

C. R. WALLER.
GOVERNING MECHANISM.
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1,064,877.

Patented June 17, 1913.

Fig. 1.

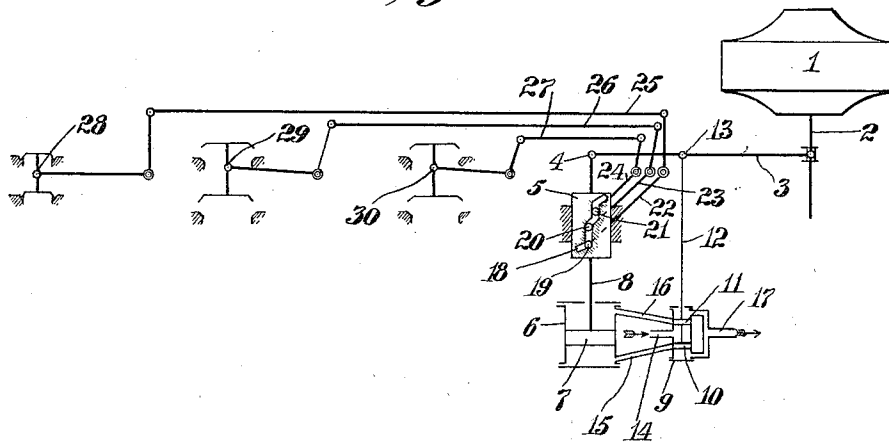
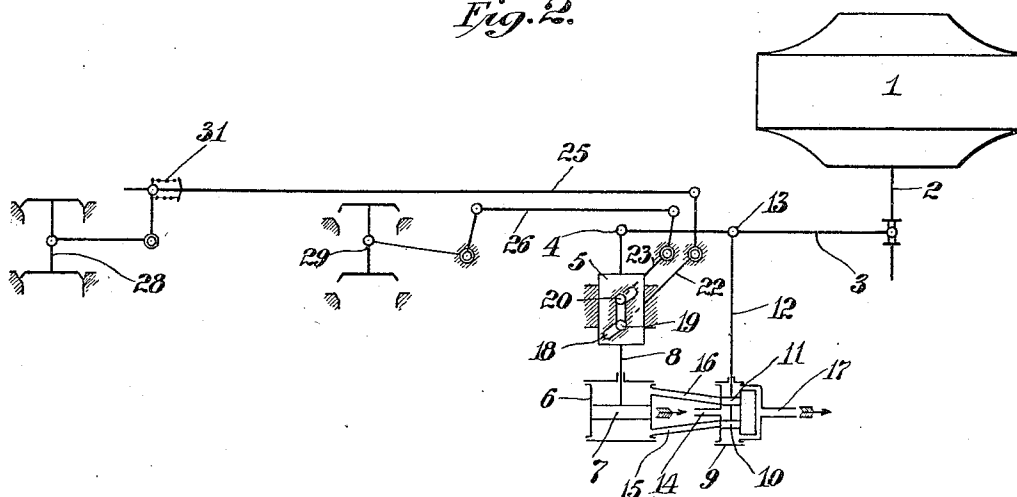


Fig. 2.



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UNITED STATES PATENT OFFICE.

CARL RICHARD WALLER, OF TRENTON, NEW JERSEY, ASSIGNOR TO DE LAVAL STEAM TURBINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

GOVERNING MECHANISM.

1,064,877.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL RICHARD WALLER, a citizen of the United States of America, and a resident of Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Governing Mechanism, of which the following is a specification.

This invention relates to improvements in automatic governing mechanism whereby a single governing device may control a plurality of valves and may cause same to open and close in succession.

My invention is particularly intended for use in connection with fluid pressure turbines of the mixed pressure type, that is to say, the type wherein steam or other working fluid of a plurality of pressures derived from a plurality of sources may be used simultaneously in the same turbine. In such cases, the governing device employed will, ordinarily, be a centrifugal governor. In the case of such turbines it is ordinarily desired that the valves (which customarily are of the lift or puppet type) shall be opened and closed successively, being closed in reverse order to the order of opening.

My invention consists in novel governing mechanism arranged to be operated by a single centrifugal or other governing device, and to open and close a plurality of valves, closing same in reverse order to the order of opening.

The object of my invention is to improve and simplify governing mechanism such as referred to.

I will now proceed to describe my invention with reference to the accompanying drawing, and will then point out the novel features in claims.

In the drawing: Figure 1 is a diagrammatic view showing my invention applied to the control of three valves; and Fig. 2 is a similar view illustrating the application of my invention to the control of two valves.

Referring first to Fig. 1, numeral 1 designates a centrifugal governor, which may be of any ordinary type, and for that reason it is deemed unnecessary to illustrate the mechanism of such governor in detail. 2 designates the spindle of such governor which spindle will be moved axially by the mechanism of the governor, in accordance with speed changes, 3 designates a connect-

ing link, so connected to spindle 2 that motion of said spindle is permitted while longitudinal motion of said spindle moves lever 3 about its pivot; and 4 designates the pivotal point of lever 3, this pivotal point being on an extension of a cam plate 5. 6 designates a pressure cylinder having within it a piston 7, the piston rod 8 of which is connected to the cam plate 5 for the purpose of moving said cam plate longitudinally, and so is connected to lever 3. 9 designates a valve chamber and 10 and 11 piston pilot valves within said valve chamber; valve rod 12, on which said piston valves 10 and 11 are mounted, being pivotally connected at 13 to lever 3. 14 designates a duct for the supply of fluid under pressure to the ends of valve chamber 9, and 15 and 16 designate ducts, normally closed by valves 10 and 11 respectively, connecting said valve chamber to the ends of cylinder 6. 17 designates an exhaust connection of valve chamber 9. Cam plate 5 is provided with a crooked cam groove 18 comprising oblique rises with intermediate axial portions or "dwells", in which groove lie rollers 19, 20 and 21, carried by levers 22, 23 and 24 respectively, which levers are connected by links 25, 26 and 27 respectively, to the operating levers of valves 28, 29 and 30. In the drawings these valves 28, 29 and 30 are indicated as double or balanced valves of ordinary construction. The rises and "dwells" of the cam groove 18 are so arranged, as indicated, with reference to the positions of the rollers 19, 20 and 21, that, during the opening of the valves, roller 21 is actuated to open valve 30 before roller 20 begins to be actuated, and roller 20 is actuated to open its valve 29 before roller 19 is actuated; the dwells of the cam groove permitting motion of the cam plate 5 as to rollers 20 and 19 until each such roller should be actuated to lift its corresponding valve. In Fig. 1 the cam plate is shown in such position that valves 30 and 29 are open and the opening of the valve 28 is about to begin. It will be obvious that, with the cam groove formed as shown, the closing of the valves 28, 29 and 30 will take place in reverse order to the order of opening of said valves.

The operation of this valve controlling mechanism is as follows: Motion of governor stem 2 in either direction moves valves

10 and 11 in one direction or the other, according to the direction of motion of stem 2, so admitting fluid under pressure to one side of piston 7, and connecting the other side of cylinder 6 to exhaust. Piston 7 is thereby moved and in its motion moves the cam plate 5, at the same time moving the pivotal point 4 so moving valves 10 and 11 toward a closed position. Cam plate 5 being so moved, operates one or another or all of rollers 19, 20 and 21, according to circumstances, and so operates one or another or all of levers 22, 23 and 24, so adjusting one or another or all of valves 28, 29 and 30.

It will be obvious that this mechanism may be employed for the control of as many valves as desired, the cam groove 18 being provided with suitable rises and dwells, according to circumstances. In Fig. 2 I show a mechanism arranged for control of two valves only; and in this view I also indicate the connection of the valve operating link, 25, of one valve, to the valve operating lever 31, which spring is desirable in any case, since it avoids necessity of nice adjustment of the form of the groove of the cam plate to the motions of the valves, permitting

some motion of roller 19 after the corresponding valve, 28, has seated.

What I claim is:—

Governor-controlled valve mechanism comprising a plurality of valves, a slidable cam provided with a crooked cam-groove having rises and dwells corresponding to the desired manner of opening and closing of the valves, followers for the several valves, in said grooves, lever mechanism connecting each follower to a corresponding valve, a governor, a pressure cylinder and piston, the latter arranged to shift said cam, pilot valve mechanism arranged to admit fluid to said cylinder, on one side or the other of said piston, according to circumstances, a lever pivotally connected to said piston, and also connected to said governor to be moved in one direction or the other thereby, and a valve rod connected to said lever and to the pilot valve mechanism.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CARL RICHARD WALLER.

Witnesses:

E. S. ROSS,

H. M. MARBLE.

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