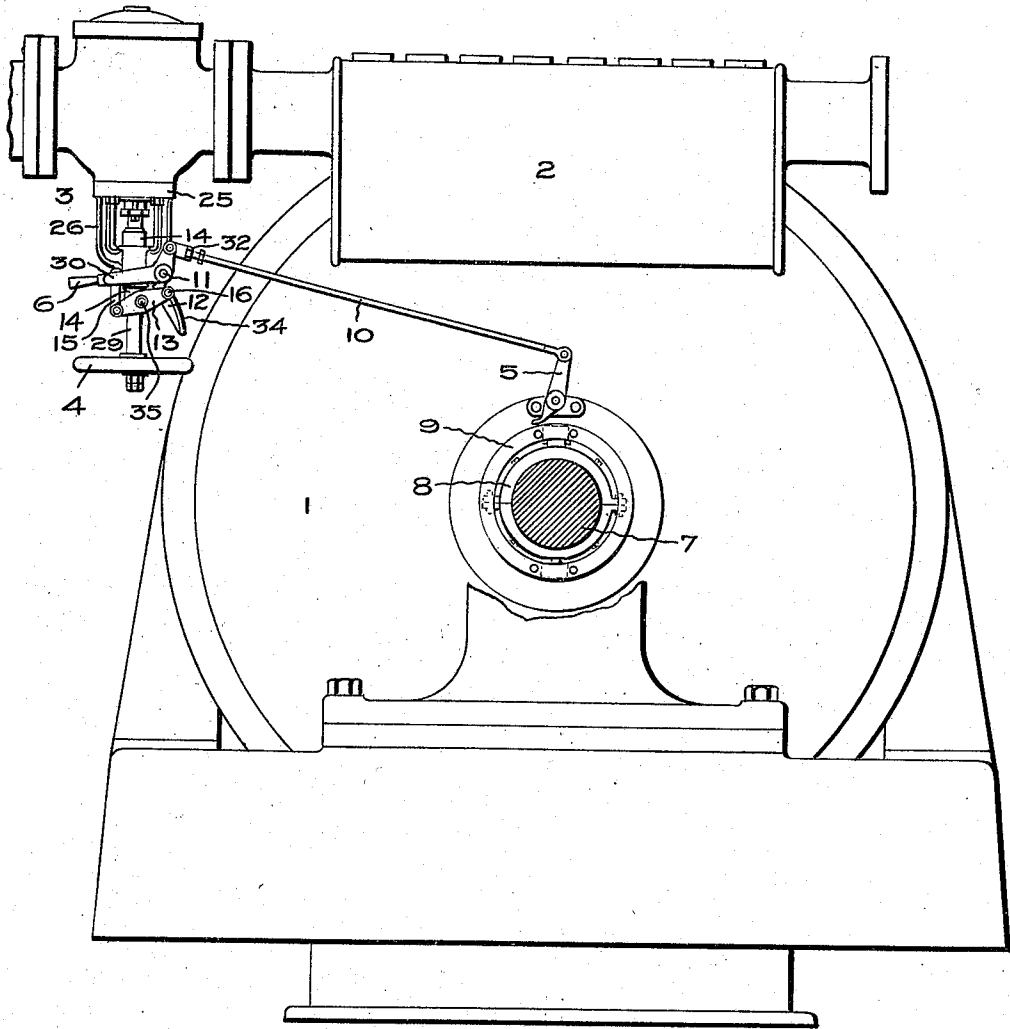


H. O. WELDON.
COMBINED THROTTLE AND TRIP VALVE.
APPLICATION FILED FEB. 10, 1908.

932,525.

Patented Aug. 31, 1909.
3 SHEETS—SHEET 1.

Fig. 1.



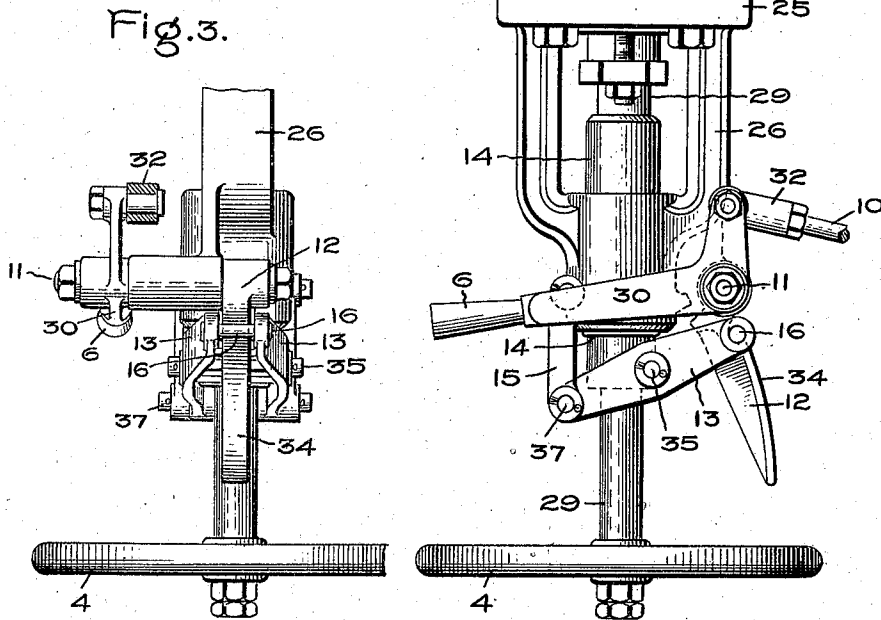
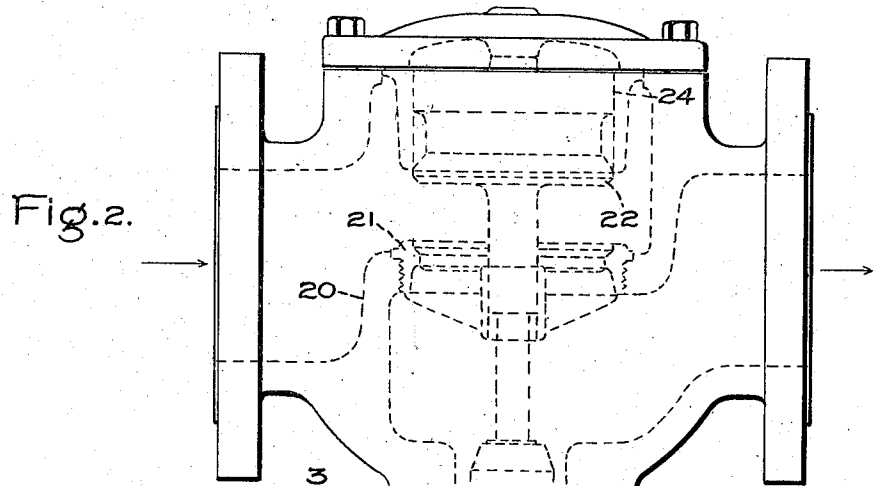
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3 SHEETS—SHEET 3.

Fig. 4.

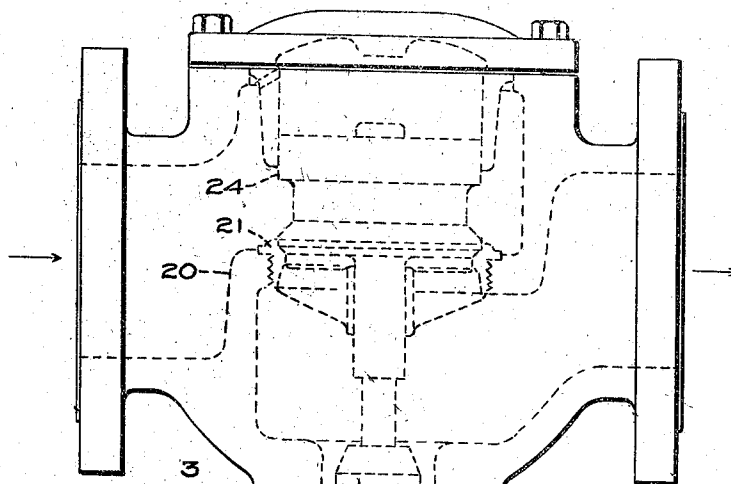
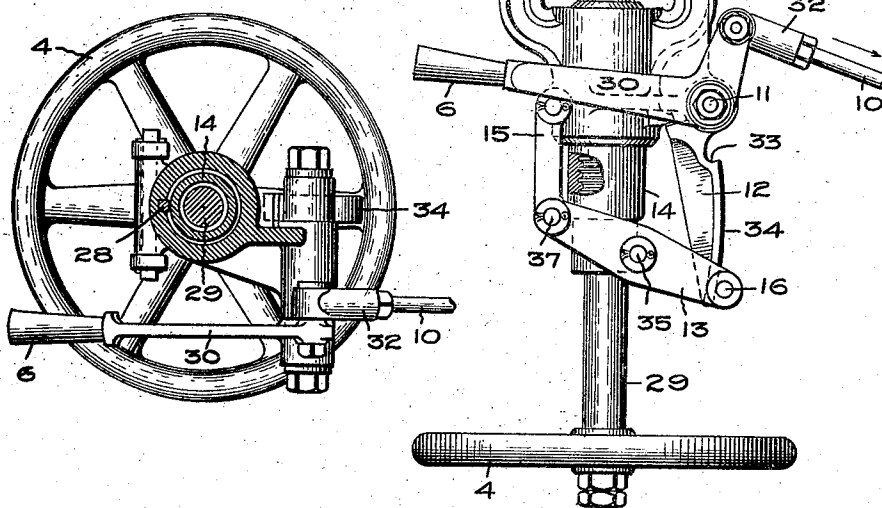


Fig. 5.



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UNITED STATES PATENT OFFICE.

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A CORPORATION OF NEW YORK.

COMBINED THROTTLE AND TRIP VALVE.

932,525.

Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed February 10, 1908. Serial No. 415,026.

To all whom it may concern:

Be it known that I, HERBERT O. WELDON, a subject of the Kingdom of Great Britain, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Combined Throttle and Trip Valves, of which the following is a specification.

The present invention relates to the valves which are employed in starting and stopping reciprocating engines and turbines under normal conditions, and also for stopping them suddenly under emergency conditions, as for example, when the speed of the main shaft becomes abnormally high.

The object of my invention is to improve the means for releasing or closing the valve, and particularly under emergency conditions, so that the tripping mechanism actuated by the emergency governor will be positively moved out of the path of the governor after the latter once operates and be held out of such path, thereby avoiding repeated hammer blows from the governor or further action therefrom until the engine under control is shut down.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and claims appended thereto.

In the accompanying drawings which illustrate one of the embodiments of my invention, Figure 1 is an end view of a turbine showing a combined throttle and trip valve mounted in position to control the admission of steam to the turbine; Fig. 2 is an enlarged view in side elevation of the valve in the open position; Fig. 3 is a detail view of the releasing mechanism taken at right angles to Fig. 2; Fig. 4 is a view in side elevation of the valve and showing the releasing mechanism in the position that it occupies after the valve is closed; and Fig. 5 is a cross-section through the valve stem and its cooperating sliding nut, the section being taken just above the hand lever for releasing the valve.

1 indicates the turbine or other prime mover, the particular construction of which is immaterial.

2 indicates the valve chest through which steam or other fluid is admitted to the nozzles or other fluid discharging devices of the turbine. The admission of fluid to the valve

chest is controlled by the combined throttle and emergency trip valve 3. This valve has a self closing tendency and is normally opened and closed by the hand-wheel 4, but under emergency conditions it is tripped or released and permitted to close by the governor actuated lever 5 or it may be actuated manually by the hand lever 6.

The rotating member of the turbine or other prime mover is mounted on the shaft 7, and to the shaft is rigidly secured a clamp 8. Carried by the clamp and rotating with the shaft is a ring 9, the periphery of which is slightly eccentric to the axis of the shaft. As the speed of the shaft increases above a certain predetermined amount, the eccentricity of the ring increases until the amount is sufficient to cause the peripheral surface of the ring to engage the lower end of the lever 5 and swing the same about its pivot. This action results in pulling the rod 10 to the right. As this takes place the rock-shaft 11 is moved clock-wise and with it a part 12 which combines the function of a latch and a cam.

13 is a lever that is pivotally secured to the sliding nut 14 of the valve and also to a link 15 to permit of a straight-line motion. On the end of the lever is a pin, roller or equivalent device 16 which, when the parts are in the position shown, is engaged by the part 12 to hold the valve open.

Assuming that the emergency governor trips the valve, the latch is released, the pin or roller 16 is forced downward by the valve and in so doing passes over the cam on the part 12 which is so shaped that it pushes the rod 10 to the right by an amount sufficient to cause the lower end of the lever 5 to move out of the path of the emergency governor and to stay out of such path until the valve is reset by hand.

Referring more particularly to Figs. 2 to 5, the valve 3 has a casing which is provided with a partition 20 of any suitable construction and supports the valve seat 21. The valve 22 is actuated under certain conditions by a piston 24 and is unbalanced with a tendency to close. The valve may be provided with a pilot or relay valve to assist in opening. Mounted on the under side of the valve casing is a head 25 having a depending U-shaped frame 26 that is bored centrally to receive the sliding nut 14. This nut

has a smooth exterior and is free to slide vertically within the frame 26, but is prevented from rotating by the spline 28, as shown in Fig. 5. The valve stem 29 is provided with an external screw thread with which the internal thread on the nut 14 meshes. The lower end of the stem is provided with a hand-wheel 4 by means of which the valve is opened and closed by rotating it in one direction or the other in the ordinary manner.

The mechanism for holding the sliding nut in position under normal conditions of operation and for releasing it under abnormal conditions will now be described: Mounted on one side of the frame 26 is a rock-shaft 11. On one end of the shaft is a bell-crank lever 30, one end of which is provided with a handle 6 by means of which the valve can be tripped when desired, which handle also acts as a weight or means to reset or to assist in resetting the rod 10 and lever 5 which are acted upon by the emergency governor on the turbine. The other end of the bell-crank lever is connected by an adjustable coupling 32 with the rod 10 leading to the governor. Mounted on the opposite end of the rock-shaft 11 is a combined latch for holding up the sliding nut and a cam for forcing and holding the tripping lever 5, Fig. 1, out of the path of the governor after the latter has once operated. I have shown the latch and cam formed in one piece on account of simplicity and decreased cost of construction but they can be made separate if desired. The construction of the latch and cam are best shown in Fig. 4 wherein 33 indicates the latch and 34 the cam surface. The lever 13 is united with the sliding nut 14 by the pin 35. The left-hand end of the lever is connected to the link 15 by the pin 37. On the right-hand end of the lever is a pin or roller 16 which is normally engaged and held by the latch 33. It will be noted that the lever 13 is made in two parts, as shown in Fig. 3, one on each side of the valve stem. This arrangement prevents any tendency of the parts to twist out of line and affords a good support for the pin 16. The weight of the free end of the lever 30 or equivalent means serves to hold the latch 33 and the pin 16 in engagement to support the sliding nut while the valve is being opened and closed under normal conditions by the hand-wheel 4.

Assuming that the valve is open as in Fig. 2 and that the sliding nut is released either by the action of the emergency governor acting through the rod 10, or that the handle 6 is raised. In either case the rock-shaft 11 is turned in a clock-wise direction a certain amount which causes the latch 33 to release the pin 16, whereupon the fluid pressure on the piston above the valve, or on the valve itself, or the weight of the parts alone or in combination will start the valve downward and with it the sliding nut.

Just as soon as the pin 16 is released by the latch 33 it travels down the cam surface 34, the latter being so shaped as to put the rod 10 under sufficient stress to force the lower end of the lever 5 out of the path of the governor and keep it out until the parts are reset by hand. In other words, the cam 34 and the part 16 cooperate during the closing movement of the valve under an emergency condition to move the governor-actuated lever 5 out of the path of the emergency governor 9 and prevent said governor from acting on the lever after it is tripped until the parts are reset by hand. Fig. 2 shows the parts set ready to operate; and Fig. 4 shows the parts after the valve has operated. Assuming that the valve is in the position shown in Fig. 4, and it is desired to reset the emergency tripping parts, the hand-wheel 4 is rotated to the right and since the valve is held against its seat by the pressure above it, or by its weight, while the nut 14 is free, it follows that as the hand-wheel and stem are rotated the nut will move upward within the frame 26 until the parts assume the position shown in Fig. 2, when the weight of the handle 6 and lever 30 will move the rock-shaft 11 in an anti-clockwise direction and cause the latch 33 to pass under the pin 16 and hold the same in position. Now that the sliding nut is held against downward movement, the hand-wheel 4 may be rotated to the left when the valve will be opened in the ordinary manner. So long as the nut 14 is held in the raised position shown in Fig. 2, the valve may be opened and closed by the hand-wheel 4 like any other steam valve, but just as soon as it is operated by the emergency governor, and this irrespective of the amount of valve opening, it becomes necessary to reset the parts in the manner previously described.

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. In combination, a valve, a means for holding the valve open, a governor, a device actuated by the governor for releasing the means and permitting the valve to close, and an agent moved by the valve as it closes for preventing further action by the governor on the device after the valve is released.

2. In combination, a valve, a device for supporting the valve away from its seat, a latch for holding said device, a tripping agent for releasing the latch, and a means

moved by the valve in closing for preventing the agent from returning to its normal position.

3. In combination, a valve, a stem therefor, a means coöperating with the stem which is normally held in a fixed position and is released and permitted to move when the valve is closed suddenly, a latch for holding the said means in a fixed position, a tripping mechanism for releasing the latch, and a device located at and acted upon by said valve as it closes suddenly for positively moving a part of the tripping mechanism.

4. In combination, a valve, a stem therefor, a means coöperating with the stem which is normally held in a fixed position and is released and permitted to move when the valve is closed suddenly, a latch for holding the said means in a fixed position, a tripping mechanism for releasing the latch, and a cam which is moved by the valve and only when it closes suddenly for moving a part of the tripping mechanism.

5. In combination, a valve, a threaded stem therefor, a sliding nut through which the stem passes, a latch which normally holds the nut in a given position, a governor actuated tripping mechanism for the latch, and a means actuated by the valve after the latch is released and as it closes, for moving one part of the tripping mechanism independently of another part.

6. In combination, a valve, a latch for holding the valve open, a pivoted cam supported by the valve casing, a tripping mechanism, and a means actuated by the valve as it closes and which acts through said cam to move one part of the tripping mechanism independently of another part.

7. In combination, a valve, a latch for holding the valve open, a cam, a pivot which is common to the latch and cam, a tripping mechanism for the latch, and a means actuated by the valve in its closing movement

which engages and moves said cam to move one part of the tripping mechanism.

8. In combination, a valve, a screw threaded stem, a sliding nut through which the stem extends, a rock-shaft, a latch carried by the rock-shaft that holds the nut in its normal position, a cam also carried by the rock-shaft, an actuator attached to the rock-shaft for moving it, and a means attached to the nut which acts through the cam for moving the rock-shaft and its attached parts when the nut is released and the valve is permitted to close.

9. In combination, a valve, a threaded stem and nut therefor, a handle for opening and closing the valve under normal conditions, a latch, a lever suitably fulcrumed and pivotally attached to the nut and supported at one end by the latch, a means for tripping the latch, and a cam moved by the lever as the valve closes for moving the tripping means.

10. In combination, a valve, a threaded stem and sliding nut therefor, a handle for opening and closing the valve, a latch for holding the nut in its normal position, a rock-shaft on which the latch is mounted, a lever for actuating the rock-shaft, a tripping mechanism for moving the lever, and a cam attached to the rock-shaft and moved by the nut as the valve closes for continuing the releasing movement of the rock-shaft.

11. In a valve, a casing therefor, a screw threaded stem and nut by which the valve is normally opened and closed, a tripping mechanism, and a device that normally holds the nut against movement and which after it is released the nut positively moves a part of the tripping mechanism.

In witness whereof, I have hereunto set my hand this 8th day of February 1908.

HERBERT O. WELDON.

Witnesses:

HELEN ORFORD,
MARGARET E. WOOLLEY.