(No Model.)

G. W. SHEFF & E. W. RIGGS.

VALVE OPERATING MECHANISM FOR ENGINES.

No. 564,112. Patented July 14, 1896.

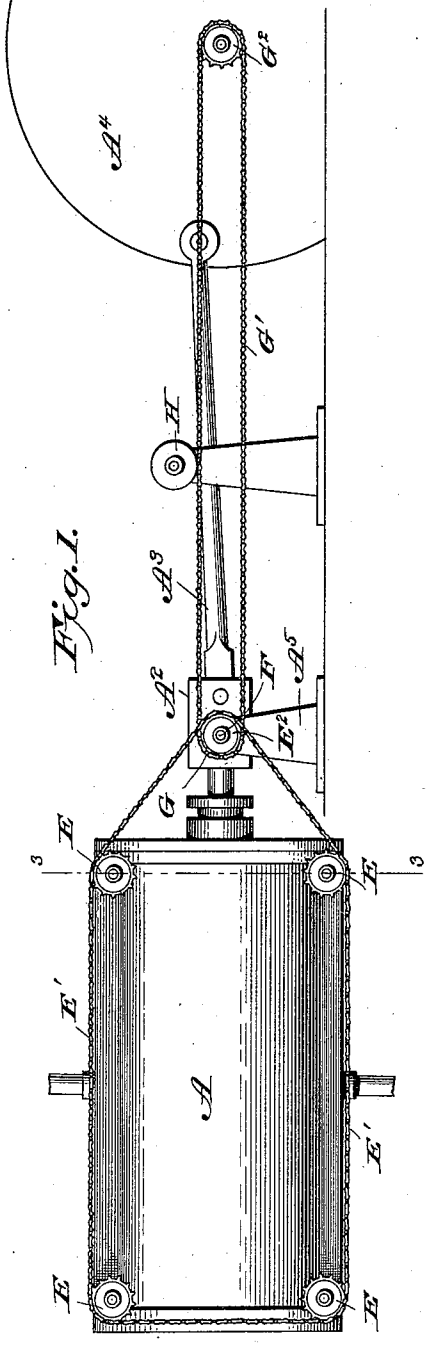

Fig. 1.

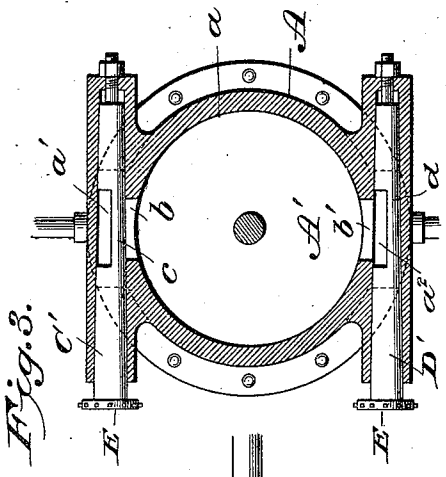

Fig. 3.

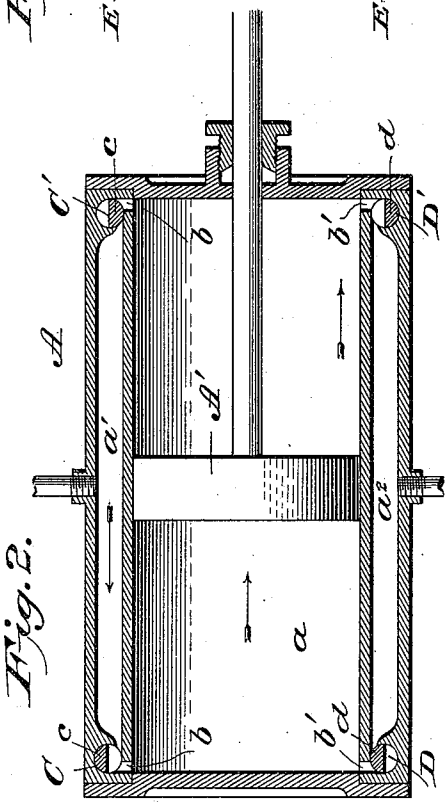

Fig. 2.

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UNITED STATES PATENT OFFICE.

GEORGE W. SHEFF AND ESOM W. RIGGS, OF SHOSHONE AGENCY, WYOMING.

VALVE-OPERATING MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 564,112, dated July 14, 1896.

Application filed April 4, 1896. Serial No. 586,246. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. SHEFF and ESOM W. RIGGS, citizens of the United States of America, residing at Shoshone Agency, in the county of Fremont and State of Wyoming, have invented certain new and useful Improvements in Valve-Operating Mechanism for Steam-Engines; and we 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 being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in valve-operating mechanism for steam-engines, and consists more particularly in providing the cylinder of the engine with rotary induction and eduction valves having sprocket-wheels over which passes an endless sprocket-chain driven from the crank-shaft by an interposed sprocket wheel and chain, the latter being kept taut by an idle-wheel while the sprocket-wheel is adjustable upon its support to take up the slack of the chain that operates the valves, all as will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation showing the application of our invention. Fig. 2 is a vertical longitudinal section through the cylinder, and Fig. 3 is a sectional view on the line 3 3 of Fig. 1.

A designates the cylinder, which is provided with the usual piston-chamber a, in which the piston A′ slides, the stem of said piston passing through the head of the cylinder and stuffing-box thereon and the outer end thereof connected to a slide A^2, to which the pitman-rod A^3, extending from the crank-disk A^4, is also connected in the usual manner.

The cylinder A is provided above the piston-chamber with a longitudinal steam-passage a', which communicates with each end of said piston-chamber by way of ports b b, and at the lower part of the cylinder A is a similar passage a^2, forming the exhaust and communicating with each end of the piston-chamber by ports b' b'. Each end of the passages a' and a^2 are rounded, as shown, to provide bearings for the rotary valves hereinafter described.

C and C′ designate the rotary induction-valves, which are located at each end of the induction-passages a' and are adapted to alternately open and close the ports b b, leading to the piston-chamber. Corresponding valves D and D′ are located at each end of the exhaust-passage a^2 and are adapted to alternately open and close the ports b' b'. These valves are each made up of a slightly tapered cylindrical bar or rod which is centrally reduced to present a semicylindrical portion c d, which is adapted to be positioned in the ends of the passages a' and a^2 and open and close the ports, as hereinbefore mentioned, and the ends of the valves beyond the cylindrical portions thereof are reduced, as shown in the detail view Fig. 3. By tapering the valves longitudinally any wear upon the same can be taken up by adjusting the set-nuts at one end. The cylinder is provided with transverse openings corresponding with the shape of the valves so as to provide bearings therefor, suitable packings being employed to present steam-tight joints. One of the reduced ends of each valve extends a suitable distance beyond one side of the cylinder to receive a sprocket-wheel E, and around or over all four sprocket-wheels passes a sprocket-chain E′, said sprocket-chain also passing over a sprocket-wheel E^2, mounted upon a counter-shaft F, journaled in bearings at the upper end of a standard A^5. Upon the shaft F is mounted a second sprocket-wheel G, which is connected by a chain G′ to a sprocket-wheel G^2 on the shaft which is driven from the engine.

The shaft F is provided with bearings, which are adjustable in a direction to and from the sprocket-wheels E, so that any slack which may occur in the sprocket-chain E′ can be taken up at this point, and the sprocket-chain G′ is provided with an idle-wheel H, vertically adjustable in a suitable standard, so as to take up the slack in said chain.

The chain E′ is driven in the direction indicated by the arrow in the drawings, and the valves are adjusted with respect to each other so that when the induction-valve C is beginning to uncover its port b the eduction-

valve D opposite thereto will have covered the outlet-port b', so that steam will be admitted behind the piston-head to drive the same toward the forward end of the cylinder, the valves C′ and D′ being positioned in such relation that the induction-valve will be closed and the eduction-valve opened, as shown in Fig. 2 of the drawings.

The sprocket-wheels E are preferably adjustable upon the valves, so that said valves can be properly positioned with respect to each other.

The construction herein shown and described provides a very simple, cheap, and effective mechanism for operating the rotary valves of a steam-engine, and the parts are so constructed and arranged that by means of guide-lines they can be readily adjusted so that the valves will open and close the inlet and outlet ports at the proper time.

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

1. The combination with a cylinder having induction and eduction passages which communicate with the piston-chamber by ports, of rotary valves for opening and closing said ports, the valves consisting of a bar having centrally a semicylindrical portion and reduced at its ends to provide shafts; together with sprocket-wheels mounted on said valves, and a sprocket-chain passing over said sprocket-wheels, the sprocket-chain being driven from the engine, substantially as shown and for the purpose set forth.

2. The combination with a cylinder having induction and eduction passages which communicate with the piston-chamber by ports, said passages having rounded bearing-surfaces at their ends, of rotary valves for opening and closing the ports, the valves consisting of a cylindrical rod centrally cut away to provide a semicylindrical portion and the ends reduced to present shafts, said valves being let into the cylinder so that the semicylindrical portions thereof will bear in the ends of the induction and eduction passages; together with sprocket-wheels attached to the valves, and a sprocket-chain which passes over the sprocket-wheels and is driven from the engine, substantially as shown and for the purpose set forth.

3. The combination with a cylinder having rotary valves therein adapted to cover and uncover the induction and eduction ports, of sprocket-wheels connected to said valves, a sprocket-chain passing over said sprocket-wheels and over a supplemental wheel journaled in a suitable support and having a second sprocket-wheel adapted to rotate therewith; together with a second sprocket-chain extending to a sprocket-wheel on the shaft which is driven by the engine, substantially as shown and for the purpose set forth.

4. The combination with a cylinder having rotary valves therein adapted to cover and uncover the induction and eduction ports, of sprocket-wheels connected to said valves, a supplemental sprocket-wheel mounted on a shaft which is horizontally adjustable, and a chain passing over the aforesaid sprocket-wheels; together with a second sprocket-wheel mounted on the adjustable shaft, a chain extending therefrom to a sprocket-wheel on a driven shaft of the engine, and an idle-wheel adapted to bear upon the latter chain, substantially as shown and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE W. SHEFF.
ESOM W. RIGGS.

Witnesses:
J. K. MOORE,
JNO. W. CLARK.