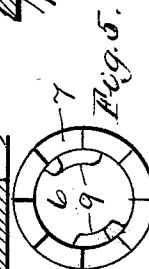
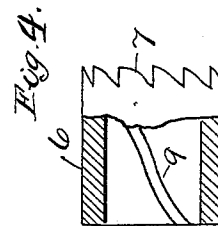
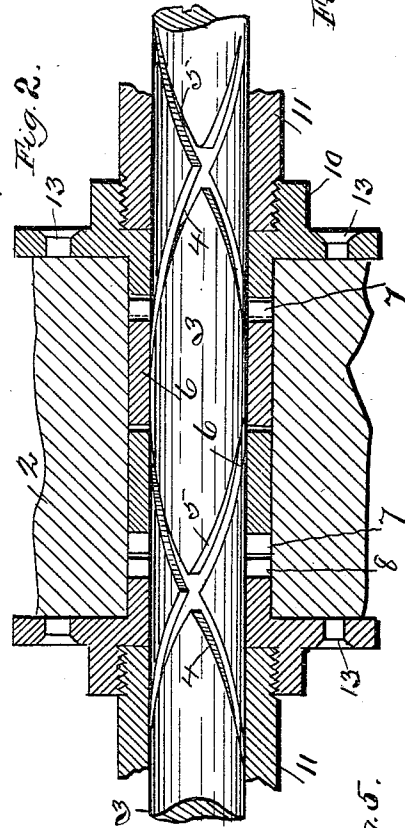
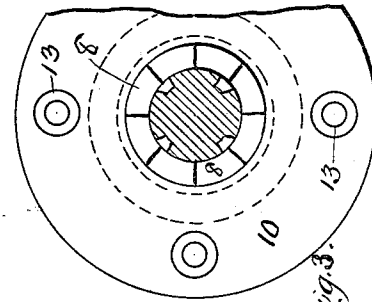
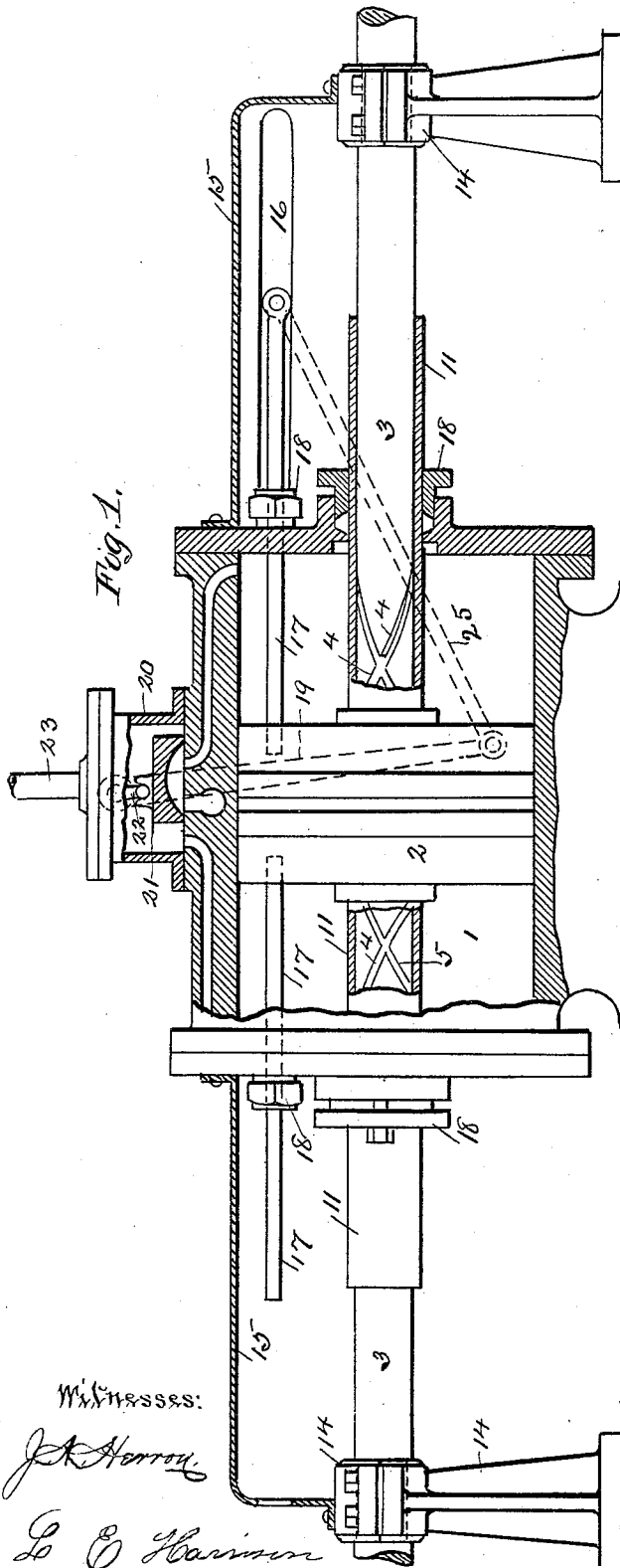


(No Model.)

J. L. GOURLEY.
STEAM ENGINE.

No. 520,757.

Patented May 29, 1894.



WITNESSES:

J. K. Harvey

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Atty.

UNITED STATES PATENT OFFICE.

JOHN L. GOURLEY, OF TARENTUM, PENNSYLVANIA.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 520,757, dated May 29, 1894.

Application filed March 28, 1893. Serial No. 468,044. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. GOURLEY, a citizen of the United States, residing at Tarentum, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved high speed engine, and consists in a reciprocating piston, operating along the length of a journaled piston rod, a right and left spiral groove formed on said rod, and suitable means of connection between the said piston and rod, whereby a rotary movement is imparted to the said rod by the back and forward movement of the piston, together with the certain details of construction, and combination, of parts as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a side sectional elevation of my improved high speed engine, partly in outside elevation, which is constructed and arranged in accordance with my invention. Fig. 2 is an enlarged side sectional elevation of a portion of the piston, showing the rod and its connecting parts. Fig. 3 is a face view of one of the clutches attached to the piston surrounding the rod, and at either side thereof. Fig. 4 is a central section, partly in elevation of one of the thimbles operating along the length of the piston rod, having a ratchet clutch formed on one of its ends. Fig. 5 is a face view of the same.

To construct a high speed engine in accordance with my invention, I provide a cylinder 1 of a suitable size and form of construction, and fitted with a steam chest 20, a slide valve 21, and other well known features common in all steam engines. Operating within this cylinder 1 is a piston 2, provided with packing rings to render the same steam tight, and adapted to move in the direction of the length of the said cylinder, and loosely connected to the rod 3 in a manner hereinafter described. This piston 2 is prevented from turning by means of two rods 17 rigidly attached on

either side of the same, and projecting through stuffing boxes 18 formed on the heads of the cylinder 1. Attached to the piston by bolts or screws 13 is a ratchet, consisting of a disk adapted to fit into a recess formed in the piston surrounding the rod, and having an inner flange provided with ratchet teeth 8, and an outside flange 10, provided with a female thread for the reception of one end of a tube or pipe surrounding the said rod 3. One of these ratchets constructed as described is fitted about the piston rod 3 at each side of the piston 2, and are adapted to engage with right and left ratchet thimbles 6. Formed spirally about the piston rod 3 are two grooves 4 and 5, each extending the length of the cylinder 1; the one formed spirally to the right, and the other to the left. These spiral grooves engage with splines 9 formed in the interior of the thimbles 6, and each of the said thimbles is provided at its inner face with ratchet teeth 7, to engage with the teeth of the stationary ratchets before described. These thimbles 6 are loosely arranged between the two stationary or fixed ratchets, and have sufficient room to disengage themselves one at a time by the back and forward movement of the piston 2. Fitted over the rod 3 at either side of the piston 2, and attached by screw threads to the stationary ratchets, are two tubes 11, neatly fitted about the said rod 3, and projecting through the stuffing-boxes 18, and of a proper length to remain at all times within the said boxes 18. These tubes reciprocate with the piston 2, and afford a means for making steam tight connections with the cylinder heads. Pivoted to one of the rods 17 for preventing the rotation of the piston 2 is a connecting link 25, the other end of which is connected to a long crank 19 to operate the slide valve 21. Arranged at each end of the piston rod 3, is a bearing 14, which will permit the said rod to revolve, but prevent any movement in the direction of its length.

In operation steam is admitted through the inlet pipe 22 into the steam chest, and the piston 2 given a reciprocating movement the entire length of the cylinder 1 in a manner well known to the art. At each forward movement of the piston 2 to the right, the thimble clutch 6 at the rear engages with its fixed

clutch 8, and in moving along the groove 5, revolves the rod 3, and when reaching the end of the stroke in that direction, releases the said clutch 6 and engages the other. This
 5 last mentioned clutch will move to engage with its fixed clutch at the other side of the piston 2, and it operating in the other spiral groove 4, will continue the rotation of the rod 3 in the same direction, thereby giving the
 10 said rod 3 a continuous rapid rotary movement by the back and forward movement of the piston 2.

The grooves 4—5, may be formed spirally any number of times about the rod 3—for example, if the grooves each make three complete turns about the rod 3, the same will revolve three times to each single stroke of the piston 2, making six revolutions to each double exhaust. It will be seen from the above
 15 example that the rod 3 may be speeded to any number of revolutions per minute desired. For light work the pitch of these grooves may be made heavy, and the cylinder short, and for heavy work the cylinder long, and the
 20 pitch light.

This engine constructed as described is adapted to be connected to dynamos, and other apparatus requiring a high speed, and is connected direct to such devices by means
 25 of a suitable clutch, and as a large number of revolutions may be obtained from each single

stroke of the piston, the saving of steam and fuel over the ordinary steam engine, will be a large item in the expense of operating the same. 35

Another advantage derived from the use of an engine constructed as described, is—the great power obtained, as the principle used is that of the wedge or screw.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is— 40

A steam engine consisting of the cylinder fitted with a steam-chest and valve, and means for operating the same the piston 2 45 provided with right and left clutches, the right and left spirally grooved rod 3 operated by said clutches, a casing or covering 11 arranged over said rod and projecting through the stuffing boxes 18, the rods to prevent the 50 piston from turning, and to operate the steam valve, and the bearings arranged at either side of the cylinder to support the rod 3, all arranged and combined for service, substantially as and for the purpose described. 55

In testimony that I claim the foregoing I hereunto affix my signature this 17th day of March, A. D. 1893.

JOHN L. GOURLEY. [L. S.]

In presence of—

JOHN C. THOMPSON,
 L. E. HARRISON.