

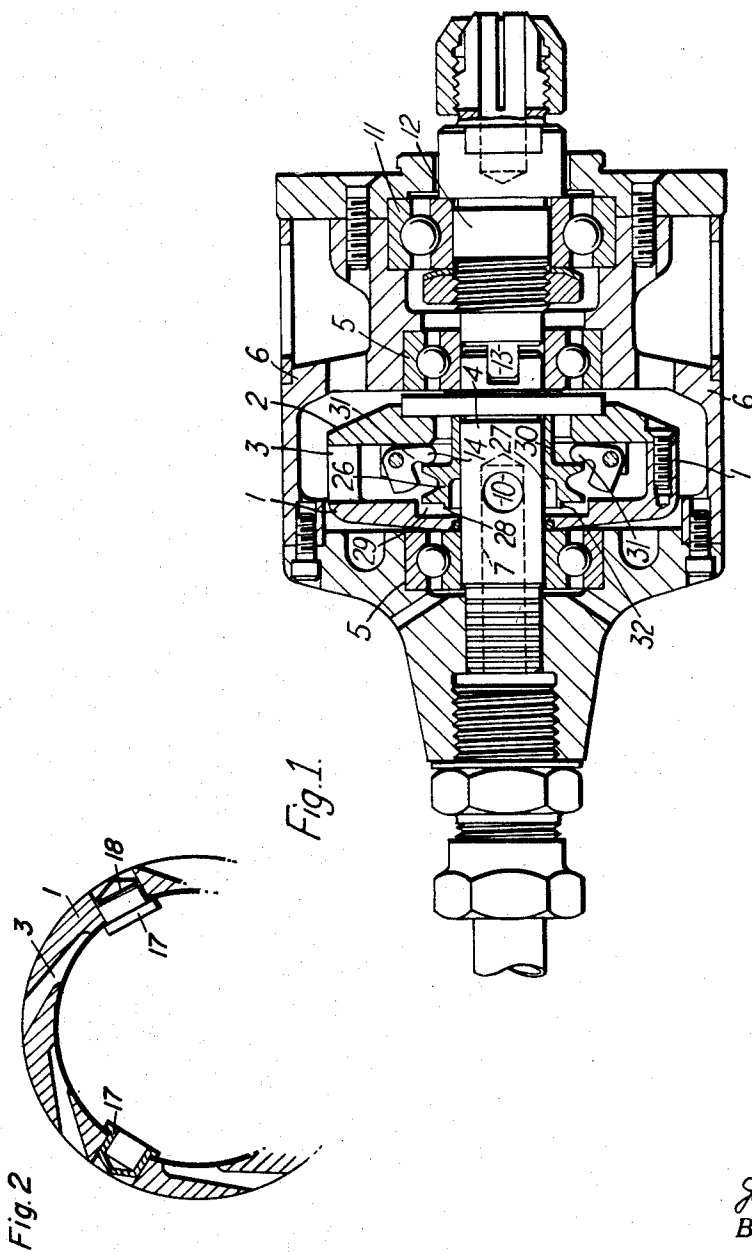
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PRESSURE-FLUID MOTORS

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1

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PRESSURE-FLUID MOTORS

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1 Claim. (Cl. 253-166)

This invention relates to motors which are intended to be driven by fluid under pressure, the term fluid being intended to include a gas such as air or a liquid such as oil. More especially the invention is concerned with portable motors of a relatively low duty such as are employed for driving portable tools and so on, such motors being of the type having a rotor formed with flow channels which are so shaped that the flow of fluid through them creates a reaction setting up a turning torque on the rotor.

According to this invention, a pressure-fluid motor comprises a hollow casing, a supply member extending through said casing, a hollow rotor rotatably mounted about said supply member and having peripheral discharge channels discharging to the interior of the casing, a regulating sleeve housed in said rotor and slidable axially on said supply member, the said supply member having supply openings controlled by the sleeve for admission to the interior of the rotor, a centrifugal governor housed in the rotor and operatively associated with the sleeve to regulate the fluid supply through the openings to hold the rotor at a predetermined speed, the said sleeve having surfaces co-operating with surfaces on the rotor and said surfaces being subjected to the pressure fluid supply so as to apply a bias to the sleeve against the action of the governor with an effect which decreases as the sleeve reaches its position of maximum displacement by the governor.

The invention is illustrated in the accompanying drawings, in which:

FIGURE 1 is a longitudinal section of a pressure fluid motor embodying the invention; and

FIGURE 2 is a transverse section of a rotor component of the motor shown in FIGURE 1.

Referring to the drawings, a motor is shown as comprising a hollow rotor 1, 2 having peripheral flow channels 3 constituting reacting nozzles discharging to the interior of a hollow casing 6, fluid under pressure being supplied via a connection to a passage 7 and ports, one shown at 10, in a support and supply member 4 on which the rotor is mounted to rotate. The rotation of the rotor is transmitted to an output shaft 12 via a coupling 13.

Housed within the rotor 1, 2 is a centrifugal governor 14 of the bob-weight type, and this governor operates to regulate the speed of rotation of the rotor by actuating a regulating sleeve, as shown a disc valve 26, controlling the supply of pressure fluid through the ports or openings 10. The disc valve 26, which is slideable axially on the support 4 is itself provided with an annulus 27 which is constantly open to the pressure fluid supply; one face 28 of this disc valve 26 forms a control face for co-operation with the walls of an annular recess 29 in the rotor 1, 2 towards which the disc moves; another face 30 of the disc valve is abutted by an extension 31 on the bob-weight 14 of the governor so that as the speed of the rotor increases the disc valve is moved axially to carry its control face 28 towards and into the annular recess 29.

The control face 28 of the disc valve is relieved so as to leave a circular rim 32.

With this arrangement, at the lower speeds of the rotor, the fluid pressure acts on the entire area of the control face 28 to oppose movement of the valve 26 under the action of the bob-weight 14. As the speed rises, the con-

2

trol face 28 is moved further into the annular recess 29 in the wall of the rotor until finally at the predetermined point of balance the rim 32 on the control face co-operates with the wall of the rotor to cut off the fluid flow from the annulus 27 in the disc valve (or to reduce the flow to a small value); in this way the major part of the counter pressure area of the disc valve, i.e., the area about the rim 32, is relieved of any sensible fluid-pressure action, and the centrifugal action is given an advantage to effect positive closing action.

As is shown, the rotor 1, 2 is supported for rotation in the casing 6 by bearing 5, and the output shaft 12 is supported by one of the bearings 5 and by a front bearing 11.

The illustrated construction includes an overriding safety device which prevents the rotor 1, 2 from developing a speed which could cause the motor to fracture or break-up under extremes of centrifugal loading. For this purpose the rotor chamber is provided with one or more openings which are normally closed by what may be termed a plug 17 having a reduced section indicated at 18 in FIGURE 2 providing a line of weakness calculated to rupture under extreme centrifugal loading; this plug may open the chamber in shunt across the flow passages 3, so destroying or at least considerably reducing the reaction effect.

I claim:

A pressure-fluid motor comprising a hollow casing, a supply member extending through said casing and having supply openings, a hollow rotor rotatably mounted about said supply member and having peripheral discharge channels discharging to the interior of the casing, a regulating sleeve housed in said rotor and slidable axially on said supply member for controlling flow of liquid through said supply openings to the interior of said rotor, said sleeve having a surface which faces and is spaced axially of said supply member from a surface on the interior of said rotor when said sleeve is in valve opening position, said sleeve surface approaching said rotor surface when said sleeve is moved axially of said supply member toward valve closing position, said surfaces defining therebetween a passage for the flow of fluid from said supply openings to said discharge channels, and a centrifugal governor housed in the rotor and operatively associated with the sleeve to regulate the fluid supply through the openings to hold the rotor at a predetermined speed, said surfaces being subjected to the pressure fluid supply so as to apply a bias to the sleeve against the action of the governor with an effect which decreases as the sleeve reaches its position of maximum displacement by the governor.

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