

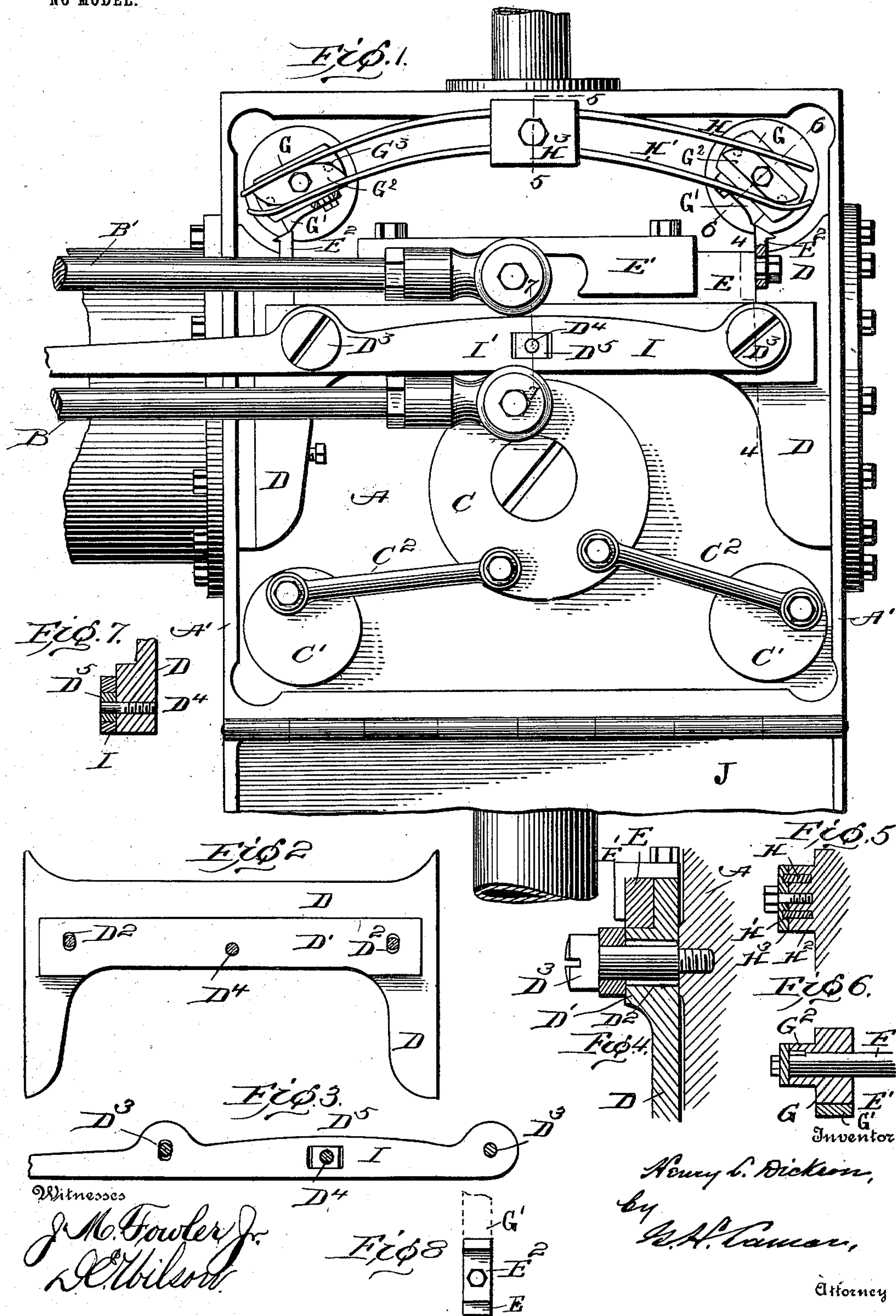
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PATENTED AUG. 4, 1903.

H. L. DICKSON.
STEAM ENGINE.

APPLICATION FILED OCT. 11, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

HENRY L. DICKSON, OF SMITHVILLE, TEXAS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 735,220, dated August 4, 1903.

Application filed October 11, 1902. Serial No. 126,819. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. DICKSON, a citizen of the United States, residing at Smithville, in the county of Bastrop and State of Texas, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Ordinarily only large slow-speed engines are advantageously of the Corliss type.

An object of this invention is to provide for engines of this type a simple construction that shall be equally adapted for locomotives and for high-speed engines generally, whatever their size.

In the accompanying drawings, Figure 1 shows in side elevation a common engine-cylinder provided with my novel devices. Figs. 2 and 3 show, respectively, a certain slide and a slide-operating lever, both of which are seen also in Fig. 1. Figs. 4, 5, 6, and 7 are sections on the lines 4 4, 5 5, 6 6, and 7 7, respectively, of Fig. 1. Fig. 8 is an end view of a certain reciprocating bar having a trip connected thereto.

In the figures, A represents an engine-cylinder of rectangular outline, having near its upper corners, respectively, two inlet-valves and below two corresponding exhaust-valves, all these valves in construction and location presenting no novelty whatever. The exhaust-valves are operated by an engine eccentric-rod B, acting through eccentrically-pivoted disks C C' and connecting-pitmen C², all without novelty. From the lateral margins of the cylinder project flanges A', which serve as a way for a vertically-moving support D, having a horizontal ledge or offset D' and provided with vertically-elongated holes D² near its ends to allow the passage of stud-bolts D³, which screw into the cylinder A. Upon the offset D' rests a slide-bar E, held in place by an angle-bar E', bolted to the upper edge of the support D and caused to reciprocate by an ordinary engine eccentric-rod B'. Upon

the ends of the bar E, respectively, are adjustably secured oppositely-turned wedge-pointed trips E², by which, as will be seen, the admission-valves are opened. To the valve-stems F, Fig. 6, are fixed oblique heads G, to which are adjustably secured catch-blocks G', to be alternately engaged by the trips E², respectively, as the slide-bar E reciprocates. When the slide-bar so moves that the vertical side of a trip meets its catch, it pushes the latter aside, and thus rotates the valve-stem, opening the corresponding valve. When the trip in passing on releases the catch, the valve is instantly closed by means of approximately parallel springs H H', held at their middles by a boss H² and a keeper H³, and normally pressing opposite sides of an elongated cam-like projection G² upon the head G. As the head is forced to rotate by the trip the cam presses the springs apart, as seen at the right in Fig. 1, and to lessen friction each working face of the cam is provided with a roller G³. When either trip so moves that the oblique side strikes its catch, the valve is moved in the closing direction beyond its normal position. This movement is, however, very slight, for the reason that the catch lies far to one side of the perpendicular from the axis of the valve-stem to the path of the trip, where it lifts rapidly in moving still farther to one side. This position of the catch is of the greatest importance for the further reason that the catch moves toward and then to the opposite side of that perpendicular in opening the valve, whereby the valve is opened suddenly and held open for a relatively long time. It is also of importance to observe that the catch is adjustable at will by sliding longitudinally, which in effect changes its angular adjustment about the valve-stem and varies its distance from the perpendicular. In this case, as before, the springs restore the valves to normal position as soon as the trips permit. For a given adjustment of the catches the valves are held open during a fraction of the stroke, which depends upon the depth of the engagement of

the trips and catches. This depth may obviously be varied by raising the trips or by lowering the catches; yet the two methods of adjustment are far from being equivalent.

5 If the trips be raised, they still begin to engage the trips at almost precisely the same point in the stroke; but they release later than before. If the like depth of engagement be secured by lowering the catches, the latter

10 will necessarily pass far toward the ends of the paths of the trips, and hence engagement will begin much earlier in the stroke. In the one adjustment the interval during which the valves remain open varies much more rapidly

15 than the time of opening, while in the other adjustment the converse is true. The oblique adjustment of the catches gives, then, in itself several novel results, and taken in connection with the trip adjustment it makes

20 still other results possible. For example, if we lower the catches, moving them obliquely outward, of course, and then correspondingly lower the trips we may materially vary the time of opening without in the slightest degree

25 changing the interval during which each remains open. The extent of engagement may also be varied from time to time during the operation of the engine by means of a lever I, actuated by the engine-governor or

30 otherwise, as desired. Both stud-bolts D³ pass through this lever, the one fitting its aperture closely and serving as a fulcrum and the second lying in a vertical slot D² in the lever, and thus offering no resistance to

35 swinging the latter slightly upon its fulcrum. The lever is provided with a horizontal slot I', in which fits a block D⁵, loosely mounted upon a stud D⁴, fixed to the support D approximately in its medial line. Now when

40 the lever is raised by decreased speed of the governor or otherwise the support D is raised in its ways and the degree of the engagement of the trips is increased, which, as has been seen, increases the amount of steam admitted.

45 Excessive speed of the governor or lowering the lever by other agency evidently has a contrary effect and may even cut off all steam if the lowering be sufficient to leave the catches above the path of the trips.

50 Two admission-valves are shown, because I prefer not to govern two ports by a single valve.

For protecting the working parts upon the cylinder I provide a door J, hinged to the cylinder and so constructed as to cover these

55 parts when closed and to fit closely at all points except about the eccentric-rods and the projecting end of the lever, where space is allowed for slight lateral movements of these

60 members.

What I claim is—

1. The combination with a rotary steam-admission valve, of a spring resisting movement of the valve from its port-closing position, a catch connected with the valve-stem

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to rotate it, a reciprocating bar alongside the catch, a trip secured to the bar in position to engage the catch, a lever swinging upon a fixed fulcrum toward and away from the catch, and a support for said bar pivotally

70 connected with the lever and accompanying it in its movements.

2. The combination with a cylinder provided with a suitable way, of rotary admission-valves, catches borne by the valve-stems, respectively, a longitudinally-reciprocating

75 bar alongside the catches, a support for said bar movable in said way toward and away from the catches, and means for moving said support in its way.

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3. The combination with a cylinder, of two rotary admission-valves, catches secured to the valve-stems, respectively, a bar reciprocating alongside said catches, trips borne by

85 said bar in position to engage said catches, respectively, a movable support forming a way for said bar, and means for moving both ends of said support equally in lines perpendicular to a line joining the points of said catches.

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4. The combination with an engine-cylinder, of two rotary admission-valves, a slide-bar reciprocating in proximity to the valve-stems, catches secured to the valve-stems, respectively, at one side of their axes and adjustable obliquely toward the path of said

95 bar, trips projecting from the bar in position to engage the catches, respectively, and means for adjusting the proximity of the bar to the catches.

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5. The combination with an engine-cylinder having two rotary admission-valves, of catches secured to the valve-stems respectively, springs resisting movement of the valve-stems from valve-closing position, a

105 longitudinally-reciprocating bar alongside the valve-stems, trips projecting from the bar in position to engage the catches, respectively, a support, for said reciprocating bar, movable in a way upon the cylinder toward and

110 away from the valve-stems, and a lever arranged for moving said support in its way.

6. The combination with the engine-cylinder and the two rotary admission-valves, of the non-cylindrical heads on the valve-stems,

115 rollers mounted in said heads, springs working against said rollers and resisting rotation of the valves, catches projecting from said heads, respectively, a reciprocating bar provided with projecting trips to engage the

120 catches, respectively, a movable support for said bar, and a pivoted lever sustaining said support and arranged to swing the same bodily toward and away from the valve-stems.

7. The combination with the cylinder and the rotary admission-valves having on their stems faces oppositely inclined to a line joining the stems, catches fixed to the stems and adjustable along said surfaces, respectively,

125 springs resisting the opening of the valves,

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5 a bar reciprocating alongside the catches, trips secured to said bar in position to engage the catches, respectively, as the bar reciprocates, a support for said bar movable toward and from the catches in ways upon the cylinder, a lever pivoted to the cylinder to swing toward and away from the catches, and a self-adjusting connection between the lever

and support compelling the latter to move with the former.

In testimony whereof I affix my signature in presence of two witnesses.

H. L. DICKSON.

Witnesses:

WALLACE GREENE,
J. JEROME LIGHTFOOT.