

(No Model.)

2 Sheets—Sheet 1.

R. B. DAVIS.
STEAM ENGINE.

No. 521,105.

Patented June 5, 1894.

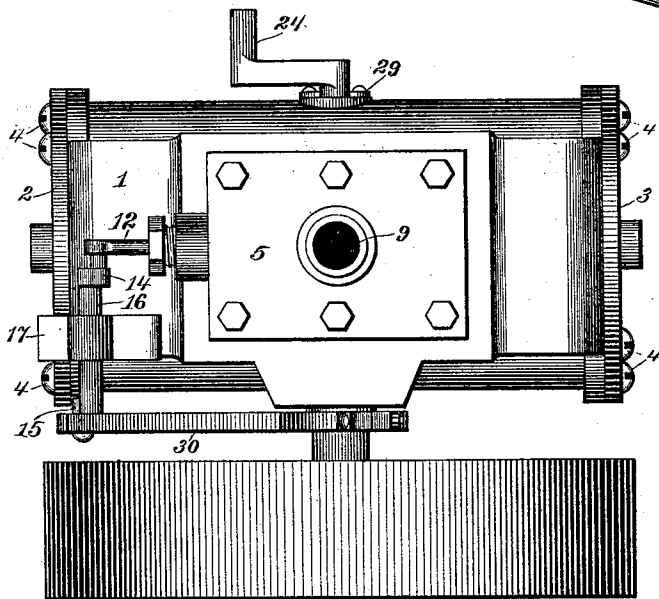
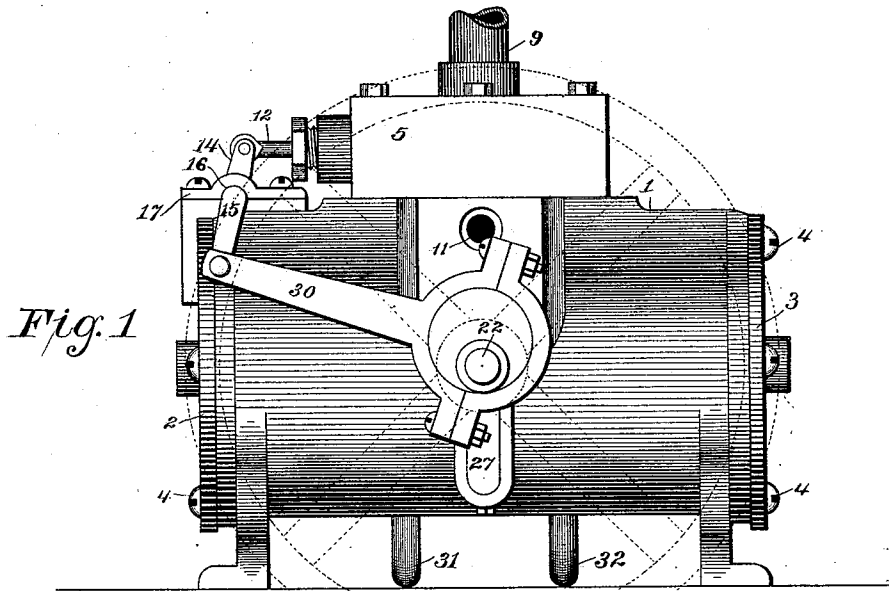
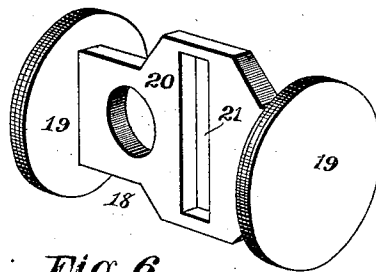
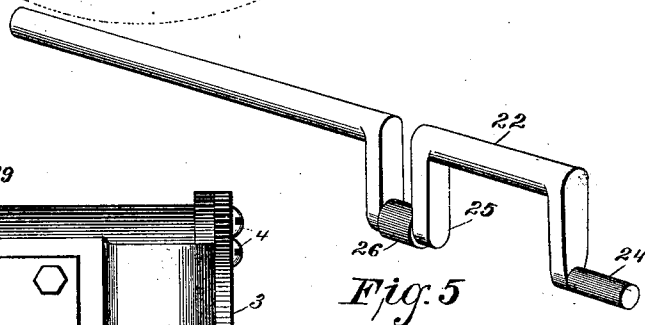


Fig. 2



Witnesses

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2 Sheets—Sheet 2.

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Fig. 3

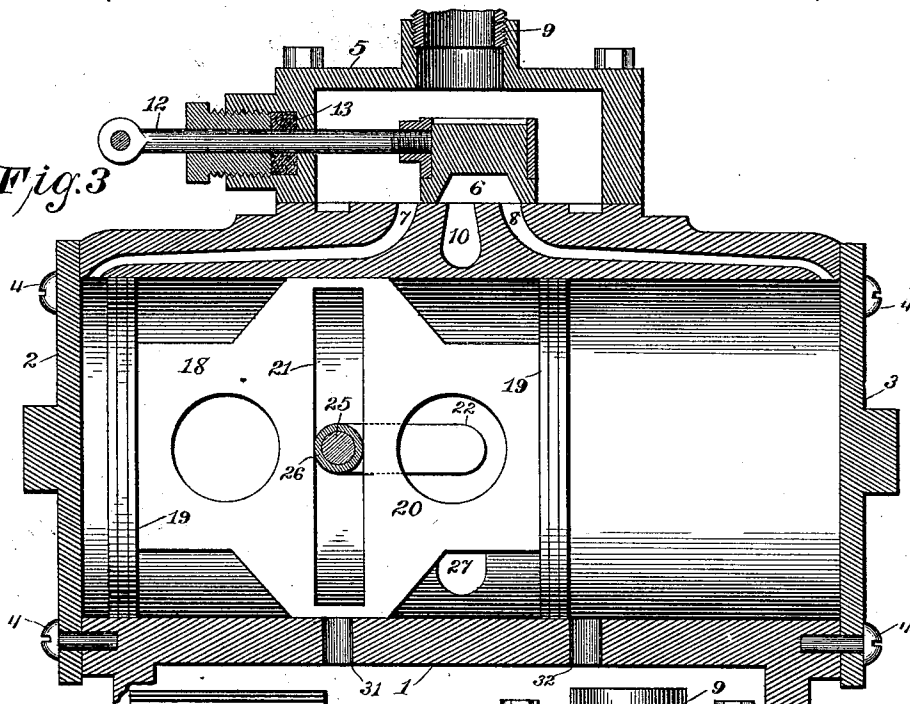


Fig. 7.

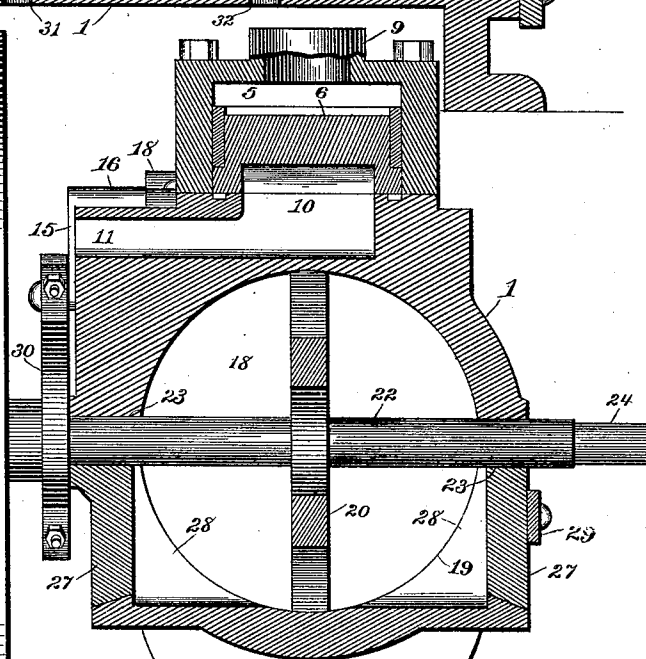


Fig. 4

Witnesses
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UNITED STATES PATENT OFFICE.

ROBERT B. DAVIS, OF ALTOONA, PENNSYLVANIA.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 521,105, dated June 5, 1894.

Application filed December 19, 1893. Serial No. 494,049. (No model.)

To all whom it may concern:

Be it known that I, ROBERT B. DAVIS, of Altoona, county of Blair, State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to provide means for transmitting rotatory motion from a reciprocating piston without the use of intermediate mechanism, whereby the necessity for the employment of the piston rod, pitman and cross head, or their mechanical equivalents for the transmission of such rotary motion is obviated.

A further object of my invention is to provide means auxiliary to the usual exhaust ports whereby the back pressure upon the piston is reduced to the minimum.

Figure 1, is a side elevation. Fig. 2, is a top plan view; Fig. 3, a central longitudinal section; and Fig. 4, a transverse central sectional view of my engine. Fig. 5 is a detail view of the crank shaft. Fig. 6, is a view of the piston detached; and Fig. 7 is a detail view of one of the plugs.

Referring to the figures on the drawings: 1 indicates the cylinder of my engine provided with solid heads 2 and 3 bolted thereto, by bolts 4, in the usual manner.

5 indicates a steam chest within which reciprocates the recessed regulating valve 6, adapted by its reciprocation to alternately convert the ports 7 and 8 communicating the steam chest with the opposite ends of the cylinder into supply and exhaust ports by alternately establishing communication between them and the steam supply pipe 9, or with the exhaust chamber 10, opening into the steam chest between the ports 7 and 8, and provided with an exhaust port 11.

The valve stem 12, of the regulating valve, extends through a bushing 13 in the end of the chest and is pivotally connected to one of two oppositely extending terminal arms 14 and 15, of a rock bar 16 fulcrumed upon the head 2 by a bracket 17 secured in any suitable manner, as for instance, by bolts, as illustrated.

18 indicates a reciprocatory piston consisting of two disks 19 provided with circumferential packing, as usual, and connected by a

diametrical web 20, cut away for the sake of lightness, and having a transverse guide slot 21 preferably of a length nearly equal to the diameter of the disks.

22 indicates a crank shaft extending diametrically through the cylinder at its middle journaled in suitable bearings 23, and provided with a medial crank 24, the bar 25 of which passes through the slot 21 and is freely movable therein, whereby the reciprocation of the piston operates to transmit rotary motion to the shaft. The bar 25 is preferably provided with an anti-friction collar 26 in order to overcome the friction incident to its movement within the slot. The bearings 23 consist of plugs 27 somewhat wedge shaped laterally and longitudinally, secured within elongated apertures 28, having correspondingly shaped sides and located in opposite sides of the cylinder. The plugs are concave upon their upper ends and constitute, with the correspondingly shaped upper ends of the apertures, cylindrical bearings in which the shaft is adapted to rotate, suitable means 29 being provided for urging the plug to compensate for the wear of the shaft within its bearings and to insure a steam tight joint between the plug and the walls of the aperture, the urging of the plug causing both a lateral and longitudinal movement thereof. These apertures 28 are of sufficient size to admit of the removal of the crank from the cylinder when necessary, as for purposes of repair, the plug having been first removed for that purpose. In the event of the wear upon the sides of the plugs being insufficient to allow them to be urged laterally to accomplish the vertical adjustment necessary to compensate for the wear of the shaft, the plugs are dressed to permit of the proper movement, the beveled sides insuring a steam tight joint.

The shaft 22 extends beyond the sides of the cylinder and is provided with a crank, or other mechanism, for the transmission of power, and has keyed to it, contiguous to the cylinder, an eccentric 30 operatively connected to the arm 15 of the rock bar whereby its rotation imparts reciprocatory motion to the regulating valve within the steam chest for the purpose described.

In order to overcome the back pressure in the cylinder, thereby reducing the resistance

of the piston to the propelling agent, I provide auxiliary exhaust ports 31 and 32 in the cylinder, which are opened by the movement of the piston at or near the farthest limit of its movement. The steam exhausting through one of these ports as soon as it has completed its office reduces the back pressure to the minimum before the port is closed by the reverse movement.

10 The operation of my device is as follows: Steam being admitted into the steam chest from the supply pipe, and the ports being in the position illustrated in Fig. 3, the steam passes through the port 7 into the cylinder behind the piston driving it toward the opposite end of the cylinder and rotating the shaft, the eccentric actuating the rock bar and reciprocating the valve therethrough to admit the steam to the cylinder in front of and behind the piston.

I do not desire to limit myself to the details of construction herein described, but reserve to myself the right to vary them at will within the scope of my invention.

25 What I claim is—

1. In an engine, the combination with a cylinder, valve, slotted piston, diametrical shaft

provided with a crank adapted to move within the slot of the piston and mechanism connecting the shaft and valve, of elongated apertures in the sides of the cylinder of a size sufficient to permit of the removal of the shaft and having converging sides and bottom, a plug having its sides and bottom correlatively wedge shaped and provided with a bearing recess at its upper end, and mechanism adapted to urge the plug laterally and longitudinally to compensate for wear, substantially as specified.

2. The combination with a cylinder, piston, and rotary shaft, of bearings in the walls of the cylinder consisting of an elongated aperture having converging sides, and a plug correlatively wedge shaped, the ends of the apertures and plugs being recessed for the reception of the shaft, and means for urging the plug to compensate for wear, substantially as specified.

In testimony of all which I have hereunto subscribed my name.

ROBERT B. DAVIS.

Witnesses:

W. J. HAMOR,

GEO. T. JACOBS.