W. H. WEICKER.

CONTROLLER MECHANISM FOR TURBINES.

APPLICATION FILED DEC. 27, 1906. RENEWED SEPT. 11, 1911.

1,021,223. Patented Mar. 26, 1912.

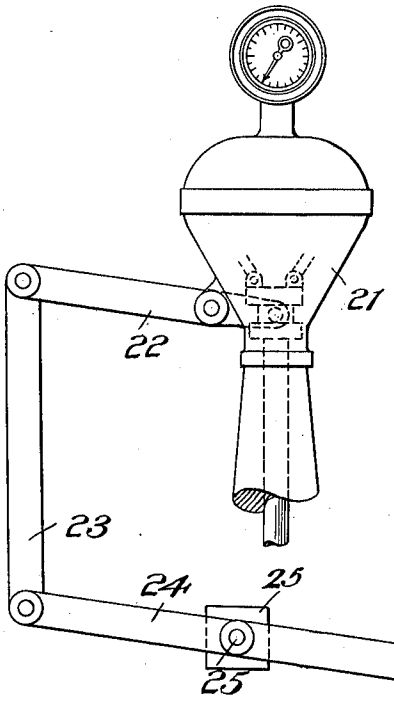


Fig. 1.

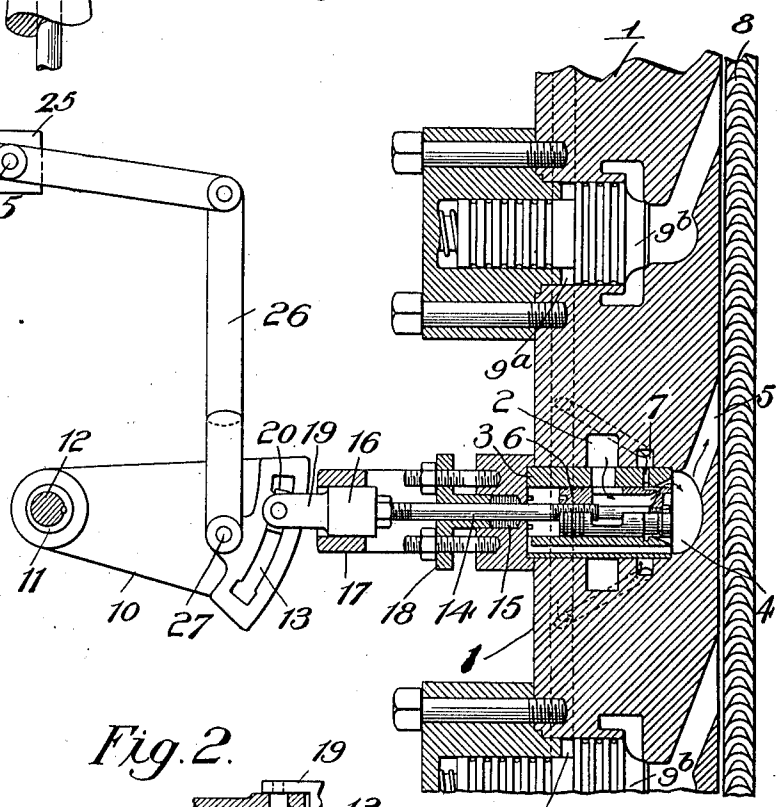
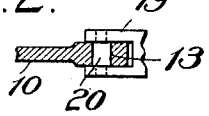


Fig. 2.



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CONTROLLER MECHANISM FOR TURBINES.

1,021,223. Specification of Letters Patent. Patented Mar. 26, 1912.

Application filed December 27, 1906, Serial No. 349,703. Renewed September 11, 1911. Serial No. 648,593.

To all whom it may concern:

Be it known that I, WILLIAM H. WEICKER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Controller Mechanism for Turbines, of which the following is a specification.

My invention relates to an improvement in governing mechanism for fluid motors designed to vibrate a device controlling the admission of fluid pressure to operate the valves controlling the supply of motive fluid to said motor. The vibrations thus given to said controlling device are of constant amplitude; but the region of vibration of said device relative to the fixed part or equivalent thereof coöperating with it in the control of the admission of such valve-operating fluid pressure is varied by a speed-responsive device. The result of this action is that the supply of motive fluid to the motor is pulsated, and the duration of the admission of motive fluid with each pulsation and the volume of fluid admitted for each pulsation is varied according to the load on the motor.

More particularly my invention contemplates a simple and effective mechanism to produce the governed operation of a fluid jet controller device described in Letters Patent No. 826,000, issued to James Wilkinson on the 17th day of July, 1906.

The novelty in my present invention consists in the use of what I term a locomotive link, which is oscillated by a constantly rotating eccentric and provided with a curved surface which co-acts with a slide block, the link and block serving as an adjustable motion transmission means between the eccentric and the controller device. Speed responsive means act to adjust the block to different positions relatively to the curved surface which is so disposed as to vary the effective length of the transmission means sufficiently to move the controller device through its whole range of adjustment.

According to the drawings, Figure 1, is a view showing the governor mechanism in side elevation with the jet controller device and turbine supply head in section. Fig. 2, is a detail view illustrating the sliding connection between the block and link.

In the drawings I have illustrated my governor shifted oscillatory operating mechanism for a controller device in side elevation, a controller device being illustrated partly in section disposed in the supply head of a steam turbine. The construction of the turbine and the controller device form the subject matter of prior Letters Patent and pending applications and, as briefly described herein for purposes of illustration only, comprise a supply head 1 provided with a passage 2 supplied with motive fluid under pressure in any suitable manner. The passage 2 surrounds a ported casing 3 which opens at its inner end into the enlarged supply end 4 of a nozzle 5. A sliding jet nozzle 6 which moves pressure tight within the casing has ports registering with the ports in the casing and it is also provided with lateral jet orifices through which the motive fluid is discharged to act with an injector or ejector effect in a chamber 7 before flowing through the nozzle 5 against a bucket wheel 8. Conduits lead from the chamber 7 to a fluid controller passage 9 in the head which leads to the motors 9^a for the supply valves 9^b, the construction and operation of which may be substantially as described at length in said Letters Patent No. 826,000, and need not therefore be here described in detail. To produce, by means of the action of the jet in the chamber 7, an intermittent cut off of the turbine supply, I propose to oscillate the jet device 6 with excursions of constant length and to adjust the device so that it acts with injector or ejector effect for varying portions of each excursion. To obtain this operation of the jet device, I use the controller mechanism which forms the subject matter of my present invention and comprises, in its preferred form, a locomotive link 10 journaled at its inner end upon an eccentric 11 keyed to a shaft 12. At its other end the link is provided with a slot 13 struck on an arc from a point eccentric to the shaft 12. The difference in the distances from the shaft 12 to the ends of the slot 13 corresponds to the maximum amount of adjustment necessary for the controller device 6. This device 6 is connected to an operating stem 14, which passes out of the casing 3 through a packing gland 15 is

connected at its other end to a cross head 16 which slides in a guide 17 fixed to the turbine head or, as illustrated, to the outer cap 18 of the packing gland. The cross head 16 carries a pair of arms 19, between which the locomotive link 10 is disposed and in which a block 20 is pivotally mounted and adapted to slide in the slot 13. A governor 21, of any suitable construction and preferably operated from the turbine shaft, rocks an arm 22, which at its outer end is connected by a link 23 to a lever 24 pivoted centrally on a stud 25, the latter being mounted on a support 25ª. This lever is pivotally connected to a link 26 which in turn is pivoted to a stud 27 carried by the link 10.

As the governor responds to speed variations, it raises or lowers the locomotive link 10 and thereby adjusts the block 20 to different positions in the slot 13. It will be evident that as the link is raised, the distance between the shaft 12 and the block is shortened and the controller device is adjusted toward the left without varying the length of its excursions produced by the eccentric 11; and vice versa, when the link is lowered, the distance between the shaft 12 and the block, is increased and the controller device is adjusted toward the right. In operation the farther the controller device is adjusted toward the right the greater the period of each excurison during which the jet acts with ejector action, as illustrated in the drawings, and holds the turbine supply valves open. On the other hand, the farther the device is adjusted toward the left, the shorter the periods of ejector action and the longer the periods during which the valves are held closed and the turbine supply cut off. This description contemplates an opening and closing of the turbine supply valves during each complete cycle of the governing mechanism when acting under normal load conditions. For extreme conditions, the mechanism may be adapted to maintain a continuous injector or ejector action.

Broadly considered, my invention contemplates the use of a governor rocked link with a curved surface or slot and a block co-acting with said surface or working in said slot to transmit motion from an eccentric to a controller device.

While I prefer to pivotally connect the controller device to the block it will be obvious that I may so connect it to the link while the block is directly driven from the eccentric. Also a curved surface instead of a slot may be used when the slide block is held in engagement with said surface by a spring or by the unbalancing of the controller device.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a fluid pressure controller mechanism for turbines, an oscillatory jet controller device, a stationary fluid conduit with which said jet device coöperates, a constantly rotating eccentric, and means to transmit uniform oscillatory movements from said eccentric to said jet device, comprising a slotted link and a slide block movable in the slot in said link, guide means to restrict the angular movements of said block, and speed responsive means to adjust said jet device relative to said eccentric by adjusting said slide block to different positions in said slot, said device having vibrations of constant amplitude while the region of vibration relative to said fixed conduit is varied by said controller mechanism.

2. In a fluid-pressure controller mechanism for turbines, fluid operated supply valves, an oscillatory controller device acting with injector and ejector effect on a relay fluid-pressure which controls the operation of said turbine supply valves, a fixed conduit for said relay fluid pressure which coöperates with said device, an eccentric actuator, and transmission means between the actuator and device, said means comprising a pivoted rocking member with a curved surface, a slide block co-acting with said surface, and speed responsive means connected to said member to adjust said member and block relatively to vary the effective length of the transmission means while maintaining the amplitude of the vibrations uniform, substantially as described.

3. In a fluid pressure controller mechanism for turbines, an oscillatory fluid jet controller device, a fixed fluid conduit with which said device coöperates, an eccentric actuator therefor, and transmission means between the actuator and device comprising a rocking member pivotally mounted at one end on said eccentric and at the other end provided with an arcuate slot struck from a center eccentric to the pivot point of said member, a stem for the controller device, a slide block pivoted to said stem and adapted to work in said slot, and speed responsive means to rock said member and adjust said block to different positions in said slot, as and for the purposes described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM H. WEICKER.

Witnesses:
J. WILKINSON,
GEO. R. BROWN.