

C. PENCE.
 ROTARY STEAM ENGINE.
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995,173.

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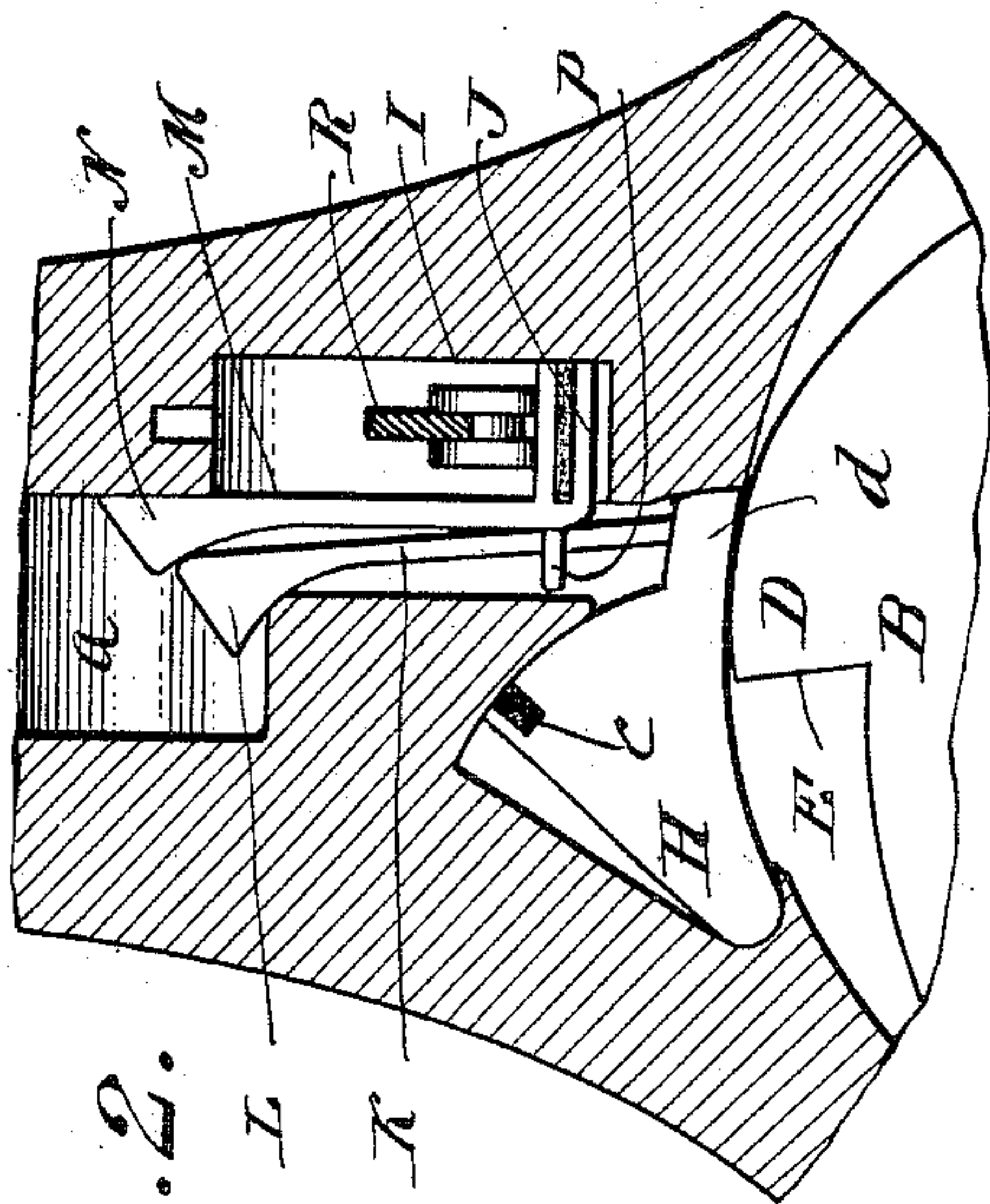


Fig. 2.

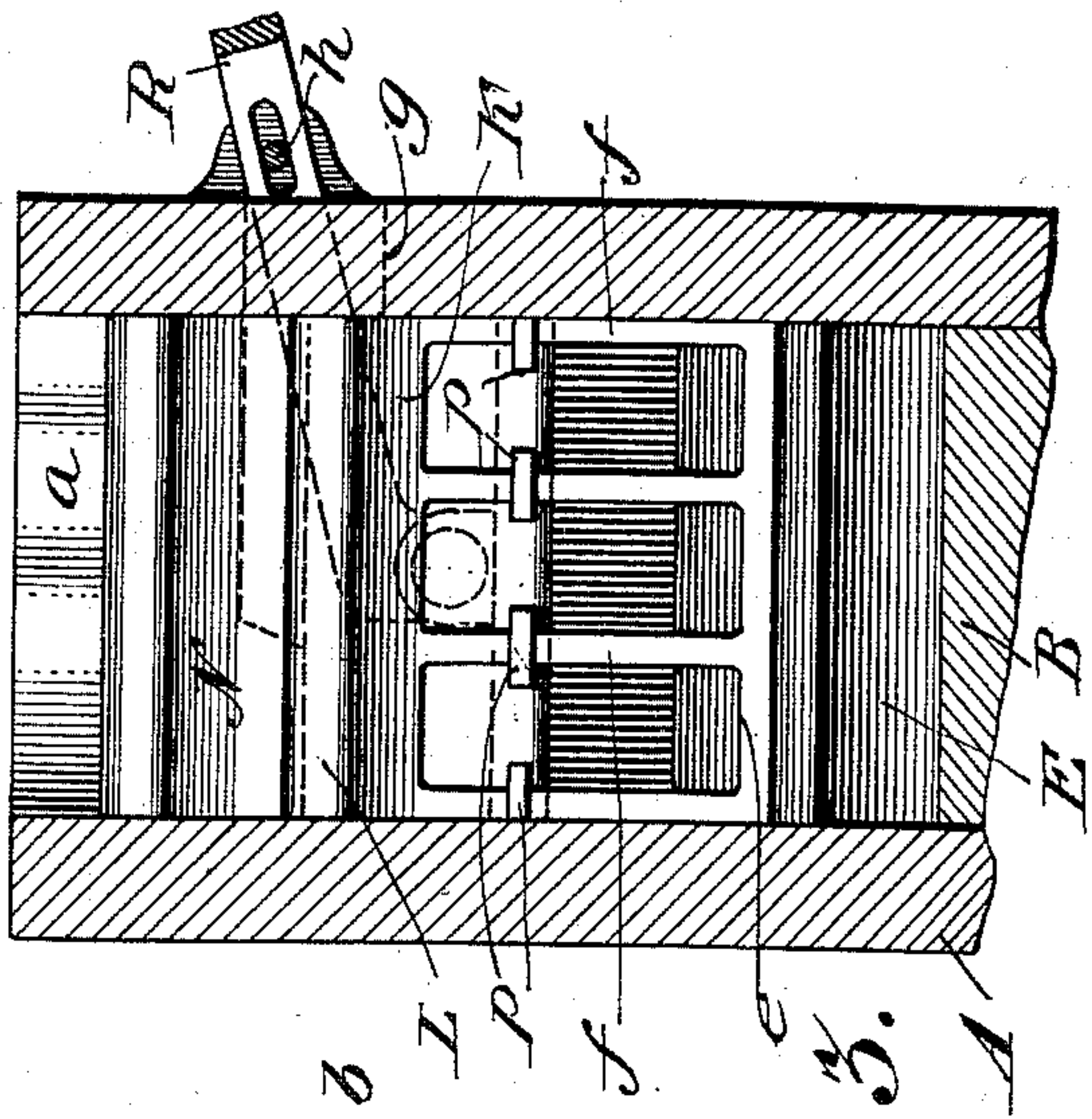


Fig. 3.

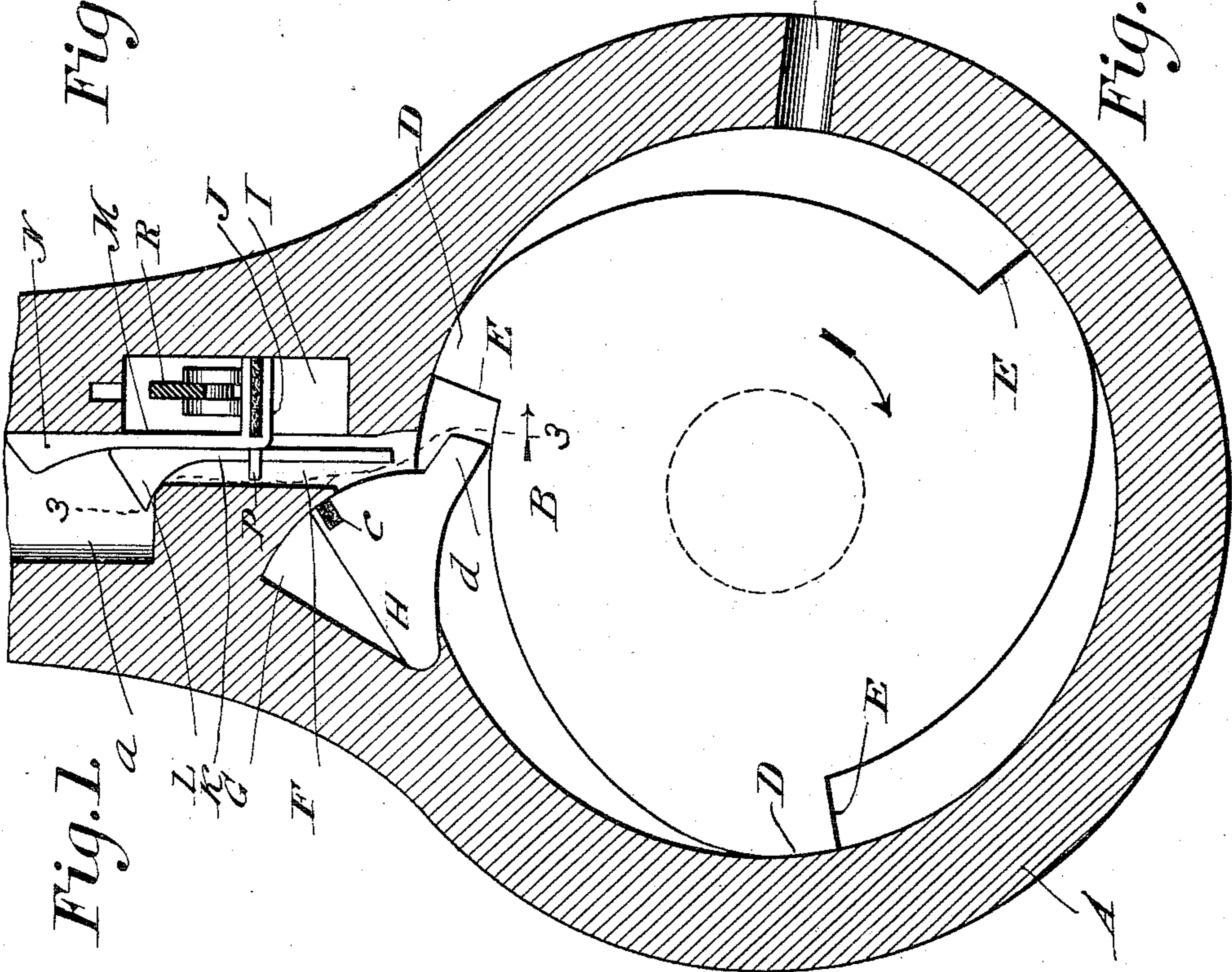


Fig. 1.

WITNESSES

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ROTARY STEAM-ENGINE.

995,173.

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To all whom it may concern:

Be it known that I, CHARLES PENCE, citizen of the United States, residing at North Manchester, in the county of Wabash and State of Indiana, have invented new and useful Improvements in Rotary Steam-Engines, of which the following is a specification.

My present invention pertains to steam engines of the rotary type, and more particularly to means for governing the admission of steam and regulating the speed of the piston; and its novelty, utility and practical advantages will be fully understood from the following description and claims when the same are read in connection with the drawings accompanying and forming part of this specification, in which:

Figure 1 is a view, partly in section and partly in elevation, of so much of a rotary steam engine as is necessary to illustrate the best practical embodiment of my invention that I have as yet devised. Fig. 2 is a detail vertical section illustrating the working parts in different positions from those shown in Fig. 1. Fig. 3 is a detail vertical section taken on the line 3—3 of Fig. 1, looking in the direction indicated by arrow.

Similar letters designate corresponding parts in all of the views of the drawings, referring to which:

A is the engine casing, provided at *a* with an inlet for steam, and at *b* with an exhaust port; and B is the rotary piston, fixed to a suitably mounted shaft, shown by dotted lines in Fig. 1, and provided with peripheral cams D and abrupt shoulders E, each arranged in rear of one of the said cams with reference to the arrow-indicated direction in which the piston is designed to be rotated.

Intermediate the steam inlet port *a* and the piston cylinder of the casing A is a passage F for steam, and at the rear side of said passage, with reference to the direction of rotation of the piston, is a chamber G in which is arranged a swinging abutment H, suitably packed at *c* and provided with a forward extension *d*, designed to cooperate with the cams D of piston B. At the opposite side of the passage F with respect to the chamber G is a chamber I, and in the said chamber is arranged a rectilinearly-movable and suitably-packed slide block J, while in the passage F is arranged the comparatively thin stem K of the valve L. The said stem

K is necessarily of open-work character and is preferably of the form shown in Fig. 3—*i. e.*, provided with a plurality of large openings *e* and vertical portions *f* at the sides of the same. The valve L is of the downwardly-tapered form, and is arranged as shown relative to the stem K for reasons hereinafter set forth.

Carried by the slide block J and opposed to the valve L and the depending stem K thereof is an upstanding imperforate portion M having a tapered enlargement N at its upper end, and on the inner portion of the said slide block J are eyes P which loosely receive the vertical portions *f* of the valve stem K. Suitably connected to the upper side of the slide block J is a lever R which extends at *g*, Fig. 3, through the casing, is fulcrumed at *h* on the casing, and is designed to be operated by hand or by a conventional or other suitable governor actuated from the shaft C. The said governor *per se* constitutes no part of my present invention, and I have therefore deemed it unnecessary to illustrate the same.

In the practical operation of my novel engine, the throttle valve (not shown) is opened to admit steam from a source of supply to the inlet *a*, and the piston is turned (by hand power applied to the usual fly wheel), whereupon one of the piston cams D will raise the abutment H, and said abutment H, in turn, will raise the valve L and thereby admit steam from the inlet *a* to the passage F, the chamber I and the cylinder space between the abutment H and the next forward shoulder E of the piston, and start the engine. With the engine started, the operation described will be repeated incidental to the passage of each cam D of the piston below the abutment extension *d*; the raising of the valve L permitting steam to enter the passage F and chamber I, which steam, after the abutment assumes the position shown in Fig. 1 and the valve L is closed by the pressure back of it, expands in the passage F, chamber I and cylinder space between the abutment H and the next forward shoulder E until the shoulder over-runs the port *b* when the steam will exhaust through the said port. When the slide block J carrying the imperforate plate M is lowered manually or by the operation of the governor mentioned, the size of the chamber I is diminished and less steam is admitted from the inlet *a*, when

the abutment H and valve L are raised, and consequently less power is exerted against the piston when the abutment H and valve L assume the positions shown in Fig. 1. On the other hand when the slide block J is raised, the pressure exerted against the piston will be increased, this because the raising of the slide block will increase the size of the chamber I and will permit a greater volume of steam to enter from the inlet α when the abutment H and valve L are raised.

By reason of the tapered enlargement N at the upper end of the imperforate plate M, the valve L is enabled when raised to press the plate M tight against the opposed wall of the inlet α , and thereby prevent steam from entering the chamber above the slide block. It will also be observed that when the slide block J is lowered as shown in Fig. 2, the tapered enlargement N will be wedged between one wall of the inlet α and the valve L, and hence will hold the valve in a partly closed position and will prevent steam from entering the passage F and chamber I until the slide block J is raised.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. In a rotary steam engine, the combination of a casing having a piston cylinder and an exhaust port leading therefrom and also having a steam inlet, a passage intermediate said inlet and the cylinder, a chamber in rear of the inner portion of said passage, and a chamber arranged at the opposite side of the passage with reference to the first-named chamber; a swinging abutment movable in the first-named chamber of the casing and having a forward extension, a rotary piston arranged in the cylinder of the casing and having peripheral cams and

abrupt shoulders in rear of the same; a tapered valve adapted to seat at the outer end of the said passage in the casing and having an open-work stem disposed in said passage in position to be engaged by the extension of the abutment; a regulating slide block movable in the second-named chamber of the casing and having eyes receiving portions of the valve stem and also having an imperforate portion arranged between said chamber and the valve and a tapered portion extending outward beyond and adapted to cooperate with the valve, and means for moving said slide block.

2. In a rotary steam engine, the combination of a casing having a piston cylinder and an exhaust port leading therefrom and also having a steam inlet, a passage intermediate said inlet and the cylinder, a chamber in rear of the inner portion of said passage, and a chamber arranged at the opposite side of the passage with reference to the first-named chamber; a swinging abutment movable in the first-named chamber of the casing; a rotary piston arranged in the cylinder of the casing and having peripheral cams; a valve adapted to seat at the outer end of said passage in the casing and having a stem disposed in the passage in position to be engaged by the abutment; a regulating slide block movable in the second-named chamber of the casing and having a portion extending outward beyond and adapted to cooperate with the valve, and means for moving said slide block.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES PENCE.

Witnesses:

CHAS. F. MILLER,
ELLIOTT MILLER.