

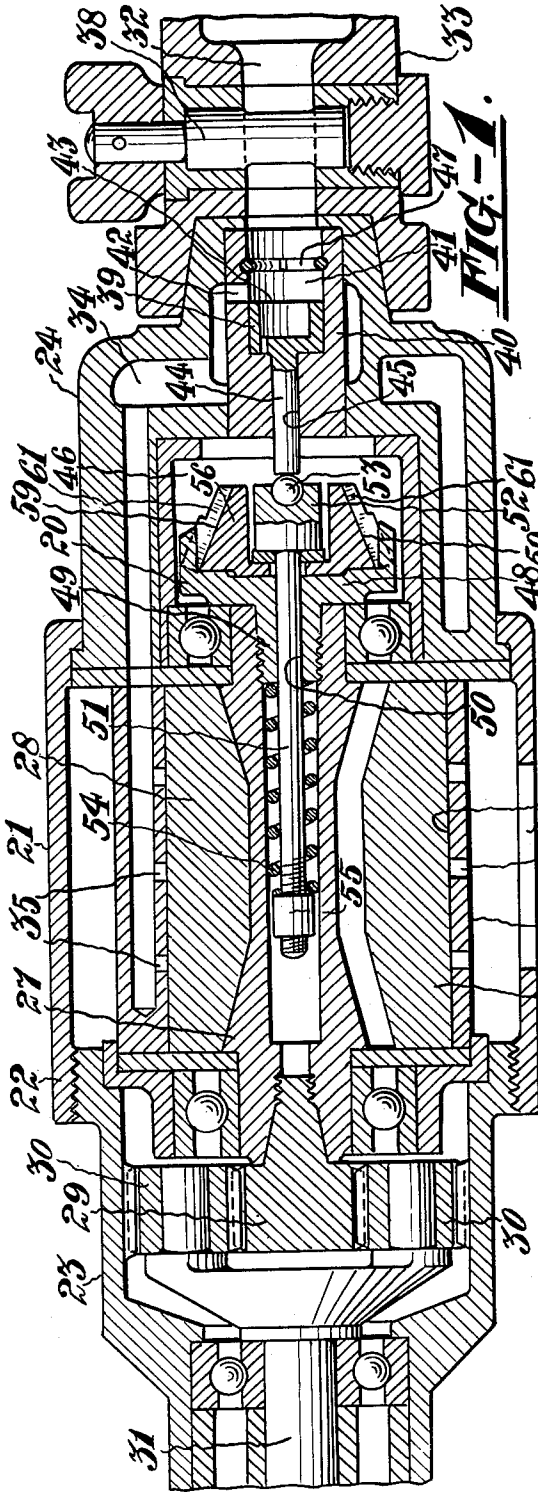
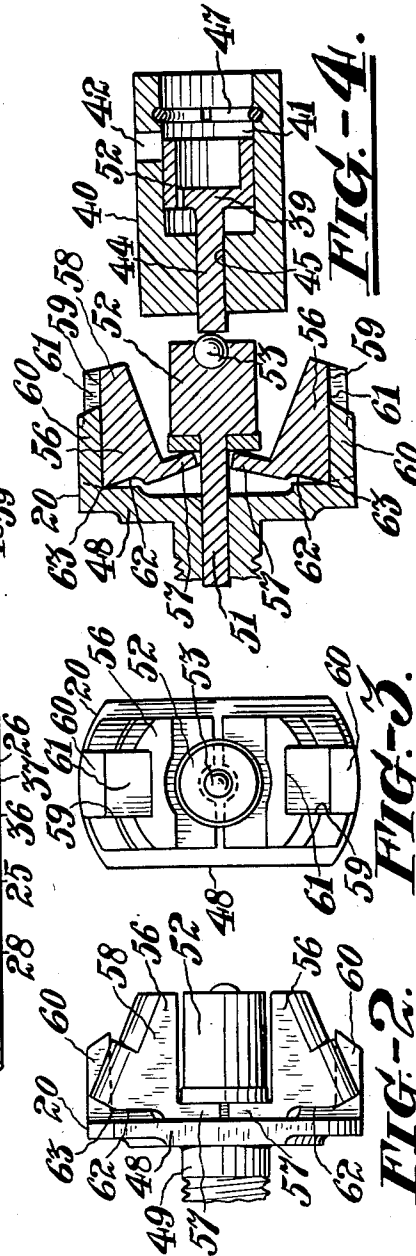
April 19, 1938.

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2,114,813

GOVERNOR

Filed May 18, 1937



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UNITED STATES PATENT OFFICE

2,114,813

GOVERNOR

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Application May 18, 1937, Serial No. 143,280

2 Claims. (Cl. 264—15)

This invention relates to governing mechanisms, and more particularly to a governor used in connection with pressure fluid actuated rotary motors for controlling the supply of pressure fluid thereto.

A few of the objects of the invention are to simplify the construction of governors of this character, to render the governor sensitively responsive to variations in the speed of the motor whereby the governor is actuated, to enable the governor to be readily adjusted in accordance with immediate speed requirements, and to enable the governor to be conveniently and expeditiously assembled and disassembled.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawing accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a longitudinal view, in section, of the governor and a motor to which the governor is applied,

Figure 2 is a longitudinal side elevation of the governor showing the position which the parts will assume when the governor is at rest,

Figure 3 is an end view of the governor, and

Figure 4 is a longitudinal elevation, in section, of the governor and an element controlled thereby.

Referring more particularly to the drawing, 20 designates, in general, a governor constructed in accordance with the practice of the invention and 21 a motor to which the governor 20 is applied.

The motor 21 is illustrated as being of the hand held rotary type commonly used for actuating a grinding wheel and similar devices (not shown). The motor comprises a casing 22 suitably connected to end heads 23 and 24. The casing encircles a cylinder 25 which, in the present instance, is clamped between the heads 23 and 24 by the casing 22. The interior of the cylinder 25 forms a chamber 26 for a rotor 27 carrying slidable vanes 28 against which pressure fluid acts for rotating the rotor and the parts connected thereto, as for example, a spider 29 forming a carrier for planetary gearing 30 which in turn is connected to a shaft 31 upon which the grinding wheel may be mounted.

The pressure fluid used for actuating the rotor 27 is conveyed thereto by a supply passage 32 extending through a handle 33, thence passes through a passage 34 in the head 24 and the cylinder 25 and through admission ports 35 in the cylinder into the chamber 26 where it acts against

the vanes 28. The exhaust fluid passes from the chamber 26 through ports 36 in the cylinder 25 and an exhaust port 37 in the casing 21.

The flow of pressure fluid through the passage 32 is controlled by a throttle valve 38, and the admission of pressure fluid to the motor is controlled by a valve 39 slidable in a valve chest 40 arranged in the head 24 and coaxially with the passage 32. The valve chest 40 is bored to provide a valve chamber 41 of which an end is in direct communication with the supply passage 32, and in the side of the valve chest is a port 42 to afford communication between the valve chamber 41 and the passage 34.

The port 42 is controlled by the valve 39 and the end of the valve adjacent the port 42 constitutes a pressure surface 43 against which pressure fluid acts. The opposite end of the valve carries a stem 44 which extends slidably through a bore 45 in the valve chest 40 and into a cavity 46 in the head 24. The valve 39 is a pressure balanced valve except for the cross sectional area of the stem 44, since the pressure fluid is free to act on both sides of the valve; and, consequently, the pressure fluid constantly acts on the unbalanced stem area to hold the valve in position for uncovering the port.

Any suitable means, such as a spring ring 47, may be placed in the valve chamber 41 to retain the valve 39 in the valve chamber.

The governor 20 constructed in accordance with the practice of the invention comprises a plate 48 located in the cavity 46 and seats against the end of the rotor 27. The plate carries a stem 49 which is threaded into the rotor, and extending coaxially through the stem and the plate is a bore 50 to accommodate a rod 51. The rod is slidable in the bore 50 and has a head 52 in which is embedded a ball 53 forming a seat for the free end of the valve stem 44. The opposite end of the rod 51 extends into the rotor 27 and a spring 54 encircling it seats with one end against the stem 49 and with the other end against a nut 55 threaded on the rod to exert a force for pressing the head 52 against the plate 48.

The head 52 is of smaller diameter than the plate 48 and between the peripheries of the head and the plate are weights 56 adapted to be actuated centrifugally for actuating the head 52 and thus the valve 39. The weights 56 are of substantially L-shape. They seat upon the junction of plate 48 and fingers 60 and have arms 57 which engage the head 52 for shifting the valve 39.

The mass or weight portions 58 of the weights 55

56 may be of substantially the same height as the head 52 which they parallel when the rotor is at rest. They taper outwardly from the free ends thereof and are provided with grooves 59 which incline in substantially the same degree as the outer surfaces of the weights and engage extensions or fingers 60 on the plate 48 to prevent relative rotation between the weights and the plate 48.

10 At the juncture of the bottoms 61 of the grooves 59 and the lower surfaces 62 of the weights are fulcra 63 in the form of knife edges which seat in the corners defined by the plate and the fingers 60.

15 The operation of the device, briefly described, is as follows: With the throttle valve 38 in the open position pressure fluid will flow from the supply passage 32 through the port 42 and associated ports and passages into the chamber 26 and actuate the rotor 27.

20 During the initial starting of the rotor the centrifugal force of the weights 56 is of insufficient value to affect the position of the valve 39. The port 42 will, therefore, be fully uncovered and the rotor will accelerate rapidly. When the rotor speed reaches a rate at which the centrifugal force of the weights 56 may overcome the force exerted by the spring 54 the valve 39 is actuated by the head 52 to partly cover the port 42 and thus diminish the supply of pressure fluid to the chamber 26.

25 If, owing to an increased resistance to the rotary movement of the motor, the speed of the motor is reduced the centrifugal force of the weights 56 will, of course, be correspondingly reduced and the spring 54 will then act to move the head 52 toward the plate 48. The pressure fluid acting against the actuating surface 43 will, at the same time, cause the valve 39 to follow the movement of the head 52 and thereby afford a wider area of communication between the valve chamber 41 and the passage 34 to again accelerate the speed of the motor.

30 In practice the present invention has been found to be a highly satisfactory governing device for use in connection with light weight port-

able rotary tools in which it is essential that the overall weight of the tool be maintained at a minimum and in consequence of which only restricted space is available for the governing device. The parts comprising the governor are of simplified design and may, therefore, be cheaply replaced and quickly and conveniently assembled and disassembled.

We claim:

1. In a rotary governor for a non-rotating reciprocating valve, a spring pressed reciprocating shaft, a head on the shaft, a bearing on the head to bear against the valve, a rotary plate to guide the shaft, fingers extending from the plate, tilting centrifugal weights having grooves in the outer surfaces thereof to co-act with the fingers to limit tilting movement of the weights and to prevent relative rotary movements between the plate and the weights, knife edge fulcra on the weights resting on the juncture of the plate and fingers, and arms on the weights to impart longitudinal movement to the reciprocating shaft upon movement of the weights due to centrifugal force to thereby move the valve.

2. In a rotary governor for a non-rotating reciprocating valve, a spring pressed reciprocating shaft, a head on the shaft, a bearing on the head to bear against the head, a rotary plate to guide the shaft, fingers extending perpendicularly from the plate and forming fulcra surfaces at points of intersection with the plate, tilting centrifugal weights having grooves in the outer surfaces thereof to co-act with the fingers to limit tilting movement of the weights and to prevent relative rotary movement between the plate and the weights, knife edge fulcra on the weights resting on said fulcra surfaces forming pivot points on the weights and arms on and extending perpendicularly from the weights and resting between the plate and head to impart longitudinal movement to the reciprocating shaft upon movement of the weights due to centrifugal force to thereby move the valve.

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