

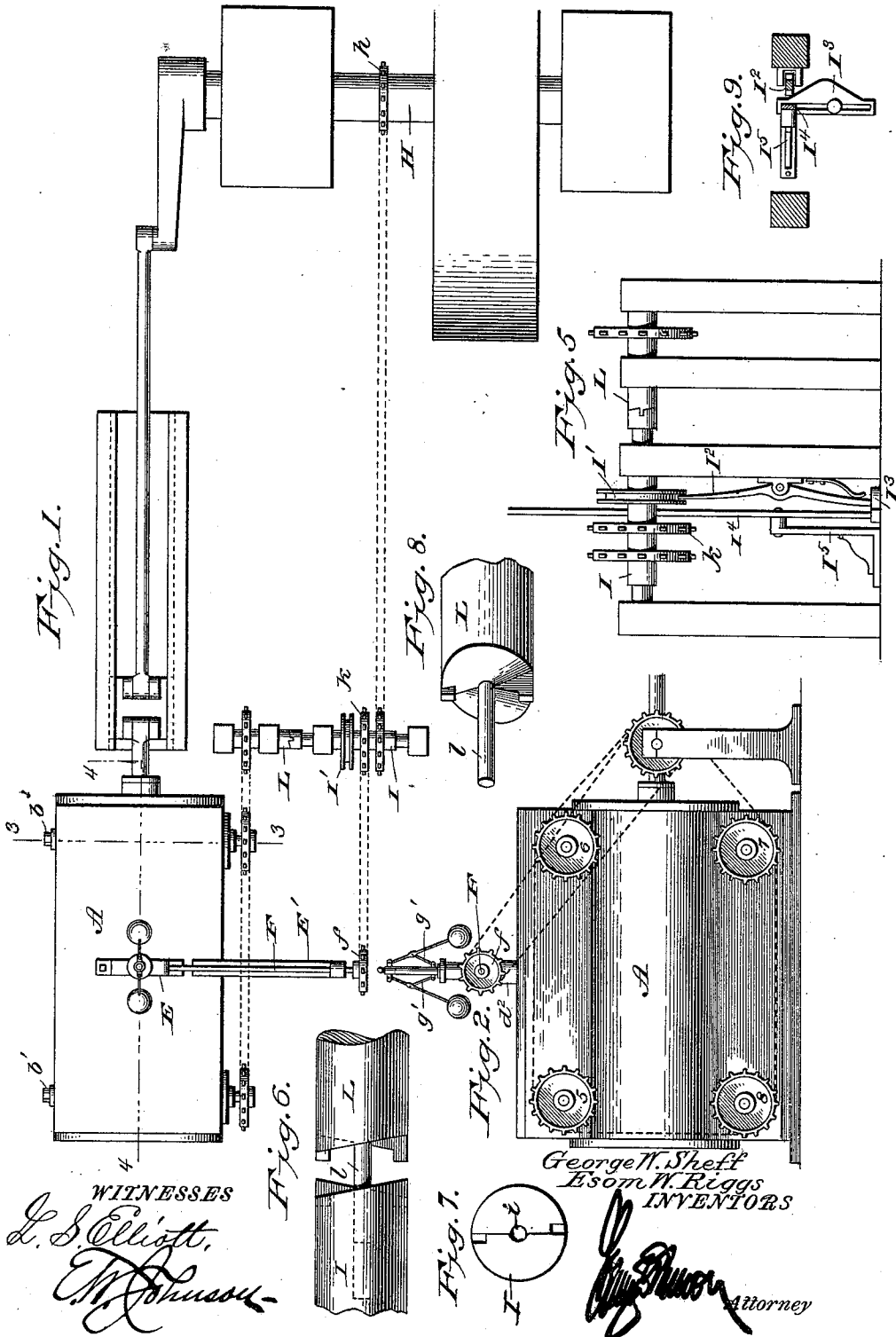
(No Model.)

2 Sheets—Sheet 1.

G. W. SHEFF & E. W. RIGGS.
STEAM ENGINE.

No. 582,832.

Patented May 18, 1897.



WITNESSES
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M. Johnson

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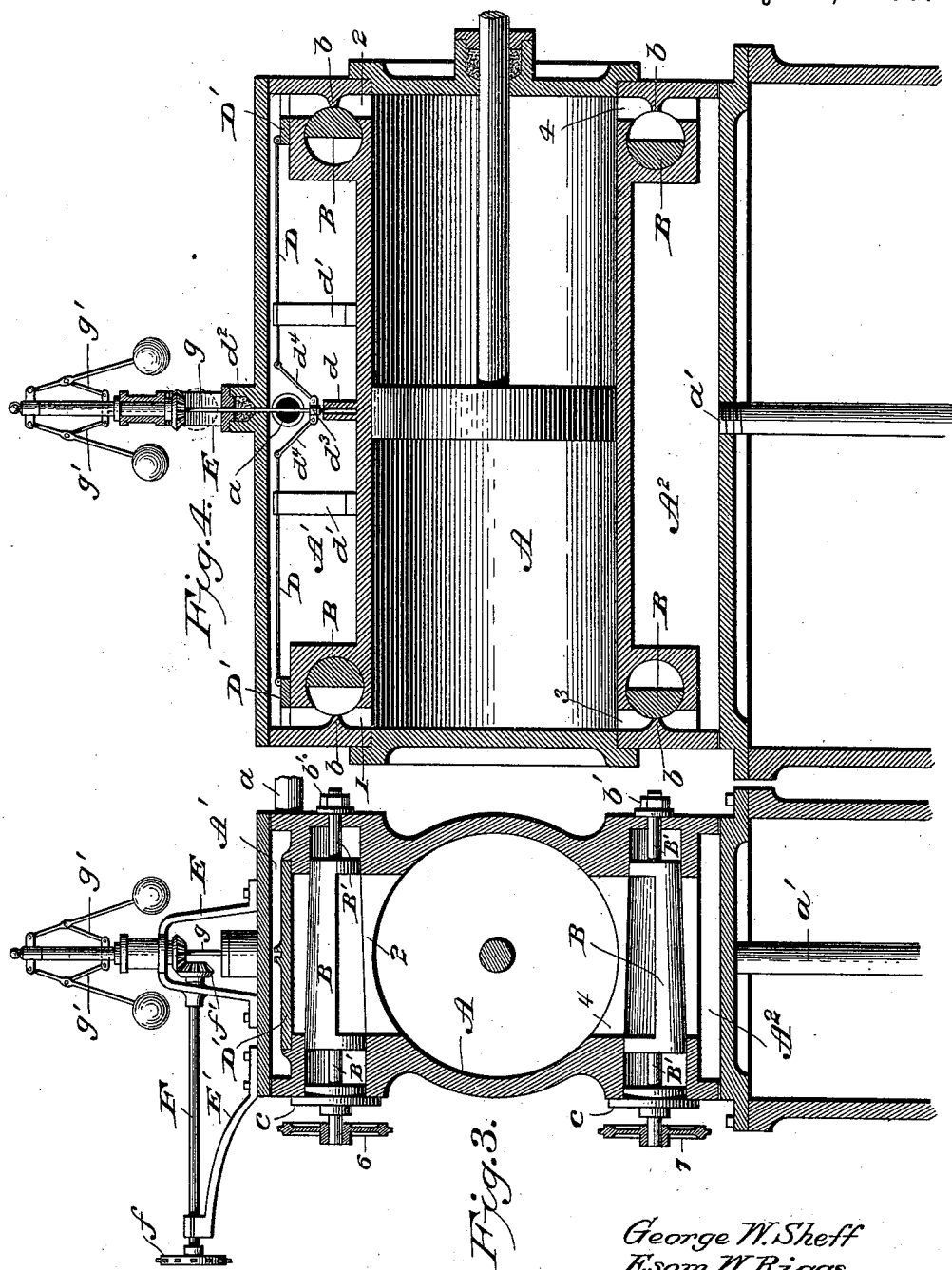
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UNITED STATES PATENT OFFICE.

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

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 582,832, dated May 18, 1897.

Application filed December 17, 1896. Serial No. 615,998. (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 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 and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in steam-engines, and more particularly to those of the Corliss type, in which the inlet and exhaust valves are rotary and geared to each other so that the valves at the opposite ends of the cylinder will be in a reverse position with respect to each other.

The present invention relates more particularly to the mechanism for reversing the engine and for regulating the supply of steam to the cylinder; and it consists in the construction and combination of the parts, 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 plan view of a steam-engine embodying our improvements. Fig. 2 is a side elevation of the cylinder and means for operating the sliding valves and governor. Fig. 3 is a vertical sectional view on the line 3 3 of Fig. 1. Fig. 4 is a longitudinal sectional view on the line 4 4 of Fig. 1. Fig. 5 is a view of the shaft-coupling and means for moving one section of the shaft laterally. Figs. 6, 7, and 8 are detail views of the interlocking parts of the shaft. Fig. 9 is a detail sectional view of a cam for throwing the parts or sections of the shaft in and out of engagement with each other.

A designates the cylinder of the engine, which is provided with steam-chests A' and A², steam being admitted into the chest A' through the port *a*, and exhausts into the chest A², having an exit-opening *a'*. The cylinder is mounted on a suitable foundation

or base through which may pass the exhaust-pipe connected to the opening *a'*.

1, 2, 3, and 4 designate steam ways or ports which enter the cylinder near the heads thereof and communicate with the chests A' and A². Into these ports extend projections *b*, which are preferably formed integral with the end walls of the steam-chests and are adapted to abut against one side of the rotary valves hereinafter described.

The ends of the cylinder are provided with projecting portions which extend into the steam-chests A' and A² and are bored with tapered openings to receive the tapered valves B, one side of each valve being cut away, as shown in Fig. 3, and the ends fit snugly into the parts of the cylinder made to receive the same. The valves B have integral projecting portions B', the projections that extend from the smaller ends of the valves passing through openings in the cylinder to receive set-screws *b'*. The opposite end of the valves passes through a flanged and shouldered disk *c*, and to the ends are secured sprocket-wheels 5, 6, 7, and 8. The flanged disk *c* is adjustable upon the shaft, so that any wear of the valves can be taken up by adjusting said disks and the set-screws *b'*.

The steam-chest A' is constructed to provide centrally an upwardly-projecting stud *d*, which is bored, and on each side of said stud are upwardly-projecting standards *d'*, which serve as supports for valve-rods D. Immediately above the stud *d* the cylinder is provided with a projecting boss *d*², adapted to receive a packing, and the upper side of the cylinder carries a frame E, adjacent to which is a frame E'. The frames E and E' have bearings for a shaft F, one end of which is provided with a sprocket-wheel *f* and the other end with a pinion *f'*, the pinion being adapted to mesh with a pinion of the governor hereinafter described.

g designates a vertical shaft provided with in the steam-chest A' with a sleeve *d*³, having projecting arms to which links *d*⁴ are connected, the opposite ends of said links being connected to rods D, attached to slides D', adapted to slide over the ports 1 and 2 of the cylinder. The shaft *g* is permitted to move freely within the sleeve *d*³, which is held upon

said shaft by rigid collars, as shown. This shaft extends into the guide or projecting portion *d* and is provided at its upper end with a cross-piece to which the links *g'* of the governor - arms are connected. It will be noted that the governor is driven by the shaft *F* and the pinion with which the pinion *f'* meshes, and as the weighted arms of the governor are thrown outward by centrifugal force the shaft *g* will be raised, the movement of said shaft sliding the cut-offs *D'* over the inlet-ports to automatically regulate the amount of steam that will be admitted to the cylinder.

In an engine of the type shown the piston-rod is connected to the crank-arm of the main shaft *II* in the usual manner, and said main shaft is provided with a sprocket-wheel *h*, over which passes a sprocket-chain that also passes over a sprocket-wheel on a shaft *I*, journaled in suitable standards. This shaft *I* also carries a sprocket-wheel *k*, over which a chain passes that connects with the sprocket-wheel *f* of the shaft *F*, which drives the governor. Upon the shaft *I* is mounted a flanged disk *I'*, and between the flanges of the disk lies one end of a lever *I²*, pivotally attached to one of the standards or supports, the lower end of said lever being in the path of a cam *I³*, which is laterally movable by means of a lever *I⁴*, pivoted upon a fixture or bracket *I⁵*, preferably located between the standards that support the shaft *I*. The end of the lever *I⁴* is adapted to be moved to and from the shaft *I*, and when actuated operates the cam *I³* to shift the lever *I²* in the direction at right angles to the movement of the lever *I⁴* and will slide the shaft *I* in its bearings to disconnect the clutch-face of said shaft from the other section *L* thereof. The clutch-faces of the shafts *I* and *L* are of the configuration shown in Figs. 6, 7, and 8 of the drawings, and one of the sections of the shaft has a stem or rod *l*, which projects over the clutch-face thereof and enters a cavity *i* in the opposite section of the shaft. One of the clutch-faces is provided with recesses and the other with corresponding projections. When the shafts are brought together, the projections will enter the recesses so that the sections will rotate in unison or together. The section or shaft *L* is provided between its supports with a sprocket-wheel, over which passes a chain that also passes over the sprocket-wheels 5, 6, 7, and 8 on the rotary valves *B* of the engine.

In operation steam is admitted into the chest *A'* and passes through one of the ports to the cylinder, and the steam on the other side of the piston is exhausted at the other end of the cylinder into the chamber *A²* in the usual manner, according to the reciprocation of the piston and rotation of the shaft *II*. When the engine reaches a higher speed than is desired, the valves or slides *D'* will be operated to reduce the size of the ports leading from the steam-chest *A'* to the cylinder. When it is desired to reverse the engine, the

lever *I⁴* is operated to slide the shaft *I* in its bearings to separate the clutch-faces, and during such movement the governor will be in gear with the driving-shaft, but the sprocket-wheel over which passes the chain for operating the valves will be out of gear with said shaft. The valves and the section of the shaft to which they are geared after the clutch is detached have no force to revolve them further, and consequently stop, and the part of the shaft which is geared to the driving-shaft will continue to revolve by the force of the engine, but the cam on the lever having released the section of the shaft to which it is attached immediately after shifting it sufficiently to allow it to separate will consequently drop back and recouple at a half-revolution, there being a suitable spring to force the shaft and ways to unite it when the projections and recesses come opposite. The valves will then rotate with the engine as before, but the steam will be reversed in the cylinder, and consequently the engine having the steam-pressure to work against will come to a stand and rotate in the opposite direction, one movement of the lever being sufficient to reverse the engine without cutting off steam-supply.

We are aware that prior to our invention it has been proposed to provide steam-engines of analogous type with rotary valves and clutches for throwing the engine out of gear with the valves, and we do not therefore claim such construction broadly; but

What we do claim as new, and desire to secure by Letters Patent, is—

1. In a reciprocating engine, the combination with the valve-gear and governor mechanism, of a two-part shaft provided with opposing clutch-faces, means for moving one section of the shaft longitudinally, said means consisting of a lever supported to move to and from the shaft, the lower end of said lever engaging a slide having a cam-face, said cam engaging with a second lever which is moved at right angles with the first lever when the former is operated, the upper end of the second lever engaging a flanged disk carried by the movable section of the shaft, substantially as shown and for the purpose set forth.

2. In a reciprocating engine, the combination with the valve-gear and governor mechanism, of a two-part shaft having opposing clutch-faces, one of the sections of the shaft being longitudinally movable in its bearings and provided with a sprocket-wheel which is driven from the main shaft of the engine, and a sprocket-wheel which is geared to the governor mechanism, a flanged disk on said shaft, and means for moving the shaft longitudinally in its bearings, the means consisting of a pair of levers which engage at their lower ends with a cam; so that when the lever is operated the other lever will engage the disk to move the shaft in its bearings and position it so that it will be in or out of en-

gagement with the other section of the shaft, substantially as shown.

3. In combination with the shafts I and L having opposing clutch-faces, one of the shafts having a rod which enters a central recess in the other shaft, the end of one of the shafts having projections, and the end of the other shaft having corresponding recesses, and means for moving one of the shafts longitudinally in its bearings, for the purpose set forth.

4. In a steam-engine, the combination, of a governor, a vertical shaft *g* connected by links to the governor-arms, the lower end of said shaft extending into the steam-chest; links *l*² connected to a fixture mounted upon

the shaft *g*, rods D connected to slide-valves D'; the governor having a pinion with which meshes a pinion carried by the shaft F having a sprocket-wheel which is driven by a sprocket-wheel mounted on a longitudinally-movable shaft geared to the main driving-shaft of the engine, 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,
JAMES F. LEES.