(No Model.)

2 Sheets—Sheet 1.

H. E. MARCHAND.

MOTOR.

No. 293,895. Patented Feb. 19, 1884.

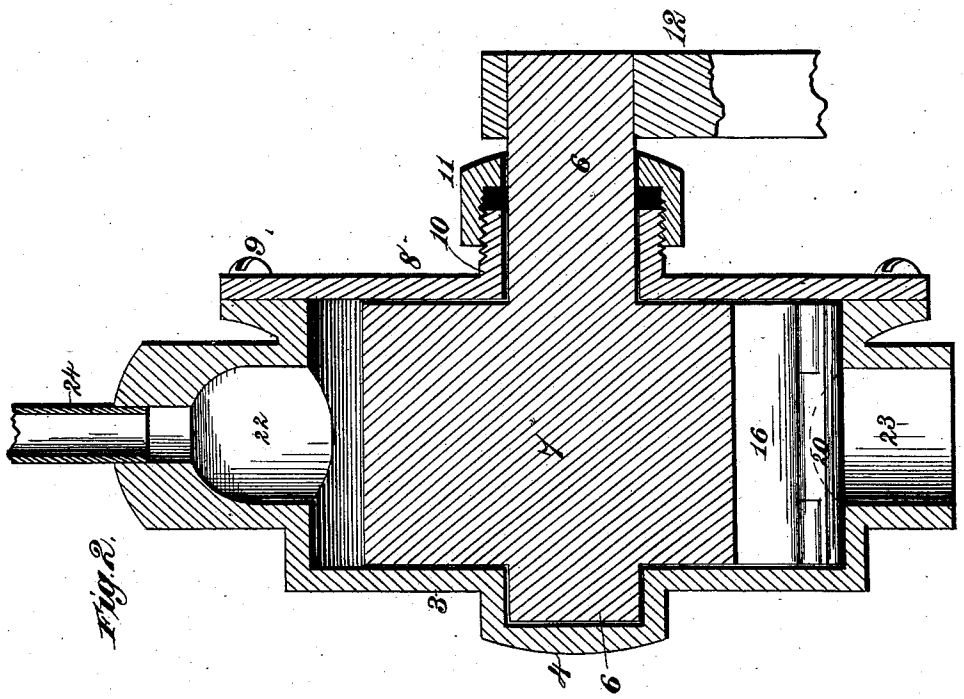


Fig. 2.

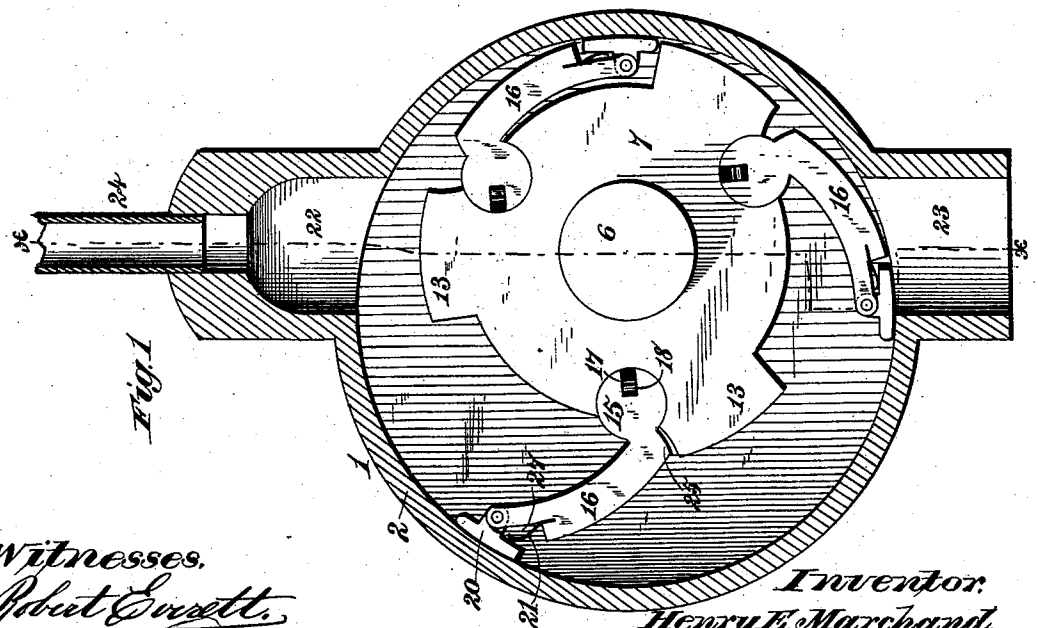


Fig. 1.

Witnesses.
Robert Ewsett.
J. A. Rutherford

Inventor.
Henry E. Marchand,
By James L. Norris.
Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

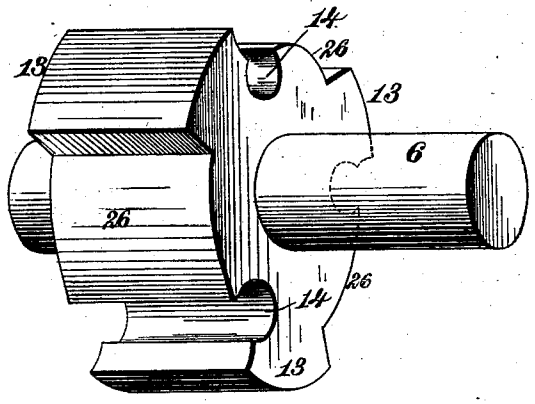
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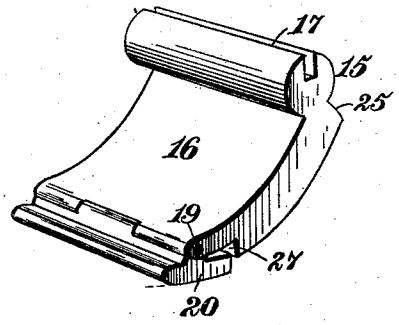
H. E. MARCHAND.

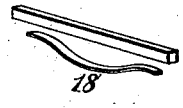
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Fig. 3.







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UNITED STATES PATENT OFFICE.

HENRY E. MARCHAND, OF ALLEGHENY CITY, PENNSYLVANIA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 293,895, dated February 19, 1884.

Application filed October 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. MARCHAND, a citizen of the United States, residing at Allegheny City, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Motors, of which the following is a specification.

This invention relates to improvements in motors driven by steam or water.

The invention consists in the novel construction and combination of devices hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal central sectional view of my improved apparatus; Fig. 2, a sectional view on the line *x x* of Fig. 1; and Fig. 3, detail views.

Referring to the drawings, the number 1 indicates a cylinder, the annular wall 2 of which is of uniform thickness, and is cast integral with a head, 3, having at one side of its center a lateral chamber, 4, which forms a housed or closed bearing for one end of the shaft or journal 6 of the piston-head 7, while the other cylinder-head, 8, is detachable and secured in place by bolts 9 or otherwise, said detachable head having a cylindrical or sleeve bearing, 10, provided at its outer end with a stuffing-box, 11. The piston-head is cast integral with its shaft or journal, and the latter is mounted in its bearings so that the piston-head is journaled eccentrically within the cylinder, the outer end of the shaft or journal projecting through the stuffing-box and provided with a crank-arm, 12. The piston-head is cut away to create three radial projections, 13, at one side of the base of each of which the head is formed with a cylindrical transverse socket, 14, to receive the cylindrical journal 15, formed at one end of the pistons or blades 16, said journals being attached by slipping them endwise or laterally into the cylindrical sockets, the cylinder-heads preventing their longitudinal displacement. The pistons or blades are curved in the arc of a circle to form segments, and the journal of each is provided with a longitudinal recess, 17, containing a curved or semi-elliptic spring-plate, 18, which serves to press a packing-strip of leather or other material against the wall of the cylindrical socket, thereby preserving a tight joint, and one which permits the piston to swing or oscillate as carried around by the piston-head, so that the outer pistons always remain in contact with the inner surface of the cylinder, while leakage of steam at the joint is prevented. To the outer end of each piston is swiveled by a pivot, 19, a shoe or block, 20, having its working-face turned to conform to the same circle as the cylinder, which shoes or blocks remain in contact with the cylinder at all times, and to the end portion of each piston is attached a flat spring, 21, the free end of which acts on the shoe or block to press it closely against the cylinder at certain periods, and thereby preserve a close joint between the two.

The cylinder is constructed with upper and lower ports, 22 and 23, at points in line with each other, and diametrically opposite the axis of the piston-head, such ports being thereby eccentric to the cylinder. If steam and water under pressure be admitted through the port 22, it will act on the inner faces of the pistons and carry them around, thus revolving the piston-head and actuating the crank-arm, the exhaust taking place through the port 23, as will be obvious; but if water or other fluid be allowed to flow into the port 23, and the crank-arm be actuated by hand or any suitable power to revolve the piston-head, the pistons will take up the fluid and force it to discharge through the port 22, whence it will be conveyed to the desired point by a pipe-connection, 24. The outward swinging movements of the pistons are limited by a heel, 25, formed at the base of each, which strikes the radial projections 13, and by the provision of the cut-away portions, which constitute segmental recesses 26 in the piston-head, the pistons can fold or turn into such recesses to permit the eccentrically-journaled piston-head to revolve.

By employing three swinging pistons of the character described, an easy and uniform motion is imparted to the piston-head, and one of the pistons always receives the entire force of the steam or water pressure.

It will be observed that the end of each piston is cut away to form a recess, 27, and that the springs 21 overhang such recesses, whereby when a piston begins to turn or fold into its recess 26 one end of the shoe or block will turn and enter the recess 27 and compress the free end of the spring, so that as the pis-

ton begins to move out of its recess 26 the spring will tend to throw the end of the shoe or block from the recess 27, whereby the shoe at such time is maintained or forced into close contact with the cylinder under all conditions. The pressure of the steam or water on the end of the shoe opposite where the spring acts will serve to maintain such end of the shoe in contact with the cylinder, so that a most perfect joint is preserved and leakage avoided.

It will be obvious that the interior of the cylinder describes a true circle, and the piston-head is eccentrically journaled therein, the ports being also eccentric and diametrically opposite the axis of the piston-head, while the oscillating pistons swing entirely out from the head, and the shoes always bear uniformly and squarely on the cylinder.

By making the cylinder a true circle interiorly and journaling the piston-head, as described, I avoid thickening the annular cylinder-wall or fixing therein a separate circular piece to make the interior eccentric to the piston-head where the latter is centrally mounted in the cylinder.

I am well aware that swinging pistons have been journaled to revolving piston-heads by means of cylindrical sockets in the head and cylindrical journals on the pistons; also, that pistons hinged to a revolving piston-head have been thrown outward against the cylinder by coiled springs, and also that a piston-plate has been arranged diametrically through a revolving drum, and having at each end a rocking packing-strip, which bears against the interior of the cylinder, and is pushed outward by a supporting-piece and a spring arranged in a recess at each end of the piston-plate. Such features, however, do not constitute my invention, and are not claimed by me.

Having thus described my invention, what I claim is—

1. The combination of the cylinder, the piston-head eccentrically journaled therein, and having cylindrical transverse sockets, and swinging pistons having cylindrical journals mounted in said sockets, and provided with longitudinal recesses, with the spring-plates arranged in said recesses, and the packing-strips arranged between the plates and the walls of the cylindrical sockets in the piston-head, substantially as described.

2. The combination of the cylinder, the piston-head eccentrically journaled therein, and constructed with radial projections 13, segmental recesses 26, and a transverse cylindrical socket at the base of each projection, the pistons having the cylindrical journals mounted in the sockets, and the packing-strips arranged in recesses in the journals of the pistons, to preserve a tight joint with the walls of the cylindrical sockets, substantially as described.

3. The combination of the cylinder, the rotating eccentrically-journaled piston-head, having transverse cylindrical sockets, the swinging pistons having cylindrical journals mounted in the sockets, and the shoes swiveled to the outer ends of the swinging pistons, substantially as described.

4. The combination of the cylinder, the piston-head, the oscillating pistons, and a hinged connection between the inner ends of the pistons and the piston-head, with the shoes swiveled to the outer ends of the pistons, and having their working-face turned to the circle of the cylinder, substantially as described.

5. The combination of the cylinder and the piston-head, the pistons swiveled to swing on said head in their travel around the cylinder, and having recesses at their outer ends, springs secured to said pistons, and shoes swiveled to the pistons, and adapted to turn at one end into the recesses of the pistons to compress the springs, substantially as described.

6. The combination of the cylinder and the eccentrically-journaled piston-head, having transverse cylindrical sockets, with the pistons, having at their inner ends cylindrical journals mounted to rock in the sockets, and shoes swiveled to the outer ends of the pistons, substantially as described.

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

HENRY E. MARCHAND.

Witnesses:
JAMES M. COOK,
WILLIAM A. DUNSHEE.