

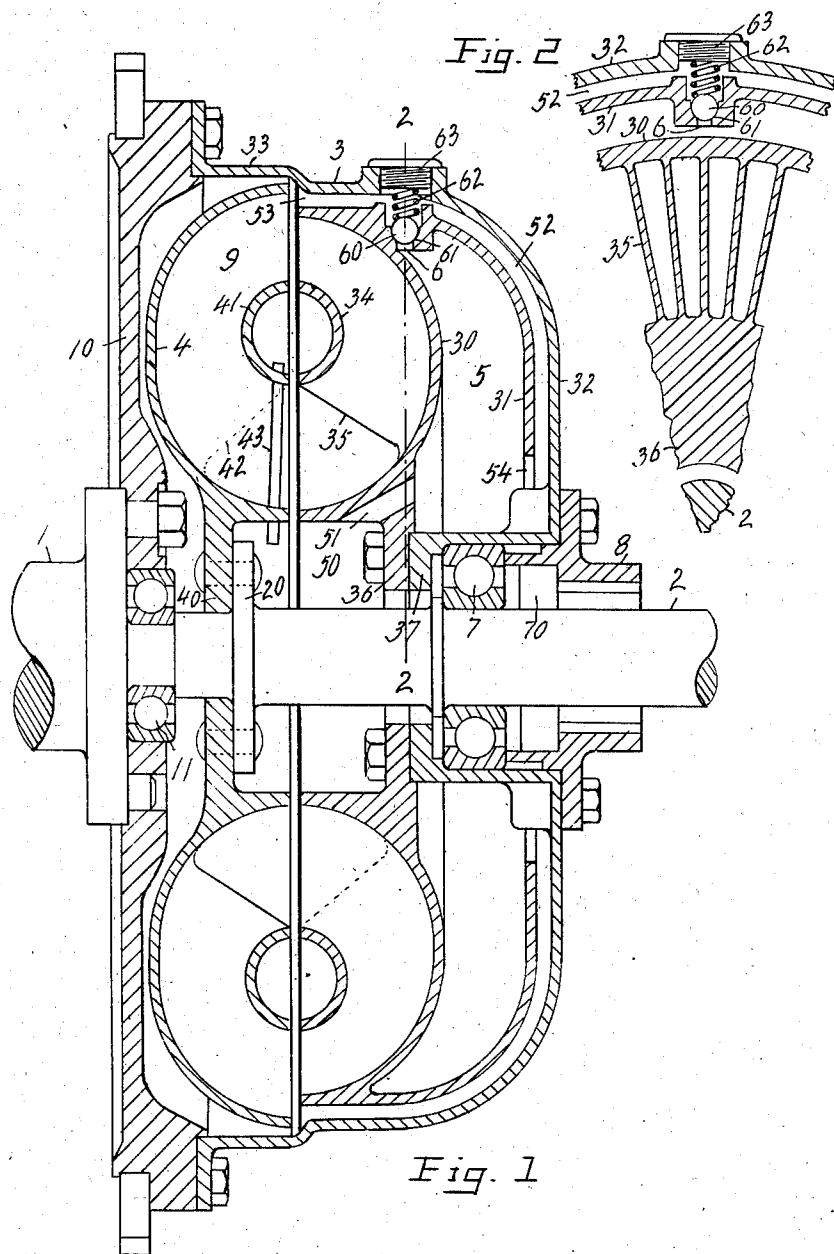
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W. A. DUFFIELD

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FLUID COUPLING

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INVENTOR
William A. Duffield
BY
Lawrence A. Anderson
ATTORNEY

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FLUID COUPLING

William A. Duffield, Windsor, Ontario, Canada,
 assignor, by mesne assignments, to Amador
 Botello, New York, N. Y.

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3 Claims. (Cl. 60—54)

This invention relates to improvements to fluid couplings and particularly to the type covered by my United States Patent No. 2,156,040, dated April 25, 1939.

In that patent means were provided whereby the fluid could be evacuated from the working circuit of the coupling and returned thereto.

This consisted of an impeller member of the fluid coupling, having a reservoir around the shaft on which it was journaled, with a by-pass passage from the reservoir opening directly into the runner member at its outer edge. This construction provided for the evacuation of fluid from the working circuit into the reservoir when the speed of rotation of the runner member exceeded that of the impeller member, and the return of the fluid to the working circuit when the speed of rotation of the impeller exceeded that of the runner member.

The present invention provides means whereby the return of the fluid from the reservoir to the working circuit can be controlled regulated and adjusted.

By this means, the runner member after the evacuation of the fluid from the working circuit permits it to over-run the impeller member, and will continue to over-run that member, until the latter reaches a certain speed of rotation, adjusted by the novel regulator means.

Reference is made to the accompanying drawing in which—

Figure 1 is a vertical cross section of the fluid coupling.

Figure 2 is a cross section on the lines 2—2 of Figure 1.

As shown in Figure 1, the impeller member 31 has the by-pass passage 52 having an opening 53 to the outer portion of the runner member 4 and leading to the outlet 54 in the inner or central portion of the reservoir 5. This reservoir 5 extends outwardly and has a series of centrifugal spring controlled ball valves 60 at its periphery opening into the by-pass passage 51 to provide outlets from the reservoir to permit the return of the fluid into the working circuit. The ball valves 60 are adjusted by the screw plugs 63 whereby the tension of the spring 62 can be varied. When the centrifugal force of the fluid in the reservoir due to the speed of rotation of the impeller 3 is sufficient to open the ball valves 60 the fluid will begin to flow back into the working circuit 9 of the runner 4.

In the construction shown the drive shaft 1 is bolted to a fly-wheel 10. The impeller 3 extends over the runner 4 at 33 and is bolted to the

fly-wheel 10. The flange 40 of the runner 4 is bolted to the flange 20 of the driven shaft 2 which is journaled at its end in the bearing 11 in the fly-wheel 10 and also in the bearing 7 in the inner portion of the impeller 3.

The impeller member 3 is shown in two castings for constructional purposes. The impeller shell 30 with its vanes 35 and core 34 has an outer shell 31 forming the reservoir 5, and a flange 36. Over and around this casting is the shell 32 extending from the extension 33 to the inner end of the reservoir 5 where it is bolted to the flange 36. The sleeve 8 is also bolted to this portion of the shell 32.

The form of the ball valve 60 as shown comprises an outlet passage 6 having a spherical or conical seat 61 for the ball 60. In the shell 32 is a screw plug 63. A coil spring 62 bears on the ball 60 and its tension is adjusted by the screw plug 63. Between the flanges 40 and 36 of the impeller and runner an inner reservoir 50 is provided, with passages 51 from the main reservoir.

Air tubes 43 from the cores 41 to the inner reservoir 50 are also provided.

With a construction of this type, when the speed of rotation of the driven shaft and runner exceeds that of the impeller, the fluid in the working circuit will flow through the by-pass passage into the reservoir. As the working circuit becomes depleted the runner over-runs the impeller freely. In order to return the fluid to the working circuit and couple the impeller and runner, the drive shaft must be speeded up. But by means of the controlled outlet valves from the reservoir, a predetermined speed is required to open these valves. The runner will therefore continue to over-run the impeller until after this speed is reached. The result is valuable and important when the coupling is combined with transmission mechanism.

It is also of value and importance in preventing creeping of the fluid from the reservoir to the working circuit when the coupling is rotating at idling speed.

What I claim is:

1. In a fluid coupling of the type specified, a drive shaft, a fly-wheel bolted thereto, a driven shaft having its end journaled in the fly-wheel, an impeller member bolted to the fly-wheel and journaled on the driven shaft, a runner member having core and vanes, bolted to a flange on the driven shaft, the impeller member comprising an inner shell having a core and vanes, an outer shell forming a reservoir, and a by-pass passage

from within the runner member and about the reservoir to its inner end, the outer end of the reservoir having a series of adjustable outlet valves opening into the by-pass passage.

2. In a fluid coupling of the type specified, a drive shaft, a fly-wheel bolted thereto, a driven shaft having its end journalled in the fly-wheel, an impeller member bolted to the fly-wheel and journalled on the driven shaft, a runner member having core and vanes bolted to a flange on the driven shaft, the impeller member comprising an inner shell having a core and vanes, an outer shell forming a reservoir, and a by-pass passage from within the runner member and about the reservoir to its inner end, the outer end of the reservoir having a series of adjustable outlet valves opening into the by-pass passage, and an inner reservoir around the driven shaft and inside the impeller and runner members with passages from the reservoir to the inner reservoir.

3. In a fluid coupling of the type specified, a drive shaft, a fly-wheel bolted thereto, a driven shaft having its end journalled in the fly-wheel, an impeller member bolted to the fly-wheel and journalled on the driven shaft, a runner member having core and vanes bolted to a flange on the driven shaft, the impeller member comprising an inner shell having a core and vanes, an outer shell forming a reservoir, and a by-pass passage from within the runner member and about the reservoir to its inner end, the outer end of the reservoir having a series of adjustable outlet valves opening into the by-pass passages, and an inner reservoir around the driven shaft and inside the impeller and runner members with passages from the reservoir to the inner reservoir, and air tubes from the core to the inner reservoir.

WILLIAM A. DUFFIELD.