

Colman & Turton,
Rotary Steam Engine.
Nº 15,281. Patented July 8, 1856.

Fig. 1.

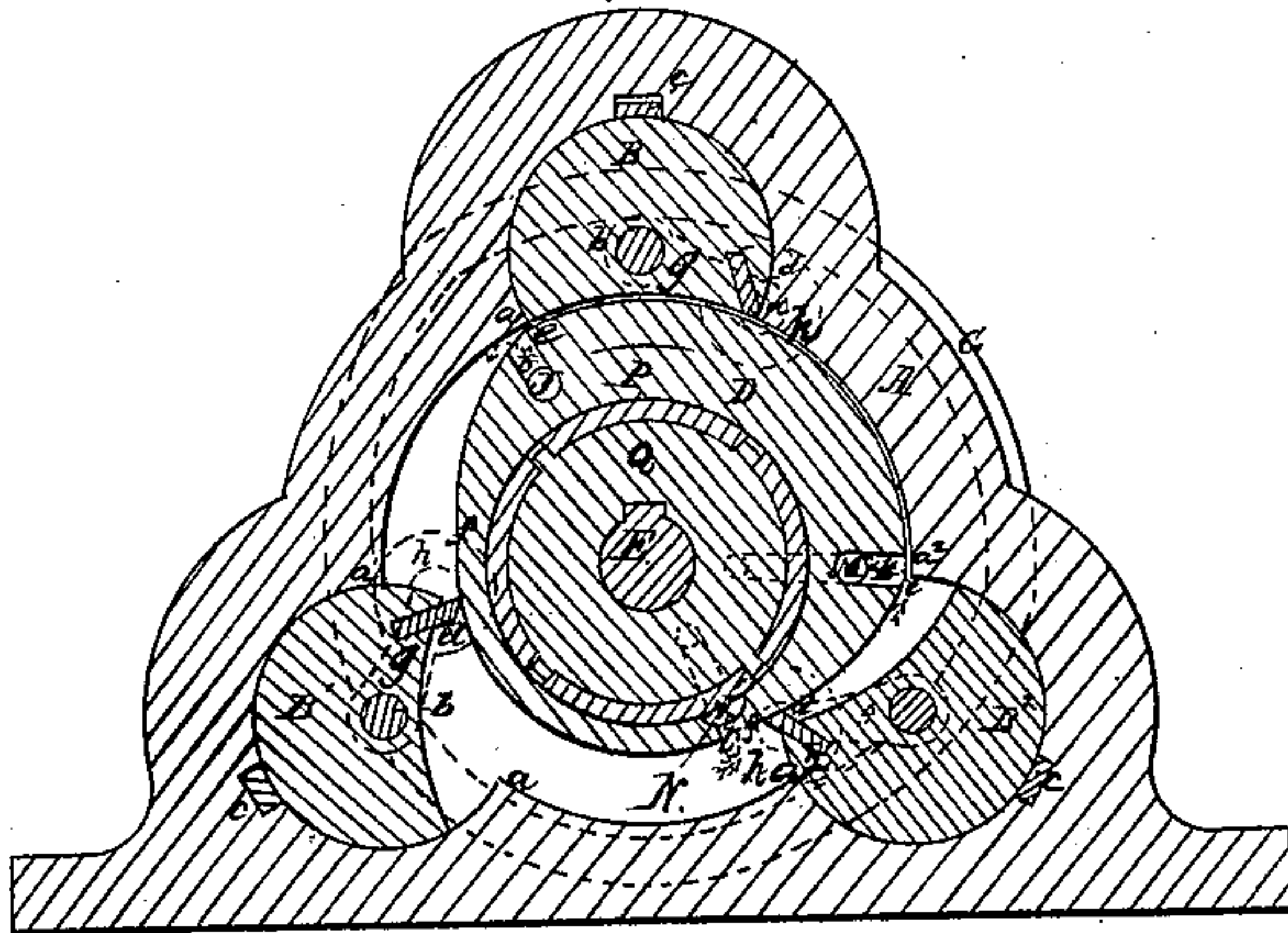


Fig. 2.

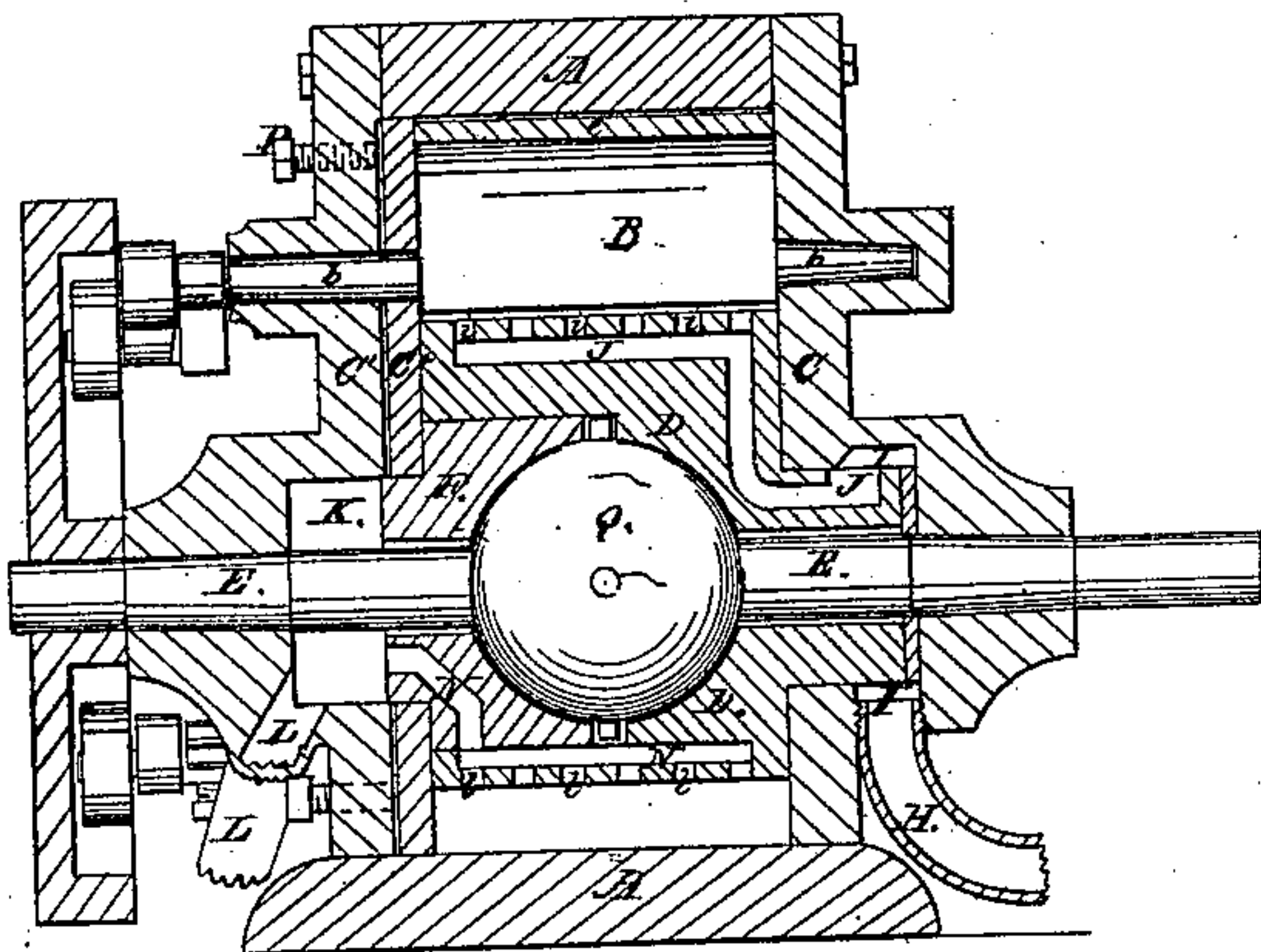
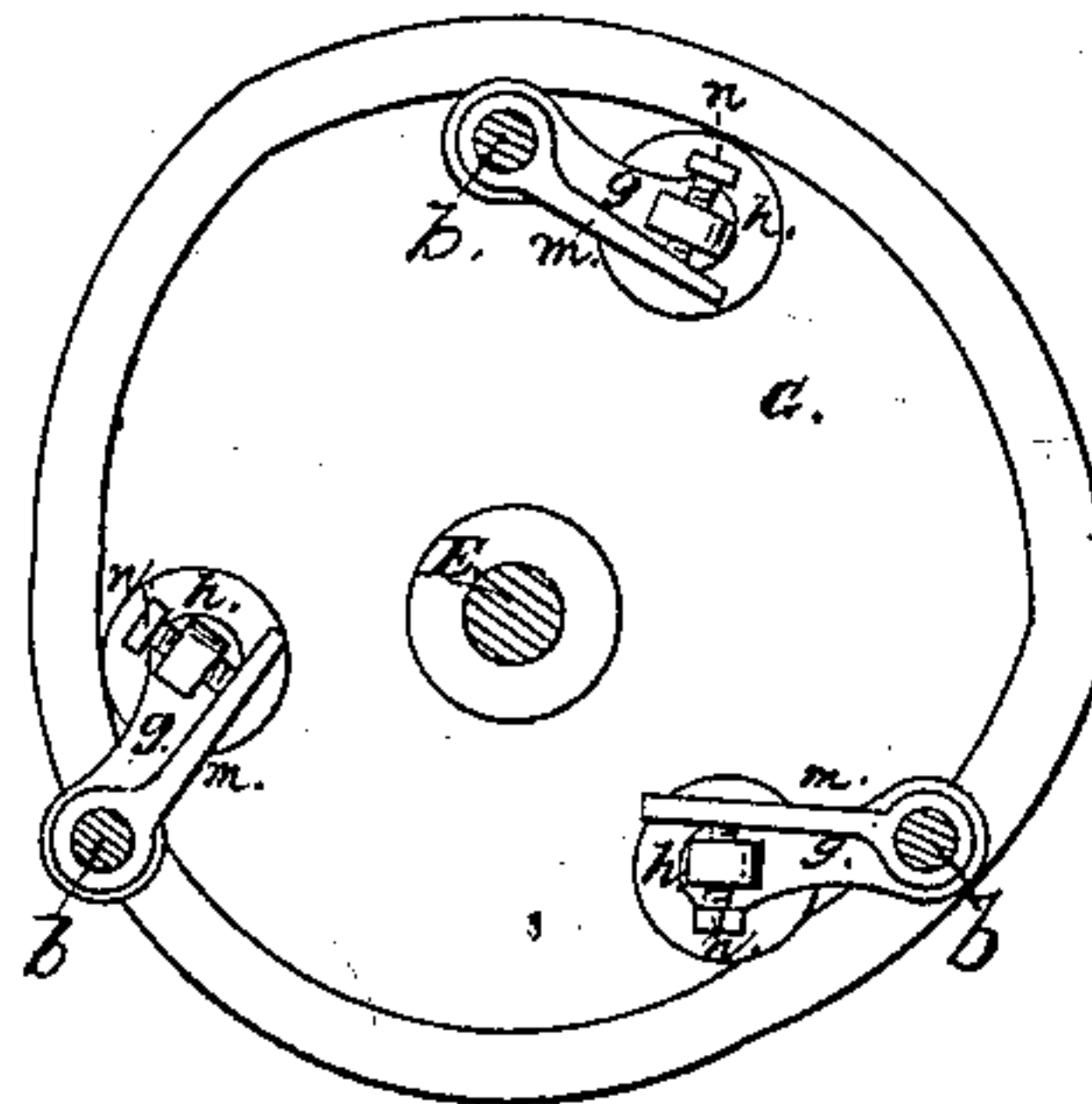


Fig. 3.



UNITED STATES PATENT OFFICE.

J. M. COLMAN AND T. TURTON, OF MILWAUKEE, WISCONSIN.

ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 15,281, dated July 8, 1856.

To all whom it may concern:

Be it known that we, JAMES M. COLMAN and THOMAS TURTON, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and Improved Rotary Engine to be Impelled by Steam or other Fluid; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a vertical section of a rotary steam engine constructed according to our invention, taken in a plane perpendicular to the axis. Fig. 2, is a vertical section of the same in a plane passing through the axis. Fig. 3, is a face view of the cam, by which the oscillating abutments are operated.

Similar letters of reference indicate corresponding parts in the several figures.

A, is the cylinder of the engine which is bored truly, but has cavities a, a, a^1, a^1 and a^2, a^2 , formed in its interior to constitute seats for three oscillating abutments, B, B¹, B², said seats being severally of cylindrical form and struck from equidistant axes parallel with the axis of the cylinder and said axes standing beyond or outside of the inner periphery of the cylinder. The oscillating abutments are severally of the form of their seats, consisting each of a cylinder with a portion cut out by an arc described from the center of the cylinder A, to form a concave, so that when in one position, as shown by B, Fig. 1, it exactly fills the seat and forms a solid continuation of the interior of the cylinder. These abutments are precisely of the same length as the interior of the cylinder and are provided with central journals b, b , which fit in suitable bearings provided for them in the cylinder heads C, C¹, and they are faced at one end to fit to the interior of the cylinder head C, and at the other to fit an adjustable head C* which fits to the interior cylinder and abutment seats, within the head C¹. The seat of each abutment is provided with a spring packing piece c , fitting to the cylindrical portion of the abutment, to prevent steam passing around the abutment and through the seat, and each abutment has a packing piece, d , fitted to a cavity formed in its concave face near where the said face unites with the cylindrical part which fits the seat.

D, is the rotary piston of the engine, a portion of whose periphery or perimeter, e ,

e^1 Fig. 1, constitutes a part of a cylinder to fit the bored interior of the cylinder A, while an opposite portion f, f , constitutes a part of a smaller cylinder and these two cylindrical portions are united by easy regular curves e, f , and e^1, f , which are struck each from a separate center at any convenient distance from the axis of the piston. The piston, it will thus be seen is struck from three centers. The length of the curve or arc e, e , is equal to the length of the face of one abutment and of the space between that and the next one, as will be seen by reference to Fig. 1. The curve or arc f, f , is a corresponding portion of a circle, though of less length, as allowance has to be made for its smaller radius. The rotary piston is faced at its ends to fit up to the interior of the cylinder heads C and C*, and is secured to a shaft E, which is fitted to work in bearings in the cylinder heads, C, C¹. One end of the shaft E, carries the hollow cam G, which is shown in Fig. 3, and also in dotted outline in Fig. 1, the interior of which cam corresponds in form exactly with the periphery or perimeter of the rotary piston though it may be larger than the piston, as is shown in Fig. 1. Each of the oscillating abutments has attached to one of its journals outside the cylinder, an arm g , carrying a roller h , to bear against the inner periphery of the cam, and the cam is so arranged on the shaft E, relatively to the piston, and the arms g, g, g , are of such length relatively to the distances of the faces of the packing pieces d, d, d , from the centers of the abutments, that as the piston and cam rotate, the abutments are caused by the action of the cam on the rollers h, h, h , and arms g, g, g , to oscillate, so that the faces of the packing pieces d, d, d follow and keep it in close contact with the surface of the piston.

I, is the induction steam chamber consisting of an annular cavity formed in the cylinder head C, around a hub at one end of the piston.

H is the steam pipe coming from the boiler to the chamber I.

J, is a passage leading through the piston from the chamber I, as shown in Fig. 2, having a number of orifices i, i, i , opening in the periphery or perimeter of the piston at the point or longitudinal line e .

K, is the eduction steam chamber consisting of an annular cavity formed in the cylinder head C¹, around the shaft E.

L, is the education pipe leading from the chamber K.

M is a passage leading from the chamber K, through the piston and having a number
5 of orifices k, k , leading to the periphery or perimeter of the piston at the point e' .

N, is a passage similar to M, leading from the chamber K, through the piston and having a number of orifices l, l , leading to the
10 periphery or perimeter of the piston at the bottom of the curve e, f , the distance between the said orifices and those k, k being equal to the width of an abutment.

P, P, are set screws screwing through the
15 cylinder head C^1 , against the inner adjustable head C^* , to force the said head up close to the ends of the piston head and the abutments and force the piston head and abutments close up to the cylinder head C. The
20 head C^* being adjustable to compensate for the end wear of the piston and abutments in the cylinder enables all other packing to be dispensed with.

Q is a spherical head keyed or otherwise
25 firmly secured to the shaft E, to be received in a spherical cavity or seat made within the piston thus forming a ball and socket connection. The object of this is to enable the piston to adjust itself to the cylinder in
30 case of the shaft wearing itself out of line. To admit the spherical head, the piston requires to be made with a movable piece F, see Fig. 2, and half the seat of the spherical head Q, is made in the body D, of the piston
35 and the other half in the piece F. Provision is also made for keeping the whole length of the packing pieces d, d , of the abutments in close contact with the piston notwithstanding any want of parallelism be-
40 tween the cylinder, abutments and the piston, by making the backs of the packing pieces of arched form endwise so that they may be capable of rocking to a limited extent in the backs of the grooves in which
45 they are contained.

m, m, m , are springs firmly secured to the journals b, b, b , of the abutments close to the

arms g, g, g . The arms g, g, g , are loose on the journals and provided with set screws
50 n, n, n , which are screwed up against the springs m, m, m , to set the rollers h, h, h , out against the interior of the cam G. This arrangement enables the arms to be adjusted to compensate for the wear of the piston, the
55 abutment packing, the rollers and the cam.

The operation of the engine is illustrated in Fig. 1, and by the aid of that figure I will proceed to describe it. The steam entering the induction chamber I and passage J, constantly issues from the openings i, i , into the
60 cylinder, as shown by red arrows and acts between one of the abutments and the face, e, f , of the piston, thereby giving the piston a rotary motion in the direction of the black arrow. The steam which has already acted
65 and ceased to act upon the piston escapes through the passages k and l to the eduction chamber K, and, as indicated by other red arrows, to the pipe L. The abutments are
70 severally caused by the cam, in regular rotation, to assume a position corresponding to that of B, as represented in Fig. 1, as the prominent part e, e' , of the piston passes
75 them to move into the cylinder and the steam acts between each abutment and the piston, in turn.

What we claim as our invention and desire to secure by Letters Patent, is—

1. The engine composed of the rotary piston D, struck from three centers, as de-
80 scribed, and the three oscillating abutments, B, B^1 , B^2 , with packing pieces at one end of their concave faces, arranged and operating in connection with the piston in a cylinder A in the manner substantially as herein de-
85 scribed.

2. Fitting the rotary piston to its shaft with a ball and socket connection, substantially as and for the purpose set forth.

J. M. COLMAN.

THOMAS TURTON.

Witnesses:

ALBERT SMITH,
JAMES HARE, Jr.