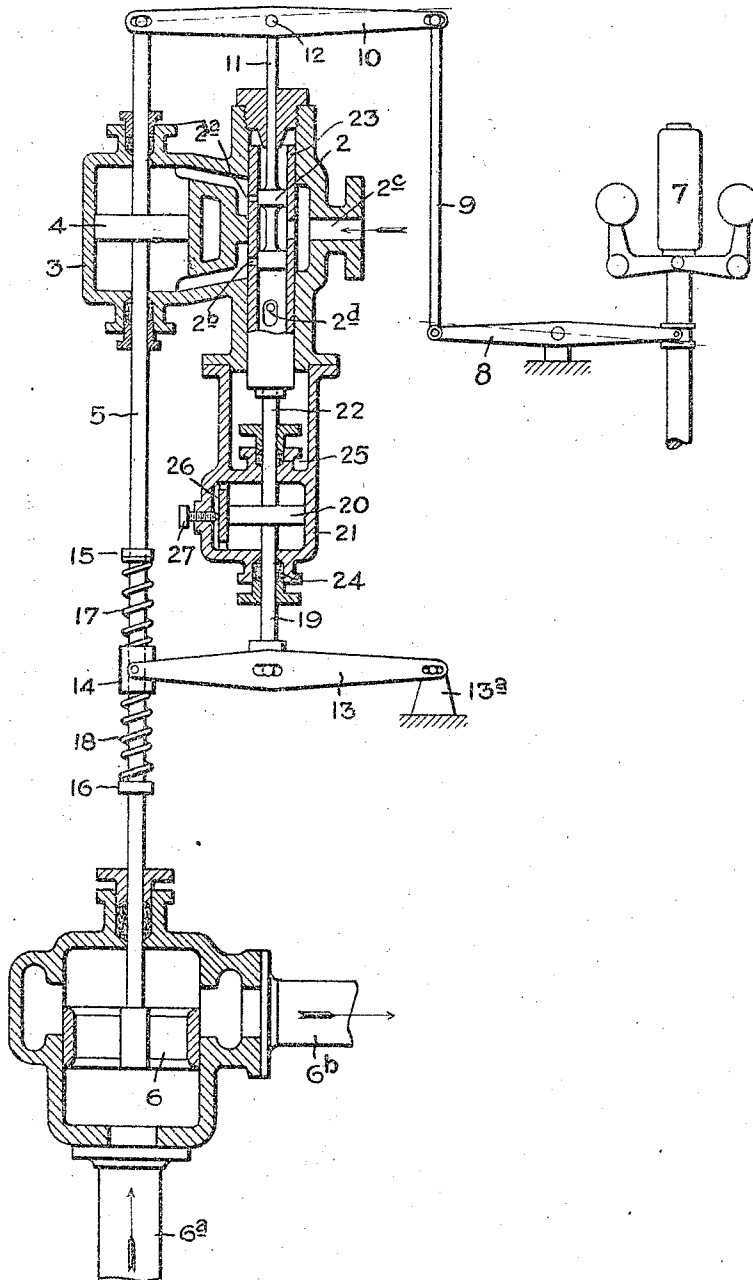


F. SAMUELSON.
SPEED GOVERNING MECHANISM.
APPLICATION FILED MAR. 7, 1914.

1,154,062.

Patented Sept. 21, 1915.



Witnesses:
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Att'y.

UNITED STATES PATENT OFFICE.

FREDERICK SAMUELSON, OF RUGBY, ENGLAND, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SPEED-GOVERNING MECHANISM.

1,154,062.

Specification of Letters Patent.

Patented Sept. 21, 1915.

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To all whom it may concern:

Be it known that I, FREDERICK SAMUELSON, a subject of the King of Sweden, residing at Rugby, England, have invented certain new and useful Improvements in Speed-Governing Mechanism, of which the following is a specification.

This invention relates to governing mechanisms for prime movers such as elastic fluid turbines, and more particularly to that class of governing mechanism which includes a valve controlling a supply of fluid to the prime mover, a fluid motor for operating said valve, and a pilot valve controlled by a speed responsive device for regulating the supply of fluid to the motor. With such governing mechanism, the speed of the machine controlled varies with the load; that is, if the load increases the speed will be reduced, and vice versa. In order to make this class of governor suitable for a prime mover which is required to run at the same speed under a heavy load as it usually runs at under a light load, it is necessary to provide some suitable means for adjusting the controlling mechanism.

The object of the present invention is to provide a mechanism for automatically keeping the speed constant under all load conditions and which, while sensitive, will effectually prevent any tendency on the part of the governor to over regulate or hunt.

The accompanying drawing illustrates one form which my invention may take.

In the drawing, 2 represents a pilot valve controlling the supply of oil or other fluid to a cylinder 3 provided with a piston 4 which is connected by means of a rod 5 to a valve 6 supplying fluid to the prime mover. This valve may be of any suitable or well known type, a form of balanced valve being shown having an inlet 6^a and an outlet 6^b. The pilot valve is operated by a speed governor 7 through a governor lever 8 and a link 9 connecting it to a lever 10, to which also the stem 11 of the pilot valve and a continuation of the motor-piston rod are connected. With this mechanism, if the speed of the prime mover falls, owing to an increase in load, the lever 8 will assume the position shown by the dotted line. This causes the right hand end of the lever 10 to rise to the position also shown by the dotted line, thereby causing the pilot valve 2 to open the upper port 2^a and allow the oil, or

other operating fluid, to enter by way of conduit 2^c to the upper end of the cylinder 3 and force the piston 4 and valve stem 5 downward, thereby opening the valve 6 to a greater or a less extent. The oil or other operating fluid passes out from under piston 4 by way of port 2^b and opening 2^d. The movement of the piston will also lower the left hand end of the lever 10 and cause the pilot valve to again cover the ports leading to the cylinder 3, thereby preventing further operation of the motor by bringing the piston 4 to rest. The connection to the piston rod thus constitutes a follow-up device which tends to prevent overtravel of the motor and hunting. The speed of the machine will now be less than formerly, according to the amount of additional load that is on it. It will be seen from the above description that the pivot point 12 of the lever 10 always occupies the same position, while the prime mover is run at any speed, irrespective of what that speed is, and irrespective of the load, this normal position being that shown in the drawing, where the pilot valve 2 covers both the ports. If the valve were not in this position, fluid would be admitted to either one end or the other of the cylinder 3 and the main valve 6 would be opening or closing so that the speed could not be steady.

I will now describe the feature of my invention by which I am enabled to maintain a speed under all conditions of load and at the same time effectually prevent hunting of the governor.

It will be seen that a lever 13 is provided which is pivoted at one end to a fulcrum 13^a, which fulcrum may be either fixed or adjustable as desired. The opposite end of this lever is pivoted to a sleeve or collar 14 on the rod 5, which sleeve or collar is held yieldingly in position between the abutments 15 and 16 by springs 17 and 18. At an intermediate point the lever 13 is connected to a sleeve 23 which carries the ports of the pilot valve and in connection with this lever suitable means are provided, as, for example, a dash pot, for retarding its movements. This connecting and retarding means is shown as comprising a rod 19 carried by the plunger 20 of a dash pot 21, which plunger is connected by rod 22 to the sliding sleeve, the rods 19 and 22 passing through suitable packings 24 and 25, 110

The dash pot may be provided with any preferred form of regulating means, as for example, a by-pass 26 controlled by a valve 27. If now the speed of the prime mover falls, due to increase in load, the governor lever 8 will assume the position shown by the dotted line, as also will the lever 10. This movement causes the pilot valve to admit fluid to the upper part of the motor cylinder so as to force the piston downward and open the main valve. The pilot valve sleeve 23, however, will not immediately follow up the piston rod due to the retarding action of the dash pot, but as the main valve rod is forced down by the motor piston the upper spring 17 is compressed. The pressure exerted by the spring on the lever 13 will gradually move the pilot valve sleeve until the levers 10 and 13 are parallel and the two springs are in their central position. When these two levers are parallel and the pilot valve ports are closed the governor weights can only occupy the position which corresponds to normal speed of the prime mover. If the speed of the prime mover should increase instead of diminish the operation of the parts described above would be similar but in the opposite direction. By the above described arrangement, it will be seen that a quick movement of the sleeve 23 taking place at the same time and in connection with the movement of valve 6, which movement would tend to permit overtravel and hunting, is avoided, and that I obtain a slow retarded movement which can be readily timed and regulated so as to cause just sufficient additional movement of valve 6 to bring the machine to the desired speed.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A governing mechanism for prime movers comprising a fluid admitting valve means, a motor for actuating it, a pilot valve controlling the motor, a governor for the pilot valve, and a device that tends to prevent overtravel of the motor, in combina-

tion with a ported sleeve that surrounds the pilot valve and through whose ports fluid flows to the motor, means moving in response to load changes on the prime mover for adjusting the position of the sleeve with respect to the pilot valve in a direction tending to retard the shutting off of the fluid by the valve, and means for retarding the movement of such adjusting means.

2. A governing mechanism for prime movers comprising a fluid admitting valve means, a motor for actuating it, a pilot valve controlling the motor, a governor for the pilot valve, and a follow-up device, in combination with a ported sleeve that surrounds the pilot valve and through whose ports fluid flows to the motor, a lever yieldingly connected at one end to the piston rod, a connection between said lever and the ported sleeve, a pivot for said lever, and means for retarding the movement of said lever.

3. A governing mechanism for prime movers comprising a fluid admitting valve means, a motor for actuating it, a pilot valve controlling the motor, a governor for the pilot valve, and a follow-up device, in combination with a ported sleeve that surrounds the pilot valve and through whose ports fluid flows to the motor, a lever yieldingly connected at one end to the piston rod, a connection between said lever and the ported sleeve, a pivot for said lever, and a dash pot for retarding the movement of said lever.

4. A governing mechanism for prime movers comprising valve means for admitting motive fluid to the prime mover, a motor for actuating said means having a piston and a piston rod, a pilot valve for the motor, a speed governor, a floating lever, means connecting the lever to the governor, the pilot valve and the piston rod, a movable ported seat for the pilot valve, a lever, a pivot or fulcrum for the lever, means for yieldingly connecting the lever to the piston rod, means connecting the lever to said seat, and means for retarding the movements of the lever.

In witness whereof, I have hereunto set my hand this nineteenth day of February 1914.

FREDERICK SAMUELSON.

Witnesses:

CHARLES H. FULLER,
J. A. FOSTER.