

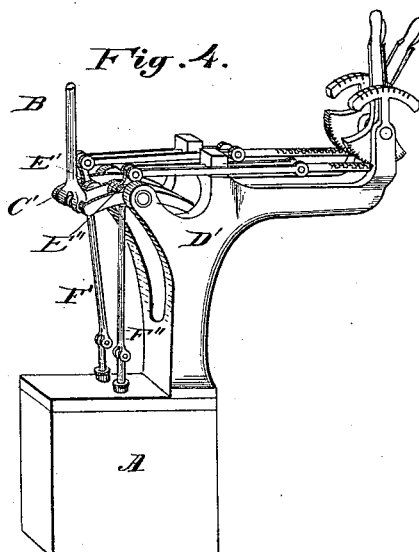
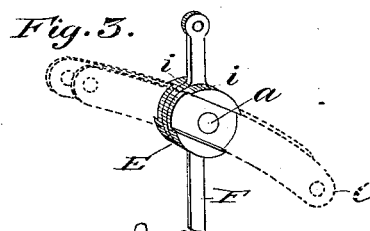
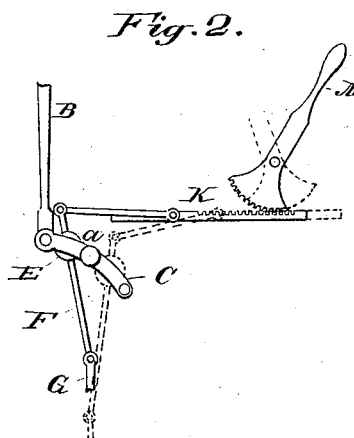
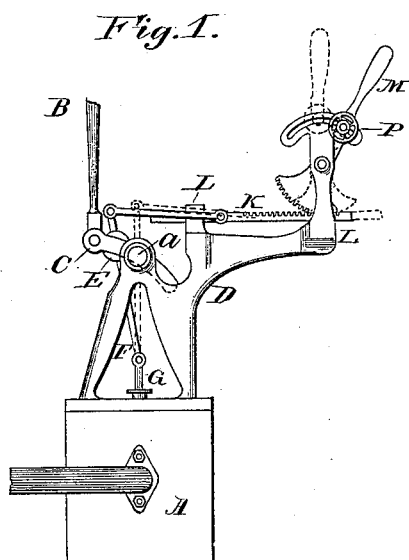
(No Model.)

H. FLEMING.

REVERSING GEAR FOR STEAM ENGINES.

No. 303,387.

Patented Aug. 12, 1884.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY FLEMING, OF NEW YORK, N. Y.

REVERSING-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 303,387, dated August 12, 1884.

Application filed February 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY FLEMING, of the city, county, and State of New York, have invented a new and useful Improvement in the Link-Motion and Reversing-Gear for Steam-Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of devices for operating the slide and cut-off valves of steam-engines in which the link is journaled in fixed bearings to rock or oscillate upon a central stationary axis.

It consists in an improvement in the construction of the link, whereby it is journaled upon two pivotal bearings, between which the link-block is free to slide from end to end of the link, and in the combination with a single eccentric, of a double link carrying two independent movable link-blocks partaking of its movement, the one being coupled to the rod of the slide-valve and the other to the rod of the cut-off valve, and each governed by a separate actuating-bar.

In the link-movements of this class heretofore constructed the link has been pivoted upon a single lateral journal-pin and the block made to slide over the face of the link, and in this form of construction the link can be employed to actuate the valve only.

The object of my improvement is to render the movement of the link more positive and steady by a double support, whereby the block and its connections shall bear evenly upon the pivotal bearing, and to provide for the adjustment of both the slide and the cut-off valves by independent adjusting-levers, while both shall be actuated in common by a single eccentric.

In the accompanying drawings, Figure 1 is an elevation of my improved link-motion and reversing-gear; Fig. 2, an elevation of the link and its connections detached; Fig. 3, a detached view, in perspective and on an enlarged scale, of the link-block and its coupling-bar; and Fig. 4, an elevation in perspective of a double link to control and operate simultaneously both the slide and cut-off valves from a single eccentric.

A represents the steam-chest of the engine,

containing the slide or cut-off valve, which may be of any approved description.

B is the pitman-rod, connected, as usual, to the eccentric or crank upon the engine for actuating the slide-valve. The outer end of this pitman is pivoted to one end of a longitudinally-slotted link, C, formed of two parallel curved bars united at each end by transverse stays. (See dotted lines, Fig. 3.) This link in turn is pivoted centrally between the two arms of a bracket or pedestal, D, projecting from the steam-chest upon journal-pins *a a*, formed upon each side of the link and adapted to support the same without obstructing the longitudinal slot extending from end to end thereof. The journals of the link are thus supported in fixed bearings in line with the slide-valve.

A link-block, E, is fitted within the extended slot in the link C, to slide freely therein from one end to the other. This link-block is constructed in two divisions, *i i*, Fig. 3, each recessed outwardly to embrace one side or arm of the link, and a coupling-bar, F, is interposed centrally between said two divisions, and pivoted thereto, so as to move therewith back and forth along the link, and yet be free to oscillate independently thereof. One end of this coupling-bar is pivoted to the end of the valve-rod G, projecting from the steam-chest. Its opposite end is extended beyond the link C, and is pivoted by means of an interposed link, H, to a reciprocating bar, K, fitted to slide at right angles to the slide-valve or steam-chest in suitable bearings, L L, formed for its support in the bracket-piece or pedestal D.

The sliding bar K may be connected by suitable devices with the governor of the engine to be made to reciprocate in obedience to its movement; or it may be actuated by a pivoted lever, M, carrying a toothed segment on its shorter arm to engage a rack on the bar, (see Figs. 1 and 2,) or by other equivalent devices adapted to this end. The movement of the slide-bar K thus connected will serve to reverse entirely the movement of the slide-valve and to determine and limit the length of its stroke. If the slide-bar be so moved as to bring the link-block carrying the coupling-bar F, by which the movement of the link is communicated to the valve, into line with the

pivotal axis of the link, as shown by dotted lines in Fig. 1, the slide-valve will be thereby brought to a standstill and the movement of the engine arrested. If the link-block be moved away from this dead-center in either direction, the oscillating movement of the link will then operate to actuate the valve, and the length of its stroke will be determined by the distance to which the link-block is carried out from the pivotal axis of the link, and the direction of the stroke by the side of the axis to which the block is thrown. (See dotted lines, Fig. 2.) When the link is not required to be used as a reversing-gear, its extension beyond its pivotal axis in a direction opposed to that of its connection with the pitman is not needed.

The actuating-lever M is fixed and locked, when adjusted, by means of a set-screw, P, Fig. 1, or other suitable device for this purpose. For the purpose of actuating both the slide-valve and a cut-off valve by means of a single eccentric, I employ a double link, C', (see Fig. 4,) constructed of three parallel curved bars forming two longitudinal slots adapted to receive two independent link-blocks, E' E'', the one, E', connected with the rod G' of the slide-valve, and the other, E'', with the rod G'' of the cut-off valve. The outer end of this double link is pivoted to the one pitman-rod B, extending from a single eccentric or crank on the engine. The outer end of each of the coupling-bars connecting the two link-blocks, the one with the slide-valve and the other with the cut-off valve, is connected by an interposed link with an independent slide-bar controlled by its appropriate lever, as shown in Fig. 4.

Although I deem it preferable that the link-block shall be supported and guided in its longitudinal play upon the link by means of a longitudinal slot or opening therein, it is mani-

fest that any suitable method of adapting the link-block to the link, so that it may move longitudinally thereon, may be employed without departing from my invention.

I claim as my invention—

1. The improved link motion for a steam-engine, which consists of a longitudinally-slotted link, C, formed of two or more parallel curved bars, which are united at each end by transverse stays, are coupled at one end to the eccentric of the engine, and are pivoted centrally between two fixed supports to provide a stationary pivotal axis for the link having bearings at both its ends, and of a link-block coupled to the valve-rod and fitted to slide uninterruptedly between the parallel bars from end to end of the link, all substantially in the manner and for the purpose herein set forth.

2. The combination, with the combined slide or cut-off valves of an engine and with a single eccentric and pitman, of an interposed double link pivoted centrally to a fixed support so as to oscillate upon a stationary axis, and which is connected at one end to the pitman and actuated thereby, and is fitted with two independent link-blocks, each adapted to move from end to end of the link and partake of its movement, the one being coupled to the slide-valve rod and the other to the cut-off-valve rod, and each governed by an independent actuating bar or lever, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY FLEMING.

Witnesses:

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