

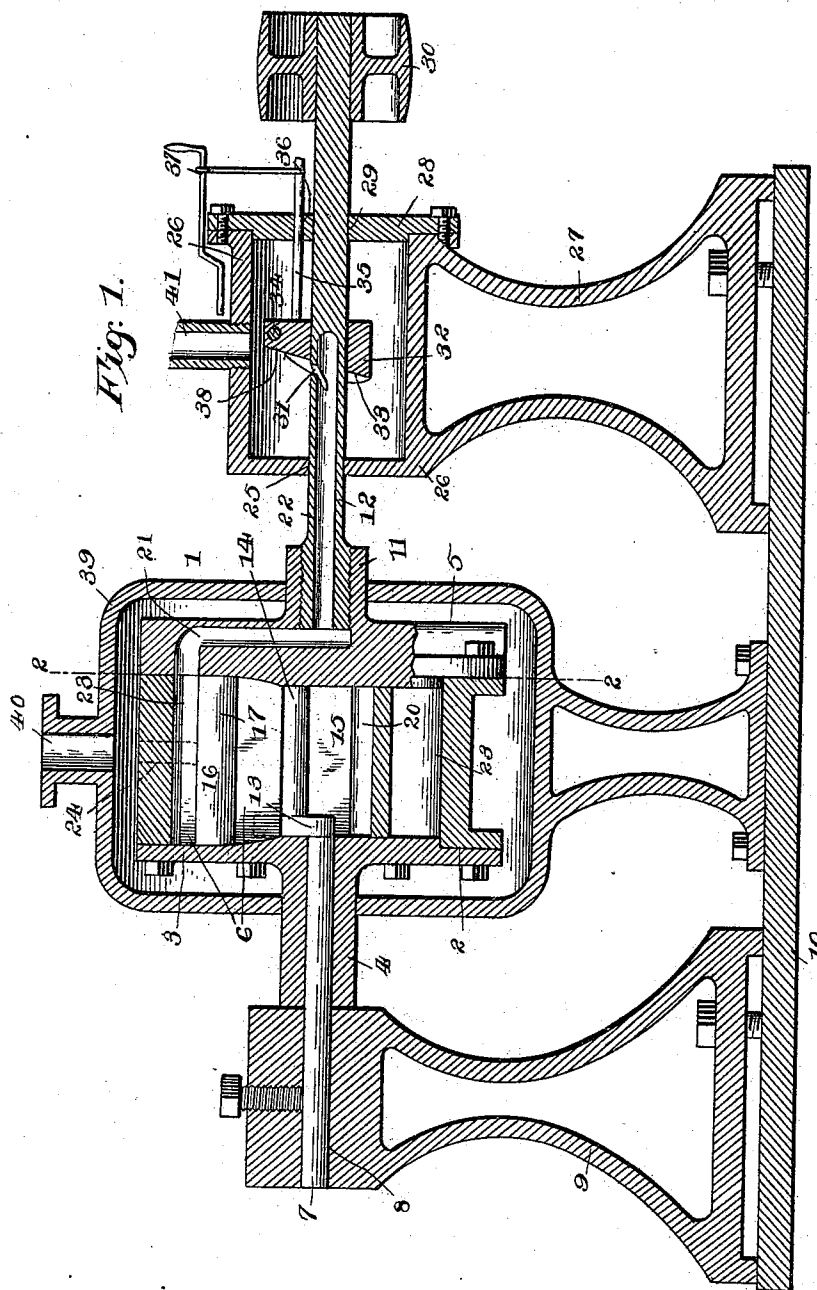
(No Model.)

3 Sheets—Sheet 1.

H. STAUB.
ROTARY STEAM ENGINE.

No. 530,908.

Patented Dec. 11, 1894.



Inventor

Henry Staub,

Witnesses

C. Ford
O. S. Wolfe

By his Attorneys,

C. A. Snow & Co.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 4.

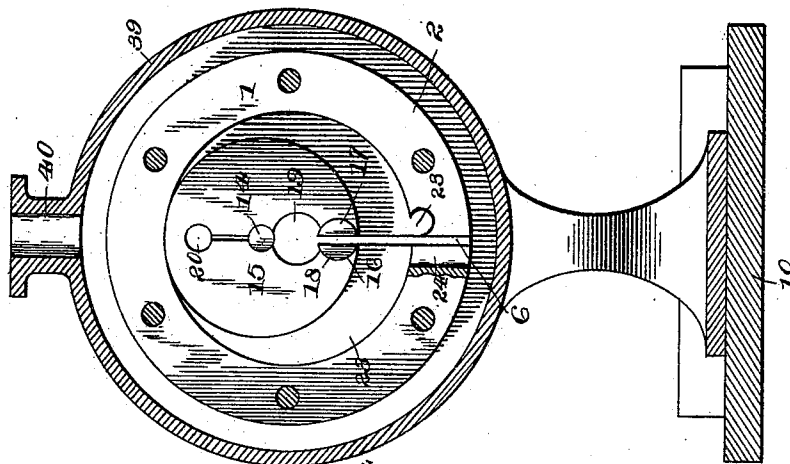


Fig. 3.

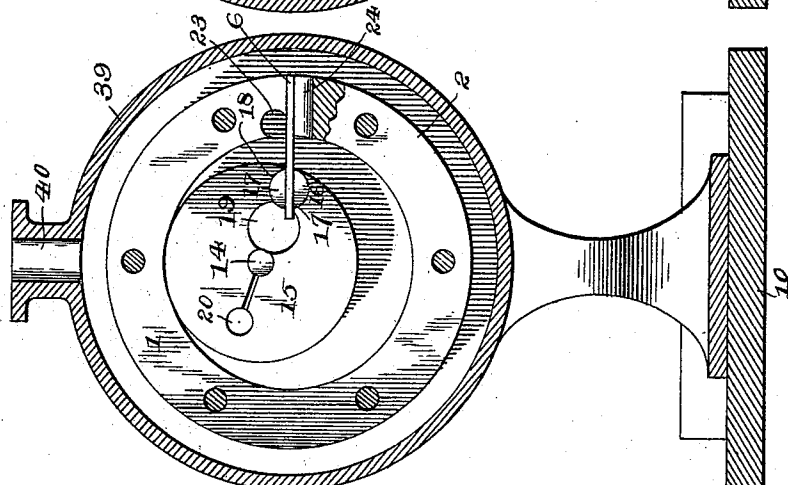
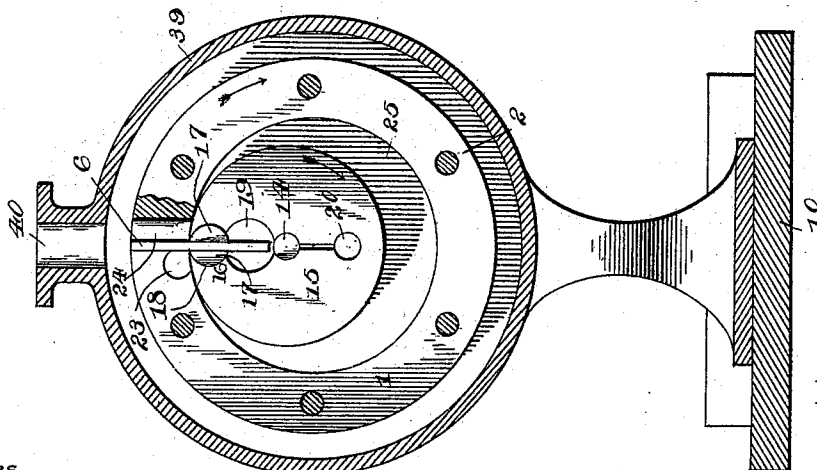


Fig. 2.



Inventor

Witnesses

Chas. Ford
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By his Attorneys.

Henry Staub,

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(No Model.)

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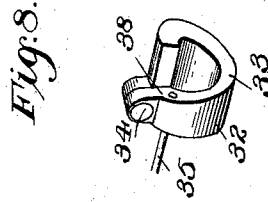
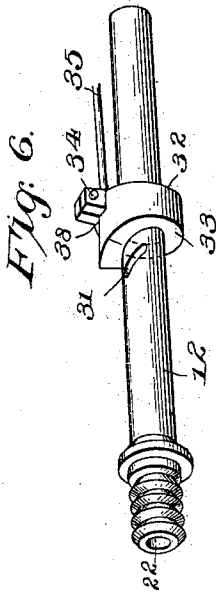


Fig. 7.

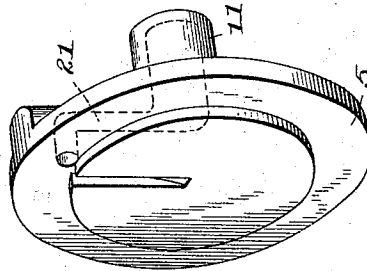
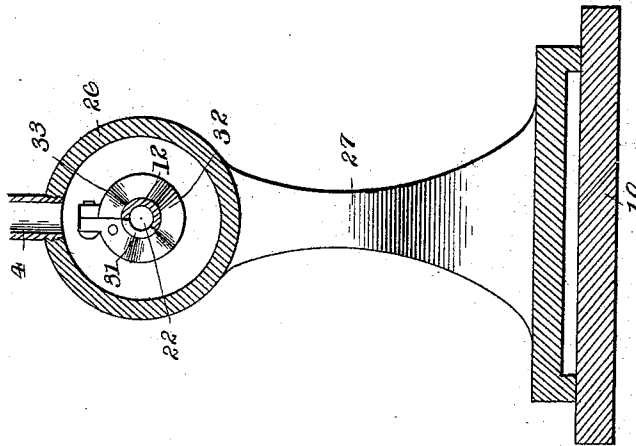


Fig. 5.



Witnesses

C. A. Ford,
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By his Attorneys.

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Inventor
Henry Staub,

UNITED STATES PATENT OFFICE.

HENRY STAUB, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH
TO GUSTAV PEYER, OF SAME PLACE.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 530,908, dated December 11, 1894.

Application filed June 4, 1894. Serial No. 513,461. (No model.)

To all whom it may concern:

Be it known that I, HENRY STAUB, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Rotary Steam-Engine, of which the following is a specification.

My invention relates to rotary steam engines of the class known as "eccentric piston;" and it has for its object to provide a construction involving the minimum friction between the co-operating parts, whereby the maximum speed with a given pressure may be attained.

In carrying out my invention I employ a rotary cylinder arranged concentric with the driven shaft and an inclosed core arranged upon an eccentric spindle and rotating synchronously with the cylinder, said core being in contact at one point with the inner wall or bore of the cylinder to form a fixed abutment, and a wing or web carried by the cylinder and slidably swiveled in the core forming the movable abutment. The steam-inlet is arranged axially with relation to the cylinder, and is preferably formed by a bore in the driven-shaft, the inlet opening being controlled by a suitable valve mechanism to admit steam continuously or at intervals, as may be required.

In the course of the following description various objects and advantages of the invention will appear, and the novel features of the construction are particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a longitudinal central section of an engine embodying my invention. Fig. 2 is a transverse section on the line 2—2 of Fig. 1, with the cap-plate of the cylinder omitted, and showing the cylinder and core in their initial positions. Fig. 3 is a similar view, showing the cylinder and core at the quarter-revolution. Fig. 4 is a similar view, showing the cylinder and core at the half-revolution. Fig. 5 is a transverse section of the steam-chest. Fig. 6 is a detail view in perspective of a portion of the driven-shaft showing the steam-inlet port and the controlling-valve. Fig. 7 is an inner face view of the removable cap of the cylinder, and showing in dotted lines the radial channel

communicating with the axial steam-inlet pipe, whereby the steam is conveyed to the transverse steam-duct in the cylinder. Fig. 8 is a detail view in perspective of the controlling valve.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates the rotary cylinder, comprising the ring 2, the rear plate 3, having a concentric sleeve 4, and the face-plate 5, said ring being divided at one side in the construction illustrated in the drawings for the reception of a radial wing 6, which, as herein- after more fully explained, forms the movable abutment. The sleeve 4 is mounted upon a spindle 7 secured in a bearing 8 in the standard 9, which may be secured to a base-plate 10, and the front cap-plate 5 is also provided with a sleeve 11 secured to the driven-shaft 12. The spindle 7 is provided at the inner side of the cap 3 with a collar 13, and beyond the said collar with an eccentric journal 14, upon which is revolubly mounted the core 15. The inner end of the radial wing 6 is swiveled in the side of the core by means of a rocker 16 formed in separable parts or members 17 having flat inner surfaces in contact with the wing and convexed outer surfaces to fit in a cylindrical seat 18 arranged longitudinally near the surface of the core. A cavity 19 is formed in and communicates with this seat to allow free movement of the extremity of the wing when the core and cylinder are approaching or leaving their initial position, as shown in Figs. 2 and 3.

The radius of the core is such as to cause the surface of the latter to bear at one point against the inner wall or bore of the cylinder, as will be seen by a comparison of Figs. 2, 3 and 4, whereby the inner wall of the cylinder is arranged at a tangent to the core, and a cavity 20 may be and preferably is formed in the core opposite the above described seat to avoid irregular movement of the core.

The front cap 4 is provided with a radial channel 21, which communicates at its inner end with the bore 22 in the driven shaft, said bore 22 forming the axial steam-inlet pipe and communicating at its outer end with a transverse steam-chamber 23, which is formed in

the inner surface of the wall of the cylinder contiguous to the plane of the above described radial wing. The steam-exhaust port 24 is formed in the wall of the cylinder on the opposite side of said wing and adjacent thereto.

The driven shaft is mounted in a bearing 25 in one end of the steam-chest 26, said steam-chest being mounted upon a suitable standard 27, which is secured to the above mentioned base; and the other end of the steam-chest is closed by a removable cap 28, also provided with a bearing 29 for the driven shaft, as shown clearly in Fig. 1. A pulley 30 or other means for communicating power to the machinery to be driven, is secured to the exterior portion of the driven shaft.

The steam-inlet pipe, which in this case is formed as above described in the driven shaft, is provided with an inlet-port 31 arranged spirally, and slidably mounted upon this pipe is a controlling valve 32 having a spiral face 33. The valve is preferably split and provided at its extremities with an adjusting-screw 34, whereby it may be adjusted to the size of the pipe to take up lost motion by wear or otherwise, and the valve is further provided with an operating stem 35, which extends through a guide-opening 36 in the removable cap of the steam-chest, and may be provided with any suitable operating mechanism, as a system of levers, shown at 37. It will be seen that the valve remains stationary during the rotation of the inlet-pipe or driven shaft, and therefore owing to the spiral face thereof it is obvious that according to the position of the valve the inlet-port may be closed entirely or allowed to remain permanently open, or may be opened and closed at longer or shorter intervals, as preferred. If the annular portion of the valve is arranged in alignment with the inlet-port, said port will remain permanently closed, and if the valve is withdrawn so that the rotation of the shaft does not bring the port under any part of the valve, said port will remain permanently open; but if, on the other hand, the valve is arranged at an intermediate position the port will be carried under a portion of the valve at each revolution and therefore the port will be alternately opened and closed and the intervals of opening and closing will be varied according to the relative position of the valve. The narrow portion 38 of the valve is arranged at such a point as to admit the full head of steam when the valve is open, as the cylinder and core reach their initial position, as shown in Fig. 2.

From the above description it will be seen that the cylinder and core rotate in the same direction and synchronously by reason of the radially disposed wing, and that with the parts in the positions shown in Fig. 2 when steam is admitted it enters the transverse steam-chamber in the wall of the cylinder and imparts motion in the direction indicated by the arrows in said Fig. 2.

It will be seen that the contacting surfaces

of the the core and cylinder form a fixed abutment, because said cylinder and core cannot be moved laterally and the wing forms the moving abutment and therefore imparts rotary movement to the said parts.

The above described construction, including the cylinder and contained core, are arranged in a casing 39 having a steam-outlet 40, and the steam-chest is provided with a steam-inlet 41.

From the above description it is obvious that the number of contacting movable parts is small, and the major portion of the friction is caused between the wing and the rocker arranged in the core, this being a sliding connection. The friction between the surface of the core and the walls of the cylinder is small, for the reason that said parts move in the same direction and at approximately the same speed, the relative positions of the cylinder and the core remaining the same throughout the revolutions of said parts.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

Having described my invention, what I claim is—

1. In a rotary engine, the combination with a casing, a driven-shaft, a rotary cylinder fixed to the driven shaft, a rotary eccentric core arranged in the cylinder in contact with one side thereof, and a wing carried by the cylinder and connected to the core, whereby motion is communicated from the cylinder to the core, of a steam-inlet channel arranged concentric with the cylinder and communicating by a radial passage with an inlet-port in the wall of the cylinder, substantially as specified.

2. In a rotary engine, the combination of a casing, a driven-shaft provided with an axial steam-inlet channel, a valve for controlling the inlet of steam, a cylinder concentric with and carried by the driven-shaft, a rotary eccentric core mounted within the cylinder and in contact at one side with the inner surface thereof, and a wing carried by the cylinder and connected to the core, substantially as specified.

3. In a rotary engine, the combination of a casing, a rotary cylinder having concentric sleeves mounted in bearings in opposite sides of the casing, a fixed spindle arranged in the sleeve at one side of the cylinder and provided within the cylinder with an off-set or eccentric journal, a core mounted upon said eccentric journal, a wing carried by the cylinder and connected to the core, a tubular driven shaft secured in the sleeve at the opposite side of the cylinder, the bore of said shaft communicating with a steam passage leading to a port in the cylinder, and a valve for controlling an opening communicating with the bore of the shaft, substantially as specified.

4. The combination with a driven shaft, of

a concentric revoluble cylinder, a core arranged eccentrically within the cylinder, a wing connecting said cylinder and core, a steam-chamber and an exhaust-port arranged respectively upon opposite sides of and contiguous to the plane of said wing, a steam-inlet pipe connected to and co-axial with the cylinder and having a lateral port, and a non-rotatable controlling valve encircling and slidably mounted upon said inlet-pipe and having a spiral face to vary the intervals of the admission and cut-off of the steam, substantially as specified.

5. The combination of a rotary cylinder, an eccentric contained core, a wing connecting said core and cylinder, a steam-chamber and exhaust-port arranged respectively upon opposite sides of the plane of said wing, a bored

driven shaft forming a steam-inlet pipe arranged concentric with the cylinder and communicating by a radial channel with said steam-chamber in the cylinder, a steam-chest concentric with said driven shaft, an inlet port formed in the side of the driven shaft and communicating with its bore, a non-rotatable controlling valve slidably mounted on the driven shaft within the steam-chest, and means for operating said valve, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HENRY STAUB.

Witnesses:

JOHN LINDER,
JOHN BENDER.