Feb. 19, 1952 C. A. WYNDHAM 2,586,136

ROTARY HYDRAULIC COUPLING

Filed Oct. 3, 1947 2 SHEETS—SHEET 1

Fig. 1

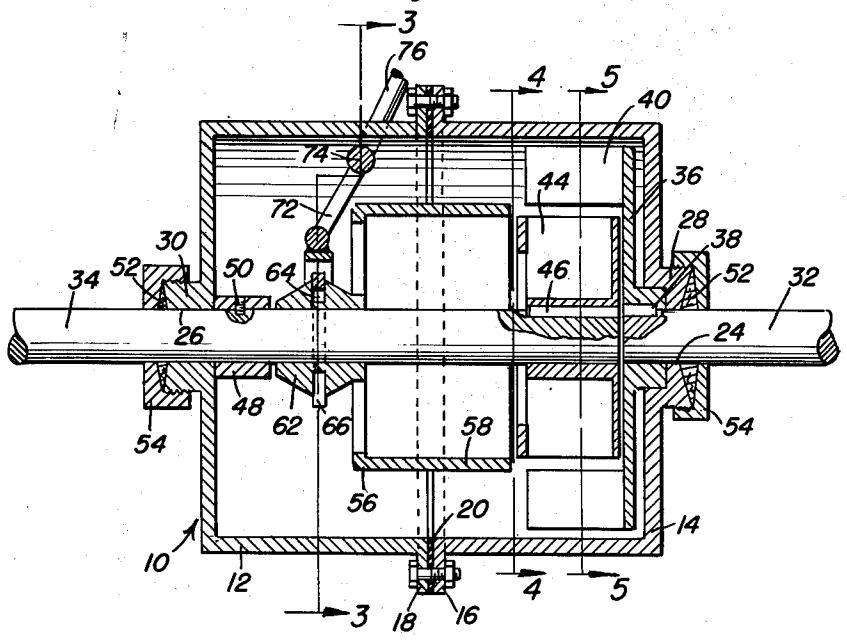
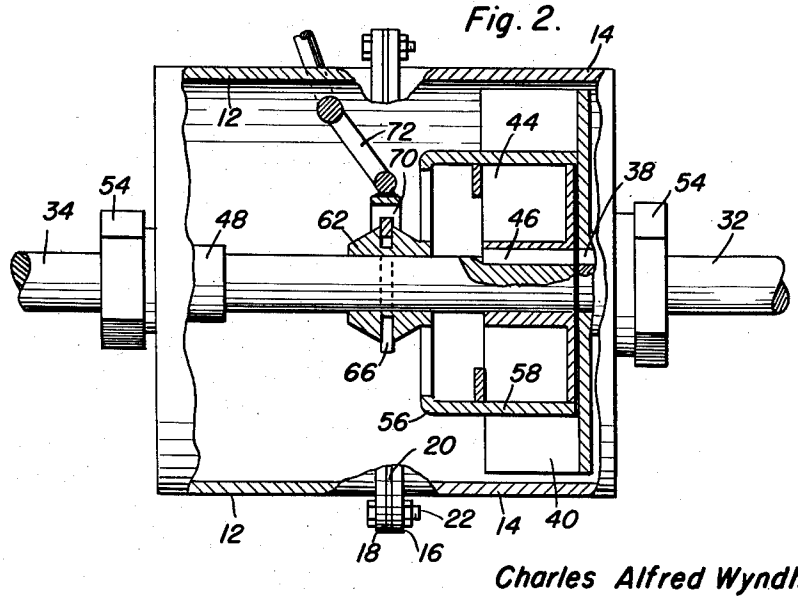


Fig. 2.



Inventor

Charles Alfred Wyndham

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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Fig. 3.

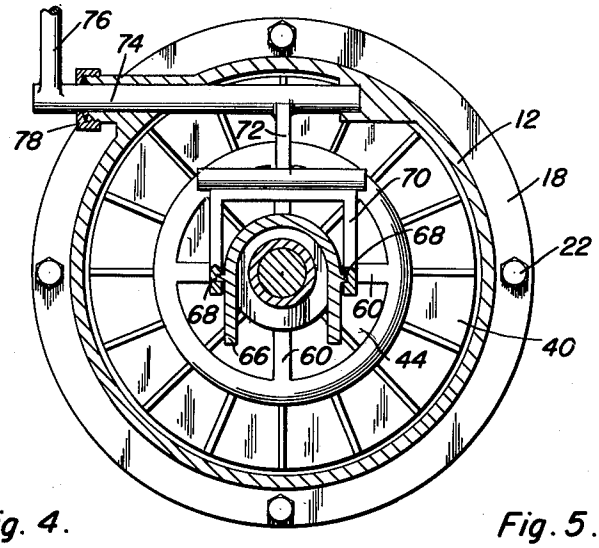


Fig. 4.

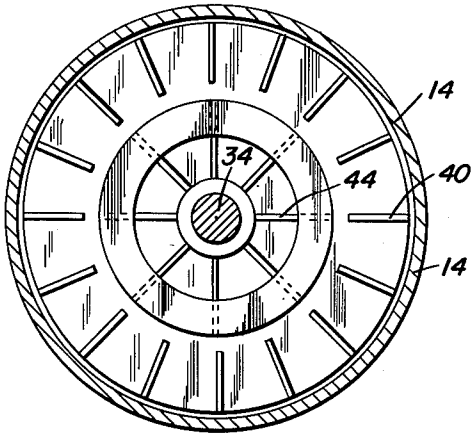
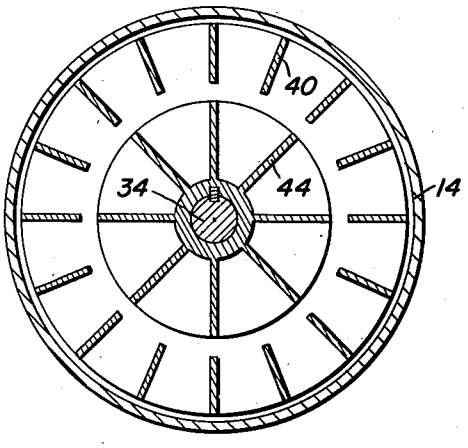


Fig. 5.



Inventor

Charles Alfred Wyndham

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Patented Feb. 19, 1952

2,586,136

UNITED STATES PATENT OFFICE

2,586,136

ROTARY HYDRAULIC COUPLING

Charles Alfred Wyndham, Bellingham, Wash.

Application October 3, 1947, Serial No. 777,803

2 Claims. (Cl. 60—54)

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This invention appertains to novel and useful improvements in fluid transmissions, and particularly control means therefor.

An object of this invention is to control the amount of torque transmitted from a drive shaft to a driven shaft.

Another purpose of this invention is to provide improved means for carrying out the above mentioned function.

A still further object of this invention is to provide a sectional housing having a drive shaft and driven shaft respectively journaled in selected sections and rotor means secured to each of the said shafts.

Another purpose of this invention is to provide valve means slidable between the sets of rotor blades whereby the amount of fluid and the rate of flow are controlled as the fluid is transmitted from one set of blades to the other set on the rotors.

Another purpose of this invention is to provide an extremely simple device of the character to be described which is efficient in operation, commercially feasible and which lends itself well to commercial manufacture.

Ancillary objects and features of novelty will become apparent to those skilled in the art, in following the description of the preferred form of the present invention, illustrated in accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of one form of the present invention;

Figure 2 is an elevational view of the invention shown in Figure 1, portions being broken away in section to illustrate details of construction, showing the valve in closed position;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1 and in the direction of the arrows;

Figure 4 is a transverse sectional view of the invention shown in Figure 1 and taken substantially on the line 4—4 thereof and in the direction of the arrows; and

Figure 5 is a transverse sectional view of the invention illustrated in Figure 1 and taken substantially on the line 5—5 thereof and in the direction of the arrows.

Referring now in detail to the illustrated preferred form of the present invention, like reference characters are used throughout to indicate similar elements thereof.

This invention has been developed to provide a device for more efficaciously controlling the rate of flow of hydraulic fluid from blades positioned on a drive shaft and on a driven shaft in a hydraulic transmission apparatus.

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Manual means for actuation of a valve which is slidable between sets of blades on the drive shaft and driven shaft is provided. This manual means may obviously be supplemented by servomotors and the like for adaptation of the invention to conventional automotive vehicles and the like. When the preferred form of the invention is utilized in association with power tools and other environments, it may be preferable to utilize the simple manual means for actuation of the valve. This, of course, is left within the prerogative of the manufacturer and may be dictated by the circumstances and environments to which the invention is subjected.

A housing, generally indicated at 10, is provided of sections 12 and 14 respectively. Flanges 18 and 16 respectively are provided on each of the said sections and a suitable gasket 20 may be interposed between the said flanges. Of course, conventional bolts 22 with their associated nuts may be utilized for retaining the said sections 12 and 14 respectively in the proper fixed position.

Apertures 24 and 26 respectively may be provided in the said sections 14 and 12 and suitable bosses 28 and 30 may be formed adjacent these apertures for the purpose of providing bearing surfaces. A driven shaft 32 is rotatively journaled in the said boss 28, while a drive shaft 34 is rotatively journaled in the said boss 30. A careful inspection of Figure 2 will clearly illustrate the relatively short length of the said shaft 32, it terminating slightly within the said housing 10.

A plate 36 is rigidly secured to the said driven shaft 32 by means of a suitable conventional pin 38 driven in a suitable slot. A plurality of blades, which might be considered the first set of blades, are provided on the said plate 36 and are indicated at 40. It will be noted that these blades 40 extend radially of the said shaft 32 and are positioned adjacent the periphery of the said plate 36. By this construction, a recess results about which would be the hub portion of the said blades 40.

A second set of blades 44 is secured to the said shaft 34 by any suitable means, preferably the pin and slot construction illustrated at 46. This last-mentioned set of blades 44 is positioned on the said shaft 34 and is also positoned within the recess formed by the said blades 40. It is further noted that the said second set of blades 44 are concentrically surrounded by the said blades 40 and extend radially from shaft 34.

A thrust bearing 48 may be secured to the said shaft 34 by any suitable means, preferably the set screw 50, and serves the purpose of limiting

means for the axial thrust of the shaft **34**. Also, suitable packing **52** may be applied in a recess in the said boss **30** with a cap screw **54** firmly retaining the said packing in position. An identical construction may be supplied about the shaft **32** and on the said boss **28**.

Means for regulating the amount of torque transmitted from the drive shaft **34** to the driven shaft **32** is provided. This means is preferably a cage or valve **56** which is slidably positioned on the said shaft **34**. This cage is, of course, slidable axially of the longitudinal axis of the said shaft **34**. It will be further noted that the said cage has a skirt **58** thereon which may be selectively positioned in the clearance between the sets of blades **40** and **44** respectively.

By selectively positioning the said skirt **58** in this clearance, the exposed area of one set of blades relative to the other set of blades may be varied in accordance with the prerogative of the operator of the fluid drive mechanism.

The cage **56** is formed with a plurality of arms **60** therein (see Figure 3) and a boss **62** is rigidly secured thereto. Now, any suitable means may be utilized for the purpose of sliding the said valve **56** on the said shaft **34**. The means illustrated may be noted as the slot **64** provided in the said boss **62** having a substantially U-shaped member **66** loosely slidable therein. Protuberances **68** are formed on the sides of the said U-shaped member **66** and a yoke **70** is pivoted thereto. This yoke has an arm **72** secured thereto which is, in turn, secured to a shaft **74**. This shaft **74** is pivoted in suitable bearings in the said housing **10** and an operating lever **76** extends therefrom. This operating lever, of course, may be manually operated or, if so desired, a servo motor construction may be used in association therewith. A cap screw **78** may be fixed at the journaling points of the said shaft **74** for the purpose of retaining an oil seal in the operative position.

It will be noted further at this point that a conventional shift mechanism might be utilized such as is conventional in mechanical transmissions.

While there has been described and illustrated but a preferred form of the present invention, it is apparent that variations may be made without departing from the spirit of the invention. Accordingly, limitation is sought only in accordance with the scope of the following claims.

Having described the invention, what is claimed as new is:

1. A fluid transmission comprising a housing having aligned apertures, a first and second shaft journaled in said apertures, a circular plate centrally secured to said first shaft, a plurality of circumferentially spaced substantially retangular blades secured at one of their ends to said plate and disposed radially of said first shaft and radially inwardly from the peripheral edge of said plate, said blades each having an inlet edge extending throughout its length and paralleling said first shaft, a second plurality of circumferentially spaced radially disposed substantially

rectangular blades mounted on said second shaft, the last-mentioned blades each having an outlet edge paralleling said second shaft and spaced radially and inwardly of the inlet edges of said first-named blades, and a valve slidably mounted on said second shaft adjacent the second plurality of blades and including a cylindrical wall movable between the inlet edges of the first-mentioned blades and the outlet edges of the last-mentioned blades and also movable across the entire length of said first and second plurality of blades while remaining concentric of said shafts.

2. A fluid transmission comprising a housing having a pair of aligned apertures; a driven shaft journaled in one of said apertures; a drive shaft journaled in the other of said apertures; a circular plate having a central hub keyed on said driven shaft; a first group of substantially rectangular circumferentially spaced blades fixed at one of their ends to said plate and having their axes paralleling said driven shaft; said blades having straight inlet edges extending throughout their lengths spaced parallel to said driven shaft; a second group of circumferentially spaced radially spaced blades mounted on said drive shaft; each blade of said second group having an outlet edge paralleling said drive shaft and also said driven shaft; the outlet edges of the blades of said second group being spaced radially from and parallel to the inlet edges of the blades of said first group; a valve member including a hub portion slidably received on said drive shaft adjacent the second group of blades and a cylindrical skirt embracing said drive shaft, said valve member being movable between the inlet edges of the blades of said first group and the outlet edges of the blades of said second group, and arms terminally secured to said hub portion and to one end of said skirt; and manually operated means carried by said housing and connected to said hub portion for moving the valve member on said drive shaft and between said first and second groups of blades.

CHARLES ALFRED WYNDHAM.

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