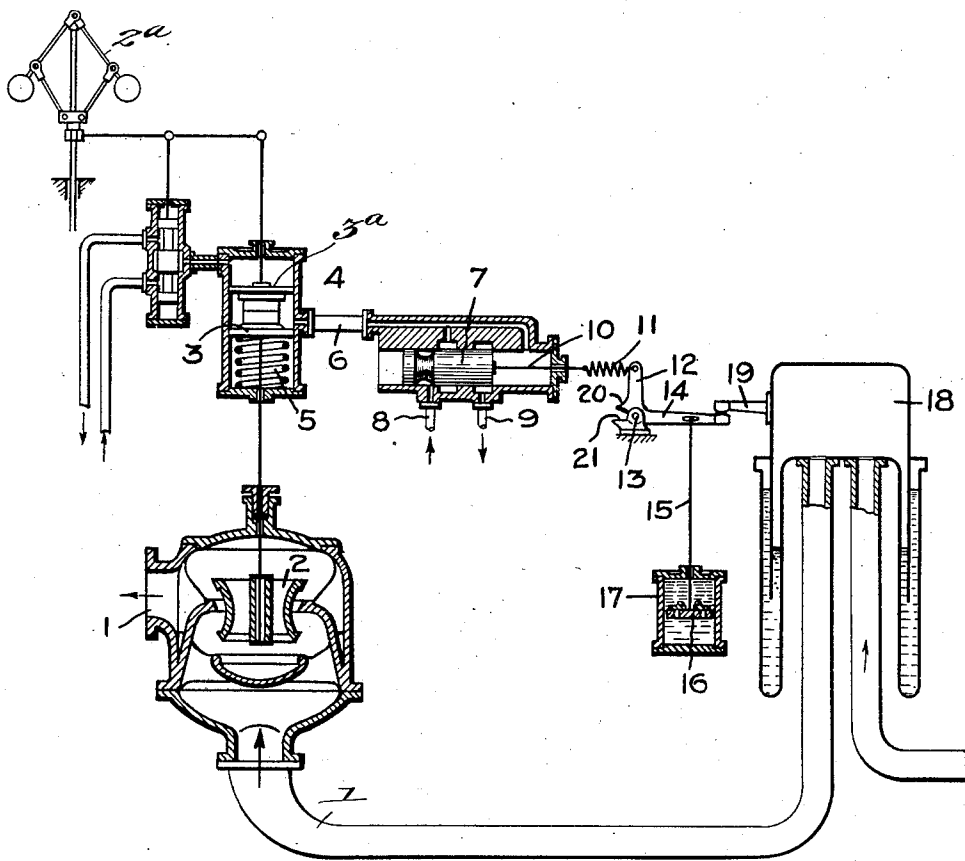


W. KIESER.  
REGULATING MECHANISM FOR STEAM TURBINES.  
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1,063,549.

Patented June 3, 1913.



Witnesses:

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Att'y.

# UNITED STATES PATENT OFFICE.

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## REGULATING MECHANISM FOR STEAM-TURBINES.

1,063,549.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed February 7, 1912. Serial No. 676,052.

*To all whom it may concern:*

Be it known that I, WALTER KIESER, a citizen of Switzerland, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Regulating Mechanism for Steam-Turbines, of which the following is a specification.

This invention relates to elastic-fluid turbines which are supplied with steam from a receiver or accumulator having a variable volumetric capacity, and the object of the invention is to regulate the admission of steam in such a manner that while a decrease in the quantity of steam in the receiver causes a shifting of the steam-inlet valve, a temporary increase thereof does not. The result is that the turbine runs at a more even speed despite changes in the supply of steam to the receiver.

The construction and operation of the invention will appear in the following detailed description, taken in connection with the accompanying drawing, which is a diagrammatic section of such elements of the system as are necessary to an understanding of the invention.

Steam flows to the turbine through a main 1 controlled by a valve 2, which is actuated by a motor, preferably a movable abutment 3 working in a cylinder 4 and biased to open the valve by a spring 5. The valve is also subject to the control of a speed governor 2<sup>a</sup> which regulates the position of another abutment 3<sup>a</sup> in the upper part of the cylinder 4 in a manner that will be evident from the drawing. A pipe 6 enters the cylinder between said abutments and conveys hydraulic or other fluid pressure to force the abutment 3 downward when it is necessary to effect a closing of the valve 2 independently of the speed governor. The flow of this hydraulic pressure is controlled by a piston valve 7 which operates to place the pipe 6 in communication with either the supply pipe 8 or the escape pipe 9 as may be. One end of the controlling valve 7 is exposed to atmospheric pressure, while its other end is subjected to the pressure existing in the pipe 6. The rod 10 of this controlling valve is attached to one end of a spring 11 whose other end is fastened to one arm 12 of a bell crank lever fulcrumed at 13. The other arm 14 of said lever is connected to a rod 15 which runs to a brake, such for instance as a piston 16 working in a

cylinder 17 and having valved ports which open when said piston descends but which close when it is moved upwardly, so that its downward movements are unopposed but its upward ones are rendered more difficult and slow.

Adjacent to the brake or dash-pot is the receiver or accumulator preferably in the form of a bell 18 adapted to rise and fall in a suitable tank of liquid, as the supply of steam increases and decreases. A tappet 19 on said bell is adapted to make contact with and actuate the arm 14 of the bell crank lever when the bell 18 descends only. Any sudden or temporary increase in the supply of steam which lifts the bell 18 merely raises the tappet away from the arm 14 and does not affect the position of the lever. For convenience of illustration, the receiver 18 is shown on a smaller scale than the other parts of the apparatus.

The operation is as follows: If the receiver sinks below a predetermined zone of movement the piston 16 is forced down, the valved ports opening so that there is no resistance to its movement or to that of the receiver. At the same time, the controlling valve 7 is moved to the right and admits hydraulic pressure to the abutment 3, so that the valve 2 is moved toward its seat. Inasmuch as the controlling valve now has on one side of it the same pressure as the abutment 3 while its other side is exposed to the atmosphere, the piston 7 has a tendency to move to the left and increase the tension of the spring 11 until the latter balances the hydraulic pressure. When, then the receiver rises and releases the lever, the piston valve 7 will at once begin to move to the left to uncover the escape port for the hydraulic pressure. But this will not take place so rapidly as the receiver rises, because the brake or dash-pot retards the movement of the lever in this direction. If, therefore, the increase in the steam supply is only temporary, the receiver will drop again and hold the lever down before the valve 7 has released the hydraulic pressure from the cylinder 4. To prevent the piston valve 7 from being moved too far to the left, a shoulder 20 is provided on the lever which strikes a stop 21 when the valve has moved to a predetermined position.

I have disclosed certain novel features which are not claimed herein because they

form a part of the subject matter of my pending application Serial No. 631,678, filed June 7, 1911.

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. The combination with the admission valve of a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a movable steam receiver, and operative connections whereby the receiver can actuate the controlling valve in one direction of its movement only.

2. The combination with the admission valve of a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a movable steam receiver, operative connections whereby the receiver can actuate the controlling valve in one direction of its movement only, and means for retarding the movement of the controlling valve in the opposite direction.

3. The combination with an admission valve of a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a movable steam receiver, a lever for opening the controlling valve, a tappet on the receiver for actuating the lever, and a dash-pot connected to the lever for retarding the closing movement of the controlling valve.

4. The combination with the admission valve of a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a bell crank lever for opening the controlling valve, a dash-pot connected with the lever and adapted to retard its upward movements, a movable steam receiver, and a tappet on the receiver adapted to operate the lever in its downward movements only.

5. The combination with an admission valve for a steam turbine, of a motor for actuating the valve, a controller for the motor, a steam receiver for supplying motive fluid to the turbine having a movable member that changes its position with

changes in the quantity of the steam supply, and operative connections whereby said member actuates the controller only when the quantity of steam in the receiver decreases.

6. The combination with an admission valve for a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a steam receiver for supplying motive fluid to the turbine having a movable member that changes its position with changes in the quantity of the steam supply, operative connections whereby said member can move the controlling valve only in a direction to close the admission valve to a greater or less extent when the quantity of steam in the receiver decreases, and means that tends to move the controlling valve independently of said member to open the admission valve when the quantity of steam in the receiver increases.

7. The combination with an admission valve for a steam turbine, of a fluid pressure motor for actuating the valve, a controlling valve for the motor, a steam receiver for supplying motive fluid to the turbine having a movable member that changes its position with changes in the quantity of the steam supply, a bell crank lever, a spring connection between one arm of the lever and the controlling valve, means actuated by the member for moving the other arm of the lever in one direction, a stop for limiting the movement of the lever in the opposite direction, and means for retarding the movement of the lever in said opposite direction.

8. The combination with an admission valve for a steam turbine, of means for opening and closing the valve, an accumulator having a movable member which changes its position with changes in the quantity of the steam supply, and a device actuated only by the movement of the member as the quantity of steam in the accumulator decreases for causing said means to move the admission valve toward its closed position.

In witness whereof, I have hereunto set my hand this 23d day of January, 1912.

WALTER KIESER.

Witnesses:

ERNST HÖHN,  
BERNHARD KUHNOW.