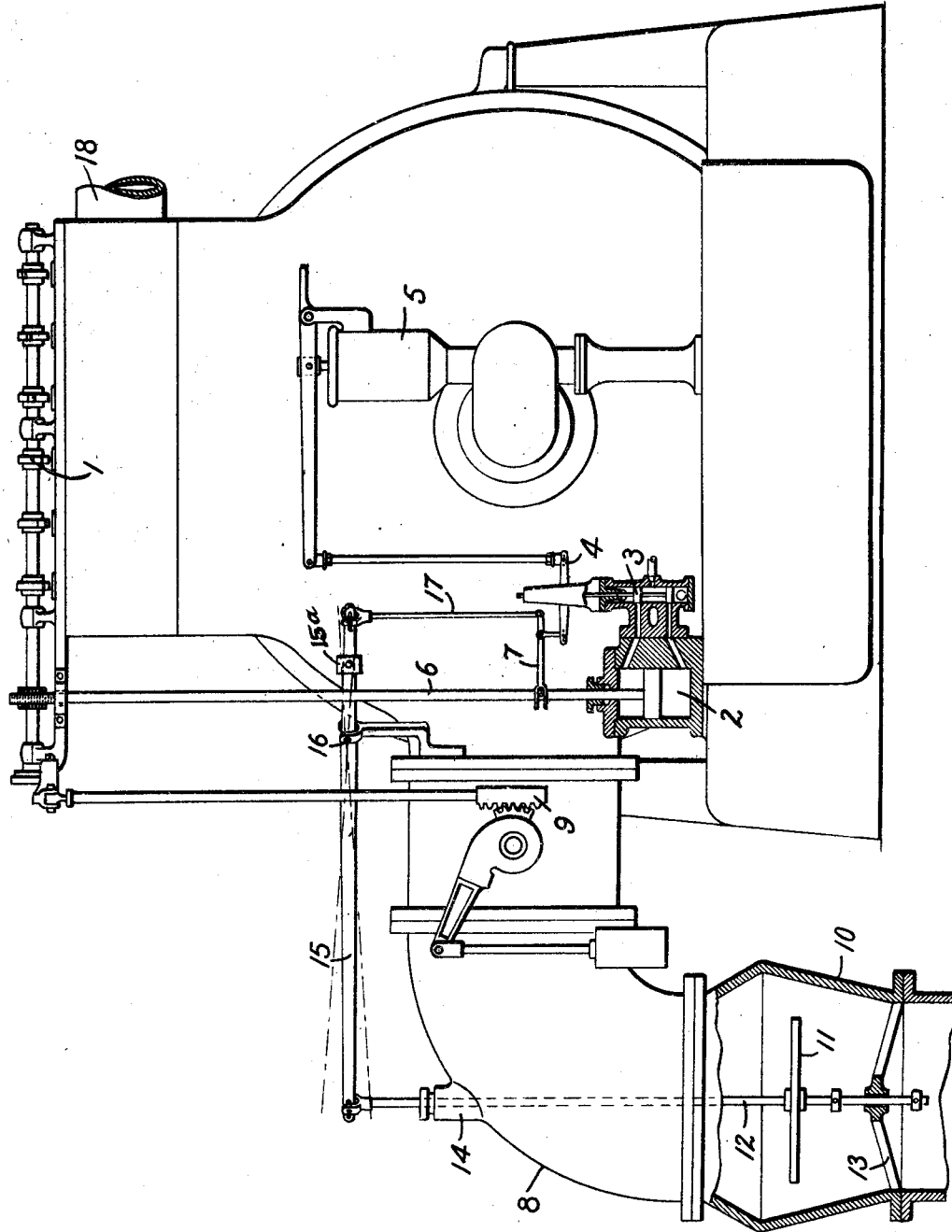


M. B. CARROLL.
GOVERNING MECHANISM FOR MIXED PRESSURE TURBINES.
APPLICATION FILED JUNE 3, 1912.

1,049,809.

Patented Jan. 7, 1913.



Witnesses:

Marcus L. Byng.
J. Elli Elin

Inventor:
Morris B. Carroll,
by *Alfred S. Davis*
His Attorney.

UNITED STATES PATENT OFFICE.

MORRIS B. CARROLL, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

GOVERNING MECHANISM FOR MIXED-PRESSURE TURBINES.

1,049,809.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed June 3, 1912. Serial No. 701,142.

To all whom it may concern:

Be it known that I, MORRIS B. CARROLL, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Governing Mechanism for Mixed-Pressure Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines, and especially to those which are driven by low pressure steam, with a provision for admitting high pressure steam in case the supply of the exhaust or low pressure steam drops below what is necessary to enable the turbine to carry its load. When a turbine of this kind is used to drive an alternating current generator connected in parallel with other alternators and all feeding into a common system of supply leads, it is found that the ordinary speed governor does not suffice to keep the output of the turbine-driven generator at its proper value. A drop in the supply of low pressure steam does not result in a drop in speed of the turbine, because its alternator tends to run in synchronism with the others and will be driven by them as a motor if the turbine does not drive it. Hence the speed governor cannot retain control of the steam supply as it should, and some additional means must be furnished to produce a proper regulation of the machine. In my present invention, I make use of a flow-responsive device in the low pressure steam main, so connected to the valve mechanism of the turbine that when the supply of low pressure steam drops off and its flow diminishes, this condition of things will affect the valve mechanism of the turbine in a manner to open one or more of the high pressure steam valves, even though the speed of the turbine has not changed.

The invention will be better understood from the following detailed description and the claims, taken in connection with the accompanying drawing, which is a somewhat diagrammatic end view of a mixed pressure turbine equipped with my invention, some parts being shown in section.

The turbine illustrated is of the horizontal type receiving live steam from a pipe 18 and having high pressure valve mechanism 1 operated by a hydraulic motor 2, whose pilot valve 3 is coupled to a floating lever

4, one end of which is actuated by the speed governor 5 while the other is attached to the piston rod 6 of the motor by a lever 7, forming a well-known follow-up device. Low pressure steam is supplied to the turbine through the main 8 which is controlled by a throttle valve operated by the rack 9 which forms a part of the motor-operated valve mechanism, as usual.

In the main 8, I preferably provide an enlargement 10 in which is located a float 11 consisting preferably of a disk, mounted on a stem 12 which is guided in a bridge 13 and extends up through a stuffing box 14. The float might, however, be arranged in a cylindrical pipe of uniform diameter. A lever 15 is pivotally attached to the upper end of this stem and fulcrumed at a point 16, its other end being connected by a link 17 to the system of levers connected to the pilot valve. An adjustable weight 15^a may be mounted on the lever 15 to vary the effective action of the float. The float 11 responds to variations in the quantity of low pressure steam flowing through the main 8, and by reason of its connections with the valve mechanism it will be seen that when the quantity of such steam falls off, the float will descend and the pilot valve will be actuated to cause its motor to open one or more high pressure valves and admit live steam to the turbine, to compensate for the lack of low pressure steam. In this way the turbine will be enabled to carry its load even though the speed governor fails to actuate the pilot valve. Conversely, as soon as the supply of low pressure steam is increased, the float will rise and tend to close the high pressure valves, so as to prevent any undue overloading of the turbo-generator. This flow-responsive device is simple and effective, and operates quite independently of the pressure of the steam in the low pressure main, depending wholly upon the quantity of steam passing by it, so that it is sensitive and prompt in action.

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. Means for governing a mixed pressure turbine, comprising a speed-responsive device, a flow-responsive device, and valve mechanism controlled by both of said devices independently.

2. Means for governing a mixed pressure turbine, comprising valve mechanism for regulating the admission of low pressure steam and high pressure steam to the turbine, a motor for actuating said mechanism, a speed-responsive device controlling said motor, and a flow-responsive device in the low pressure main adapted to control said motor independently of the speed-responsive device.

3. Means for governing a mixed pressure turbine, comprising valve mechanism for regulating the admission of low pressure

steam and high pressure steam to the turbine, a motor for actuating said mechanism, a float in the low pressure main, and operative means whereby said float controls said motor.

4. Means for governing a mixed pressure turbine, comprising valve mechanism for admitting low pressure steam and high pressure steam to the turbine, a low pressure main having an enlargement, a float located in said enlargement, and operative connections whereby said float controls said valve mechanism.

In witness whereof, I have hereunto set my hand this first day of June, 1912.

MORRIS B. CARROLL.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."