(No Model.)

R. H. RICE.

STOP MOTION FOR GOVERNORS.

No. 539,758. Patented May 21, 1895.

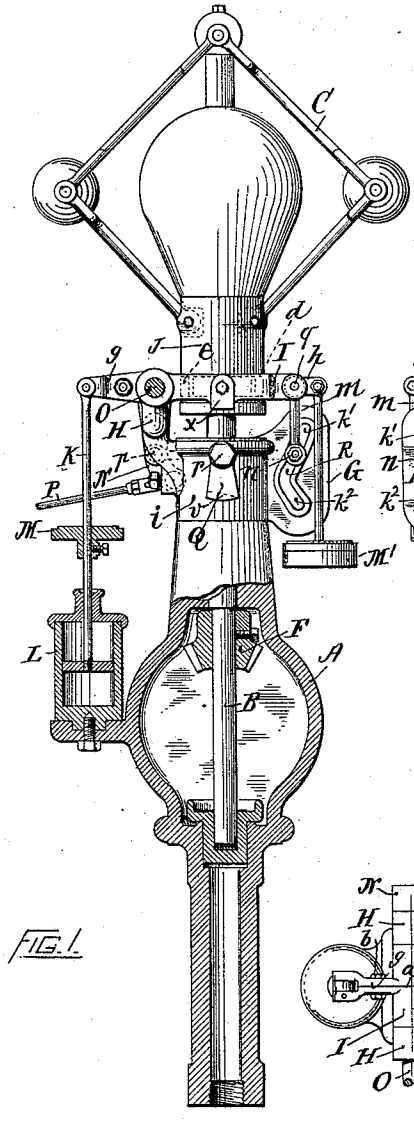

FIG. 1.

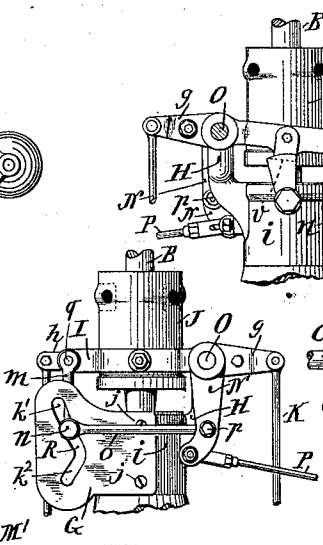

FIG. 5.

FIG. 3.

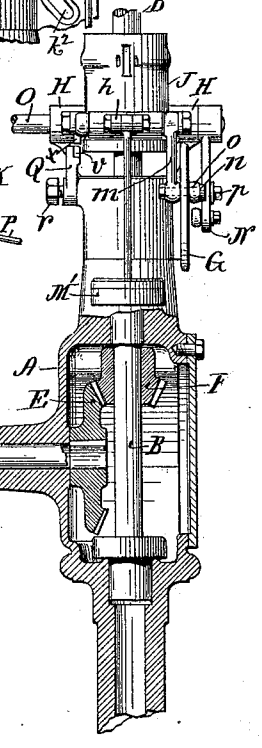

FIG. 2.

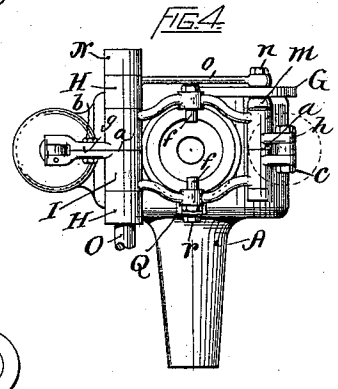

FIG. 4.

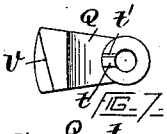

FIG. 7.

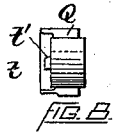

FIG. 8.

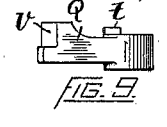

FIG. 9.

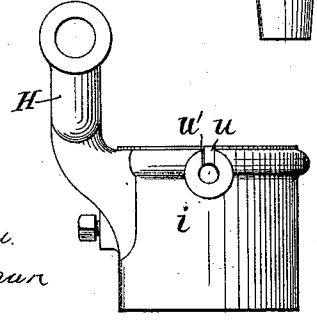

FIG. 6.

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STOP-MOTION FOR GOVERNORS.

SPECIFICATION forming part of Letters Patent No. 539,758, dated May 21, 1895.

Application filed January 4, 1895. Serial No. 533,836. (No model.)

To all whom it may concern:

Be it known that I, RICHARD H. RICE, a citizen of the United States, residing at Providence, in the State of Rhode Island, have invented a new and useful Improvement in Stop-Motions for Governors of Steam-Engines, of which the following is a specification.

The object of my invention is to provide positive means for automatically shutting off the steam from the engine, upon the occurrence of any accident which results in stopping the rotation of the governor, while the engine is continuing its action; and my invention consists in the employment of a parallel movement, in combination with a stationary cam-slot, between the governor and the valve gear, as hereinafter fully set forth.

In the accompanying drawings, Figure 1 represents a side elevation and partial section of a steam-engine governor provided with my improved stop-motion. Fig. 2 represents a detail side elevation taken at right angles to that shown in Fig. 1. Fig. 3 represents a detail side view taken from the opposite side to that shown in Fig. 1. Fig. 4 represents a detail top view, the governor being removed. Fig. 5 represents a detail side view showing the sleeve of the governor when held in position for starting the engine by means of an inclined supporting-arm. Fig. 6 represents an enlarged side elevation of the head of the standard which serves to support the upright shaft of the governor. Figs. 7, 8, and 9 are different views of the movable arm which serves to support the governor in its proper starting position.

In the drawings, A represents the fixed standard which serves to support the upright shaft B of the governor C, the said shaft being driven from the shaft D, by means of the bevel gear E, and the pinion F. The head *i* of the standard A, is provided with the forked arm H, to which is pivoted the lever I, which is preferably made in two parts as indicated by the line *a*, in Fig. 4, the said parts being held together by means of the bolts *b* and *c*. The two parts of the lever I are made to inclose the sliding sleeve J of the governor, the said sleeve being provided with a circumferential groove *d*, within which is placed the ring *e*, as indicated by dotted lines in Fig. 1, the said ring *e* being provided with perforations which are adapted to receive the studs *f*, *f*, which extend inwardly from the opposite parts of the lever I, so that upon the rise and fall of the sleeve J of the governor, a corresponding movement will be imparted to the lever I.

The lever I is connected at its short arm *g*, with the piston rod K, of the oil cylinder L, which serves to steady the action of the governor, the said rod being provided with the weight rest M, and to the end of the long arm *h* of the lever is connected the pendent weight-rest M′, for effecting the proper adjustment of the action of the governor.

To the side of the head *i* of the standard A, is secured the plate G, by means of the screws *j*, *j*, the said plate being provided with the cam-slot R, the upper portion k' of which is cut with a radius extending from the sides of the cam-slot R to the axis of the rock-shaft O, the lower portion k^2 forming an angle with the upper portion, as shown in Fig. 3.

To the side of the long arm of the lever I, is jointed the pendent cam-link *m*, the said link *m* being provided with a stud *n* which passes through the cam-slot R in the plate G, and to the outer end of the stud *n* is jointed the horizontal link *o*, which is jointed at its opposite end by means of the stud *p* to the pendent rock-arm N, secured to the rock-shaft Q upon which the lever I is loosely pivoted; the said rock-shaft being adapted to extend to the valve gear of another engine for conjoint regulation, when desired; and the length of the cam-link *m* is made equal to the distance from the screw-stud *p*, to the axis of the shaft O, and the length of the link *o*, is made equal to the distance between the pivoting point *q* of the cam-link *m* upon the lever I, to the axis of the shaft O, so that the lever I, the arm N, and the links *m* and *o*, constitute a parallel-movement which is pivoted upon the forked arm H.

To the downwardly projecting lower end of the arm N, is jointed the rod P, by means of which connection is made with the cut-off valve-gear of the engine.

Upon the screw-stud *r* at the side of the head *i* of the standard A, is placed the loose arm Q, provided at the forward side of its

hub, with the projection t, having at one side an inclined cam surface t', the said projection t being adapted to fit into the notch u made at the side of the head i of the standard, the said notch being provided with the inclined surface u', which fits the corresponding inclined surface t', of the projection t; and the arm Q is also provided at its outer end with the inclined surface v.

To the lever I is attached the engaging piece x, which is adapted to bear upon the inclined surface v, to hold the governor in a desired elevated position upon the stopping of the engine by the engineer.

When the governor is operating under normal conditions, the stud n, which passes through the cam-slot R in the plate G, will be held in the curved upper portion k' of said slot, and in this case, the arm N from which connection is made by the rod P with the cut-off valve-gear, will be operated as though the said arm was rigidly fastened to the lever I, the up and down movement of the governor being thus transmitted as by a bell-crank lever, without change, to the rod P; the jointed parallel movement, formed by the lever I, arm N, and the links m and o, operating as a rigid structure; but upon the loosening of the belt of the governor, so that the governor is caused to sink below a proper normal position for its lowest extreme of variation, then, the stud n will be caused to enter the lower portion k^2, of the slot R, and the action of the said lower portion of the slot R upon the said jointed parallel-movement will be such as to cause a reverse movement of the arm N to that before produced by the downward movement of the governor, and this cam-produced reverse action will serve to automatically close the valves of the engine to shut off the steam.

When the engineer desires to stop the engine, so that it can be readily started again by opening the valve, he raises the loose arm Q from the pendent position shown in Fig. 1, to the upright position shown in Fig. 2; at the same time pushing the arm Q forward upon the screw-stud r, so that the projection t, will enter the notch u in the side of the head i, thus holding the arm Q in its said upright position. Now when the steam is shut off from the engine, the lever I will be caused to fall, by the slower rotation of the governor, until the engaging piece x, attached to the side of the lever I, strikes the top of the arm Q and by reason of the inclines t' and u' and the inclined surface v, the weight of the governor will cause the backward movement of the arm Q, upon the screw-stud r, and the consequent release of the projection t, from the notch u, and then, the action of the incline v, under the face v' of the engaging piece x, will cause the turning of the arm Q, upon the stud r, to the final resting position, shown in Fig. 5, and upon again opening the valve, the engaging piece x will be lifted from its holding seat upon the inclined surface v, and the arm Q upon being released will drop by gravity to the position shown in Fig. 1, so as to allow for sufficient downward movement of the governor to effect the proper closing of the valve, by the action of the cam-slot k^2, if occasion requires.

It is evident that it is not necessary to make the upper portion k', of the cam-slot on a curve as shown, since the sides of the same may be made straight without materially changing the movement imparted to the arm N.

I claim as my invention—

1. In a stop motion for the governor of a steam engine, the combination of the governor, with the lever operatively connected with the sleeve of the governor, the cam adapted to reverse the transmitted action of the governor at its abnormal downward movement, the cam-link connected with the lever, the rock-arm connected with the cut-off valve gear, and the link which connects the rock-arm with the cam-link, substantially as described.

2. In a stop-motion for the governor of a steam engine, the combination of the governor, and the lever operatively connected with the sleeve of the governor, of the loose supporting arm provided with means for holding it in a stable upward position, and having an inclined bearing surface for engagement with a suitable bearing surface upon the governor actuated lever, whereby upon the downward movement of the governor, the said arm will be moved from its initial set position to an inclined unstable position by the action of the engaging surfaces, so that upon the succeeding elevation of the governor and the governor actuated lever, the supporting arm will fall automatically to its lower disengaged position, substantially as described.

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