

UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF NEW YORK, N. Y.

IMPROVEMENT IN CUT-OFFS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 119,908, dated October 10, 1871.

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of New York, in the county of New York and State of New York, have invented a new Variable Cut-Off for Steam-Engines regulated by the governor; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

Figure 1 is a cross-section of a steam-cylinder in its place on a bed-plate, showing the arrangement of the steam and exhaust-valves with the valve-stems, and a shaft to which the cams are attached to work the steam-valves. Fig. 2 is a side view of the steam-cylinder with the valve-gear complete, and indicating a way of connection of the cam-shaft with the governor. Fig. 3 is a plan of the cam-shaft alone. Fig. 4 are different views of the cam in larger scale.

A represents a steam-cylinder, fastened to a horizontal bed-plate, W. E¹ E² are the two exhaust-valves, worked horizontally, by a common valve-rod, F¹ F², which is moved by an eccentric on the crank-shaft of the steam-engine. In front of those exhaust-valves, in separate chests G¹ G², are situated the two distributing slide-valves S¹ S², or poppet-valves S¹ S². Steam is admitted through the opening C into a channel, D, on the cylinder, from where it is led into the steam-chests G¹ G², and through the valves S¹ S² and the ports F F into the cylinder; from the cylinder the steam is exhausted through the valves E¹ E² into a channel, B, on the cylinder, and escapes through the room B² and the pipe B³ below the body of the cylinder. The exhaust-valves are moved regularly by an eccentric, but the steam-valves S¹ S² are lifted alternately each by an eccentric cam, K¹ K², fastened to a common shaft, H, which is revolving and driven by gearing from the main crank-shaft in such a way that the shaft makes exactly one revolution with every one of the main crank-shaft. This cam-shaft H is supported by bearings P P on the bed-plate W, and is also movable lengthwise or sliding along either way while revolving. This movement is brought about by the action of the governor, which is connected to the shaft H by a lever, U T Q. The center-rod of the governor, which is raised or lowered by the action of the balls and arms of the governor, is connected to the end of the

lever-arm U, and the end Q, working between the two collars p p, communicates this motion to the shaft H, which is connected to another shaft, Y, by a coupling, V, in such a way as to allow the shaft H to slide out and in the coupling to the required extent. The shaft Y is driven direct, by the gearing before mentioned, from the crank-shaft, and does not slide, but only revolves. Each of the cams K¹ K² has the appearance of an eccentric, the one side of which is cut like a screw, and the pitch of this screw-line determines the sensibility of the cut-off in regulating the admission of steam by the movement of the sliding cam-shaft H, as shown in Figs. 2, 3, and 4. To the valve-stems R¹ R² are fastened the toes L¹ L², guided at the outer ends by pins m m, attached to the cylinder, and to these toes L¹ L² are fastened the intermediate pieces N N by bolts o o, which pieces N¹ N² fit with their lower faces to the outside circumference of the cams K¹ K², and the one side toward the cams is cut oblique to match the side of the cams K¹ K², which is cut like a screw, as shown in Fig. 4. These pieces N N also move on the bolts o o a little, to accommodate themselves to the cams, keeping their whole surface close to the circumference of the cams so that the wearing is on the whole surface. As soon as the shaft H is revolving, the cams K¹ K² alternately lift the valves S¹ S², and as soon as the oblique edge n of the cam passes the corresponding side of the intermediate piece N the valve with its stem, toe, and all attachments will instantly drop down and close the ports or shut off the steam. This dropping off of the toes from the cams does not happen over a sharp corner; it is done by a sharp edge of the full width of the toe or intermediate piece N, sidewise over the sharp edge of the cam n. The sudden fall of the valves is checked by dash-pots M¹ M² at the lower ends of the valve-stems. These cams K¹ K² are arranged in such a way that they open the steam-passages of the valves to their full extent as long as the engine is working slow, until it reaches nearly the required speed; then the governor commences operation, and, by acting through the lever U T Q on the cam-shaft H, the cam-shaft H, with the cams K¹ K² attached, is drawn away from the toes, so that the toes L¹ L² drop off quicker from the oblique edge of the cams, and in this way do not admit as much steam into the cylinder as on the

start, but sufficient steam to keep up the required speed and to do the required work. If more work is thrown on the engine and the speed reduced momentarily, the governor immediately moves back the shaft with the cams under the toes, and opens the valves more and keeps them open longer to admit more steam until the regular speed is again obtained. The least movement of the shaft H increases or reduces the amount of steam admitted into the cylinder. If less work is required of the engine, the governor immediately acts on the cams to reduce the amount of steam let into the cylinder.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the cams $K^1 K^2$ on the shaft H with the valve-stems $R^1 R^2$, the toes $L^1 L^2$, and the intermediate pieces N N, with their oblique sides corresponding with the oblique sides $n n$ of the cams, for the purpose as set forth.

WM. WRIGHT.

Witnesses:

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