses of the side-walls being arranged in staggered relation, means connecting each depression with a depression in the other side-wall, a shaft rotatable in said casing, a core fixed to said shaft, pistons slidable
100 axially in said core between the depressions and bosses of the side-walls, a liquid contained in said casing, and means for controlling the passage of the liquid in advance of said pistons.

2. In a hydraulic clutch and change speed device, the combination of a casing having side-walls provided inter-
105 riorly with alternating series of depressions and bosses, means for connecting the depressions of each side-wall with those of the other wall, a shaft rotatable in said casing, a core carried by said shaft, blocks slidable in radial slots in said core and forming pistons which fit
110 between the opposing depressions and bosses of the side-walls of the casing, a liquid contained in said casing, and means to control the passage of such liquid in advance of the pistons.

3. In a hydraulic clutch and change speed device, the

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combination of a casing having opposing series of alternating depressions and bosses on the inner surfaces of its side-walls, pipes connecting each depression with a substantially opposite depression of the other side-wall, a stop-cock in one of said pipes, a shaft journaled in said casing, a core mounted on said shaft and provided with radial slots, pistons slidable axially in said core within said slots and fitting between the opposing depressions and bosses. and a body of liquid contained in said casing.

In testimony whereof I have signed this specification 10 in the presence of two subscribing witnesses.

LÉON MARIE JOSEPH
CLÉMENT LEVAVASSEUR.

Witnesses:

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HERNANDO DE SOTO.