(No Model.)

3 Sheets—Sheet 1.

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REVERSING MECHANISM FOR ENGINES.

No. 510,094. Patented Dec. 5, 1893.

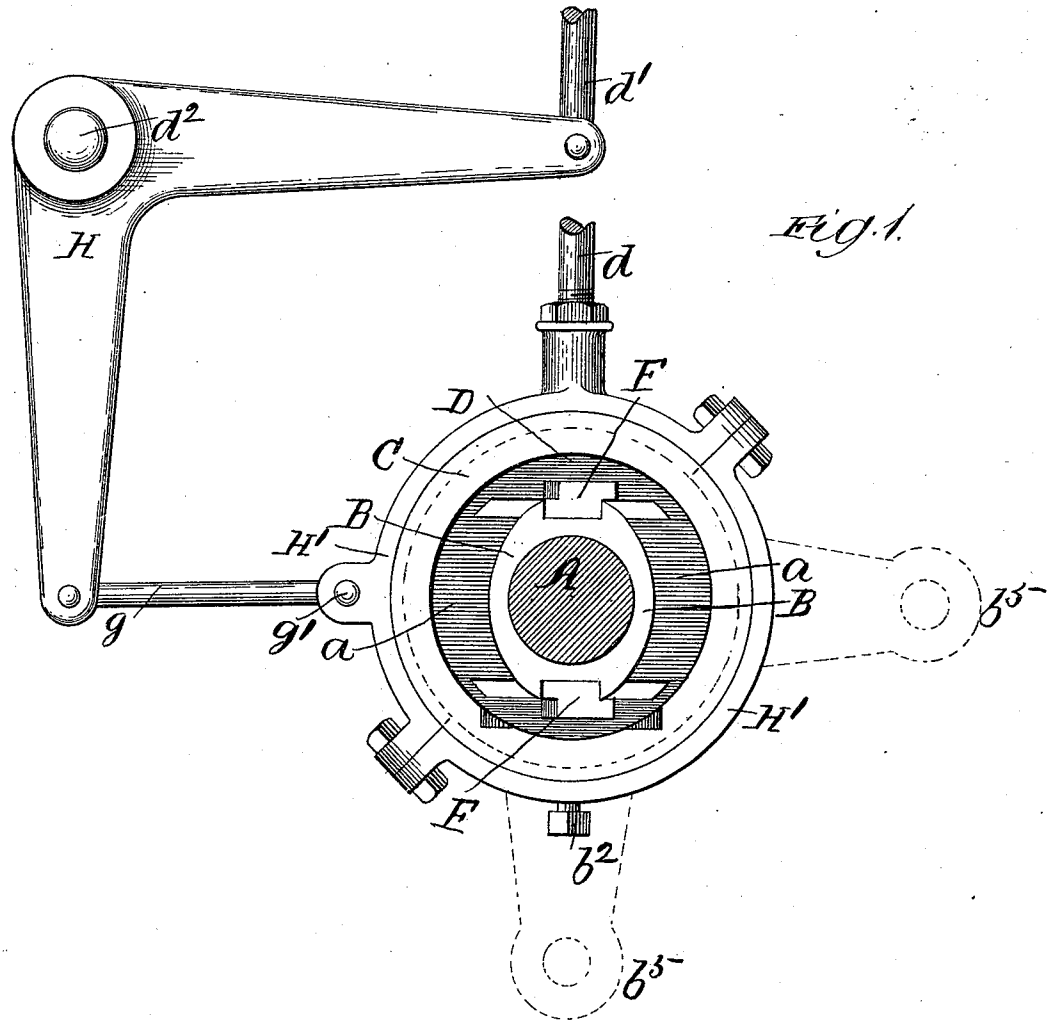

Fig. 1.

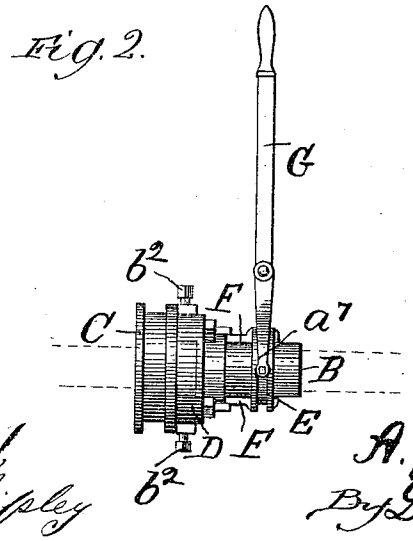

Fig. 2.

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Fig. 7.

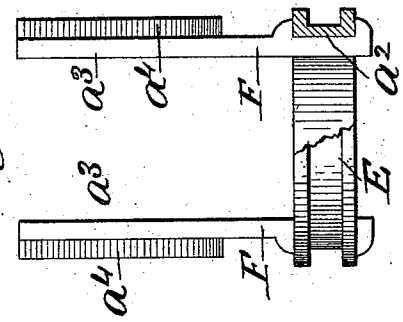


Fig. 8.

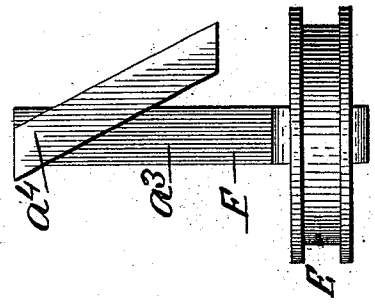


Fig. 5.

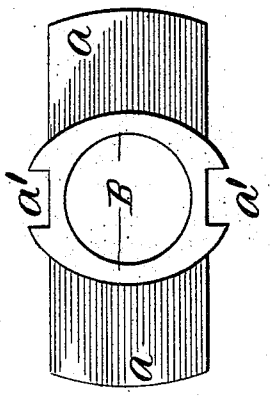


Fig. 6.

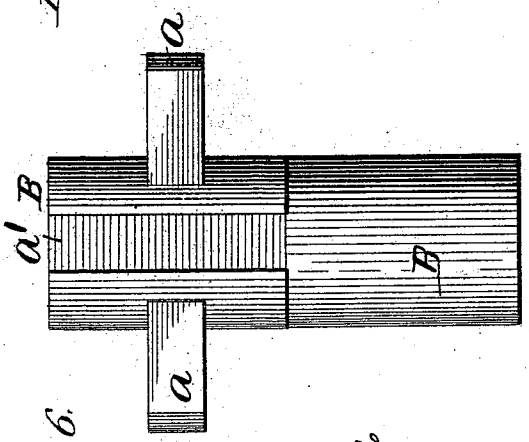


Fig. 3.

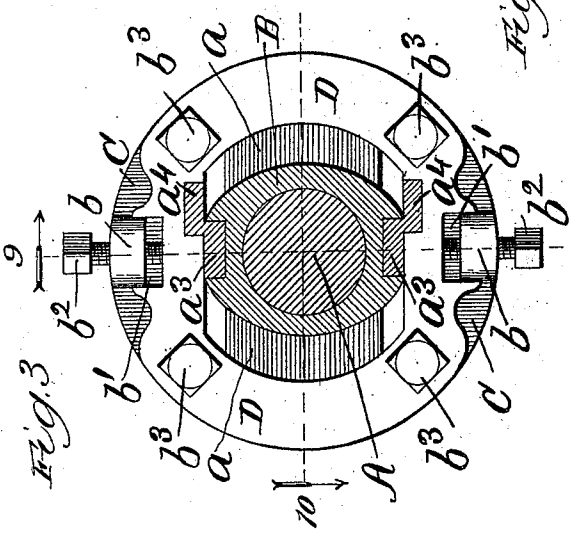
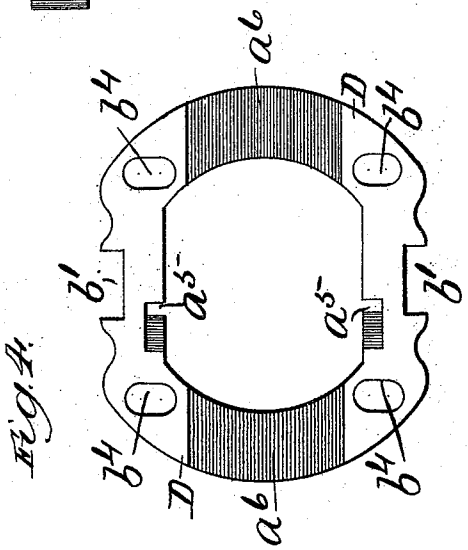


Fig. 4.



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REVERSING MECHANISM FOR ENGINES.

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Fig. 9.

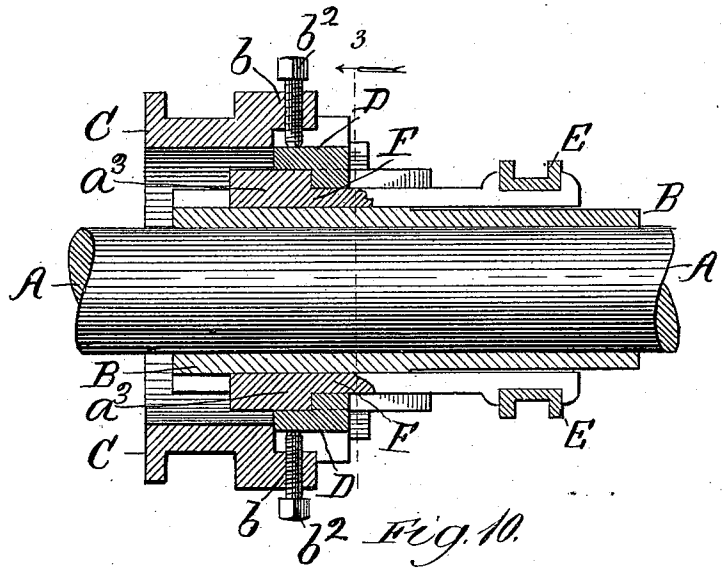
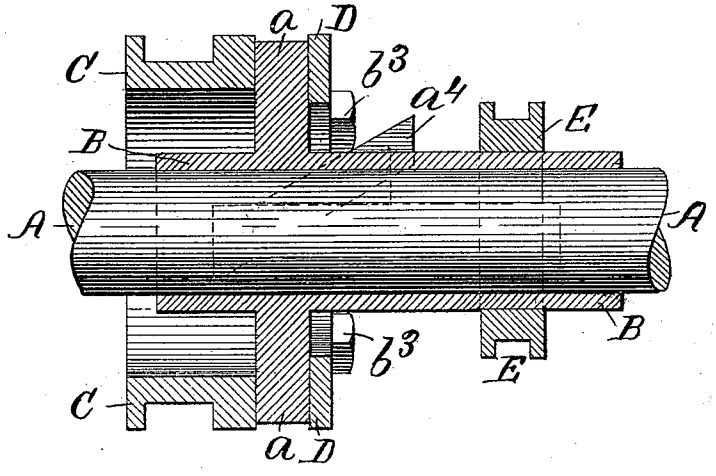


Fig. 10.



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UNITED STATES PATENT OFFICE.

ANDREW J. SCHINDLER, OF CHICAGO, ILLINOIS.

REVERSING MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 510,094, dated December 5, 1893.

Application filed June 23, 1893. Serial No. 478,636. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. SCHINDLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reversing and Cut-Off Valve Mechanism for 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.

Reference is had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in that class of steam-engine devices set forth in United States Letters Patent No. 463,873, issued November 24, 1891.

The improvement hereinafter set forth is more especially intended for use in connection with locomotive, marine and other engines of the two cylinder class; but is equally well adapted for a single, triple or four-cylinder engine. But one eccentric is used, no matter whether the application is to a single, double, triple or four cylinder engine; the eccentric being moved or shifted straight across the shaft instead of swinging on a pivot as it does in the patent herein referred to, the principle of action and result being, however, the same.

In addition to dispensing with the use of one eccentric, the usual link motion is also dispensed with, as the present invention embodies, in addition to its own improved features, all the advantages of the link-motion without any of the disadvantages; the engine being reversed, cut off or throttled from a single eccentric and by the movement of one lever.

In the drawings—Figure 1 is an elevation of an arrangement embodying my improved features; the engine or main shaft being shown in transverse section and the valve-stems broken away; Fig. 2, a detached side elevation of the device proper; the broken lines indicating the relative position of the engine shaft; Fig. 3, a transverse section on line 3, Fig. 9, looking in the direction indicated by the arrow; Fig. 4, a detached elevation of an adjusting-plate to which the eccentric is attached; Fig. 5, an end elevation of a sleeve-disk; Fig. 6, a plan of the same. Fig. 7 is a plan of the shifting feathers and their collar, a portion of the collar being broken, showing one way of securing this end of the feathers to the collar; Fig. 8, a side elevation of the same. Fig. 9 is a longitudinal section on line 9, Fig. 3; and Fig. 10, a longitudinal section on line 10, Fig. 3, or at right-angles to Fig. 9.

A may represent the engine or main shaft, B a guide-sleeve rigidly mounted thereon, C an eccentric, and D a disk-plate to which said eccentric is adjustably attached. The sleeve B is somewhat thickened for about one-half its length and is provided on opposite sides with guide-wings a a, shown in the different views, but more fully in Figs. 5 and 6. This sleeve is provided in the enlarged part and on opposite sides at right angles to the wing projections, with grooves a' a', starting in at one end and stopping short at the limit of the enlarged part. A grooved collar E is loosely mounted on this opposite end of the sleeve B, and has an endwise movement thereon.

The companion shifting-feathers, F F, are seated loosely in the grooves a' a' and have their outer ends rigidly secured to the collar E, as shown by the broken-away part at a^2. These shifting-feathers are arranged diametrically opposite each other, and consist of a straight, parallel bar a^3 and a diagonal bar a^4, usually formed integral.

The disk-plate D, to which the eccentric is secured, is provided, on its inner edges (Fig. 4) at opposite points, with diagonal grooves a^5 in which the diagonal bars a^4 have an endwise movement. The straight bars a^3 move in the grooves in the sleeve; one side bearing against the inner edge of the eccentric plate. That side of the disk-plate D adjacent to the eccentric is cut away, as at a^6, (Fig. 4) to a depth corresponding to that of the thickness of the guide-wings a a which fit therein and on which said disk-plate has its lateral movement with reference to the engine shaft. The lower bifurcated end a^7, of the shifting-lever G, (Fig. 2) embraces the grooved collar E and is properly attached thereto to permit of a rotary movement of said collar.

The reversing or shifting-lever is shown (Fig. 2) in its central vertical position. In this position the engine is throttled. Now, by moving the lever to the right the collar and shifting-feathers are forced in the oppo-

site direction and the eccentric moved across the shaft by the wedging action of the feathers in the diagonal grooves in the disk-plate, and the engine started ahead. The lever being at its extreme limit on this side, the engine is working full stroke, but may be cut off at any point desired by moving the lever to any position between its limit of movement on that side and its vertical throttling position. By throwing the lever over to the opposite side the motion of the engine is reversed. The lever may be moved with the greatest ease and the engine reversed without closing the throttle. The eccentric and its disk-plate encircle the engine shaft or other axial center, but have no direct connection therewith.

The eccentric is provided at diametrically opposite points with lugs b b, which project into notches b' b' formed in the edges of the disk-plate D. The adjusting-bolts b^2 b^2 are inserted through and have a screw-threaded engagement in said lugs and bear against the edge of the disk-plate at direct opposite points and at right angles to the plane in which the eccentric is moved by the shifting-lever, as shown in Figs. 2, 3 and 9.

The eccentric is secured to the disk-plate by a number of tap-bolts b^3; the bolt-holes b^4 (Fig. 4) in the plate being elongated, so that by loosening up on bolts b^3, and slacking back on one of the bolts b^2 and setting up on the other the relative position of the eccentric is changed. This adjustment is for the purpose of giving the engine-valve or valves more or less lead; the eccentric being out of center with reference to the shaft just what the lap is, the lead side being opposite the crank.

The dotted lines, b^5, in Fig. 1 indicate the relative position of the cranks of a two-cylinder engine. The one valve-rod d is directly opposite to one crank. The second valve-rod d' is connected to one end of a bell-crank lever H having its rocking-pivot at d^2. To the opposite end of the bell-crank is connected one end of a link g; the opposite end of this link being connected to the eccentric strap H', as at g'; thus making a connection for the second valve-rod directly opposite the other crank, as shown, the action being the same as though the connection was direct.

The bell-crank is used simply to illustrate one form of connection in order to bring the valve-rod into proper position with reference to its crank. For a three-cylinder engine the cranks are arranged equidistant, and for a four-cylinder engine they are set quartering.

For a stationary engine running in one direction only, the reversing-lever may be dispensed with and a suitable governing apparatus, such as shown in the patent herein referred to, attached as under the ordinary conditions.

In attaching the device, the engine is first placed on its dead center, the guide-sleeve then set so as to bring the shifting-feathers exactly on the upper and under side of the shaft, as shown in Fig. 1, the high part of the eccentric being on top.

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

1. The combination with the main shaft, of a sleeve, provided with guide-wings and grooves, as described, and rigidly mounted on said shaft, a disk or eccentric-plate, loosely mounted on said sleeve and having a lateral movement on said wings across the line of the shaft, an eccentric, encircling the shaft and adjustably secured to said disk-plate, shifting-feathers, loosely engaging with the sleeve and disk-plate, and a collar, to which the outer ends of said feathers are rigidly secured, substantially as set forth.

2. The combination with a stationary sleeve, provided with guide-wings and longitudinal grooves, as described, of a disk-plate, provided on its inner opposite edges with diagonal grooves, companion shifting-feathers, each consisting of a parallel and diagonal bar, the parallel bars seating in the longitudinal grooves in said sleeve, and the diagonal bars seating in the corresponding grooves in said disk or eccentric plate, and an eccentric, adjustably attached to said plate, whereby a longitudinal movement of said feathers imparts a lateral movement to the plate and eccentric, substantially as set forth.

3. The combination with a sleeve, provided with guide-wings and grooves on diametrically opposite sides and held in a rigid position, a disk-plate, provided with diagonal grooves, companion shifting-feathers, located on opposite sides and engaging with the grooved sleeve and plate, a collar, loosely mounted on said sleeve and to which the outer ends of said feathers are secured, the operating-lever, and the eccentric, attached to said plate, substantially as set forth.

4. The combination with a disk or eccentric-plate, provided with a number of elongated bolt-holes and notched edges at opposite points, of an eccentric, provided with lugs projecting into said notches, adjusting-bolts, inserted through said lugs, and the clamping-bolts, securing the eccentric to its plate, whereby the eccentric may be adjusted at right angles with reference to the movement imparted by the shifting-feathers, substantially as set forth.

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

ANDREW J. SCHINDLER.

Witnesses:
L. M. FREEMAN,
J. B. DONALSON.