F. FISCHER.

LINK-MOTION FOR STEAM-ENGINES.

No. 192,158. Patented June 19, 1877.

Fig: 2.

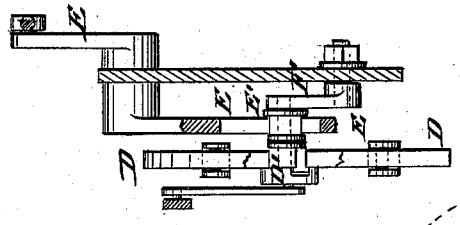
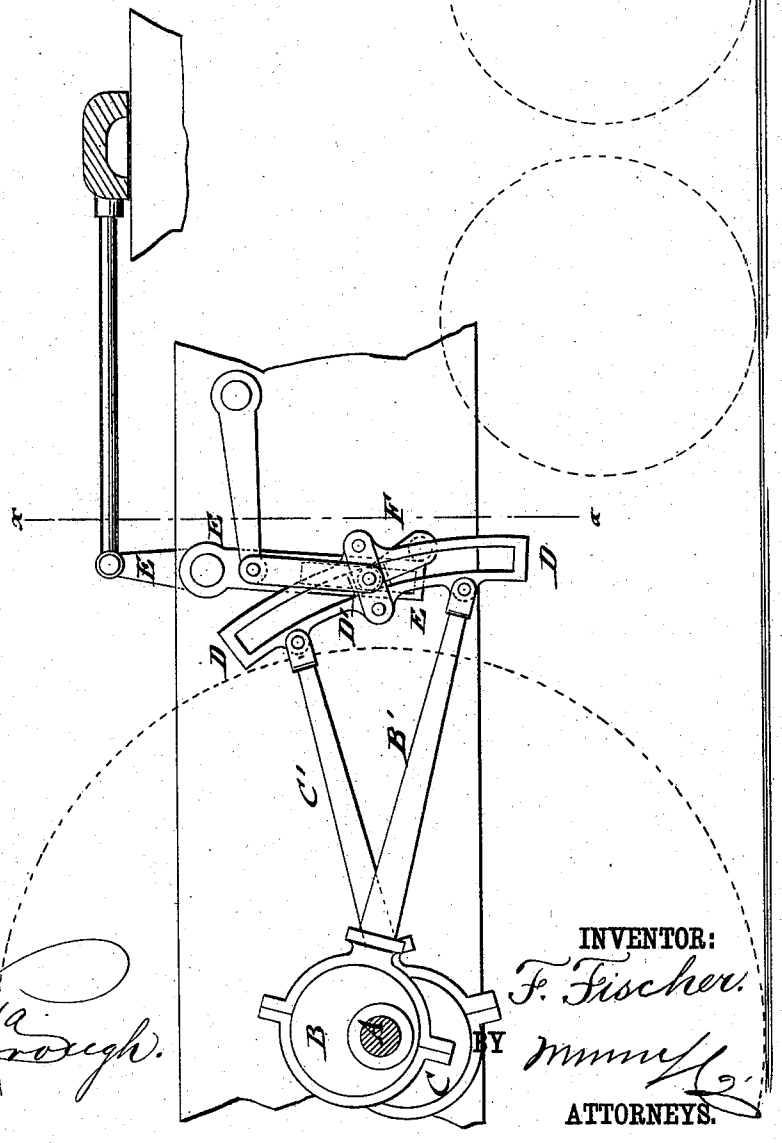


Fig: 1.



WITNESSES:

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FREDERICK FISCHER, OF NEW YORK, N. Y.

IMPROVEMENT IN LINK-MOTIONS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **192,158**, dated June 19, 1877; application filed May 28, 1877.

To all whom it may concern:

Be it known that I, FREDERICK FISCHER, of the city, county, and State of New York, have invented a new and Improved Link-Motion, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a side view, and Fig. 2 a vertical transverse section on line *x x*, Fig. 1, of my improved link-motion.

Similar letters of reference indicate corresponding parts.

The object of this invention is to provide for locomotive and other engines an improved link-motion, by which the travel of the slide-valve may be modified in such a manner as to move at greater speed when closing and opening the ports, so that the steam-engine may be worked more effectively for expansion by retaining the steam longer, and also facilitating the entrance and exhaust of the same.

The invention consists of the combination of the slide-pin of the link with a second slide-pin of the slotted rocker-arm, and with a swinging crank-pin, connecting the slide-pins.

In the drawing, A represents the driving axle or shaft, which is connected in the customary manner by the eccentrics B C and rods B′ C′, with the link D, that is raised or lowered on the slide-pin D′, so as to work the slide-valve with full or partial strokes, or reversing the same, as required. By working the engine with short strokes, the steam is cut off and worked expansively, so as to produce a greater effect.

For the purpose of utilizing still more the expansive force of the steam, the rocker-arm E is slotted at the lower end, and provided with a second slide-pin, E′, that moves therein, being connected with the slide-pin of the link D by the pivot-pin of a swinging crank-arm, F.

This connection of the link slide-pin with the slotted rocker-arm results in a modified motion of the slide-valve, imparting to the same an accelerated speed when opening the entrance-port, so as to quickly open the port to its full extent, for the more favorable admission of the steam, while retaining the valve longer over the opposite port, and opening then the same with the same accelerated speed for exhaustion.

This results in the quicker entrance and exhaust of the steam to and from the cylinder, and in the more effective working of the same for expansion.

The travel of the valves is improved by the compound motion obtained by the joint action of the motions of the link, and of the slide-pins and crank-arm on the slotted rocker-arm.

The crank-arm F will affect both link and rocker-arm in forward as well as backward motion; but in going forward I derive a gain from link and rocker-arm, while in going backward the gain in link is diminished, but not sufficiently to neutralize the gain in rocker-arm E.

At full stroke the crank-arm F describes an arc of about fifty degrees, raising the link-blocks in the link, as well as rocker-arm, about one and one-fourth inch, the highest point being reached when the valve is in the center and the steam-ports covered equally on both sides.

The crank-arm serves, also, to bring the link-blocks in the link and rocker-arm back to the same line when the stroke is beginning or finishing. The link-block is raised upward from the center, and that in rocker-arm brought nearer to center on the forward movement, so as to increase the speed of valve.

On the backing motion I lose the gain on link to a great extent; but this is unimportant, as high rates of speed are not used in backing.

My valve is behind time both on the forward and backward movement in the first half of its travel; but as soon as it reaches the center it takes on accelerated speed, thus producing a stronger pressure on the piston, and enabling me, when going at a high rate of speed, to work the valves at a much shorter stroke, and, of course, with more expansion, thus saving much steam.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of the link D, having slide-pin D′, slotted rocker-arm E, having slide-pin E′, and swinging crank-arm F, connecting both slide-pins by pivot-pin, substantially in the manner and for the purpose specified.

FREDERICK FISCHER.

Witnesses:

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