(No Model.)

# G. LENHARDT.

## ROTARY MOTOR.

No. 272,562. Patented Feb. 20, 1883.

Fig. 4

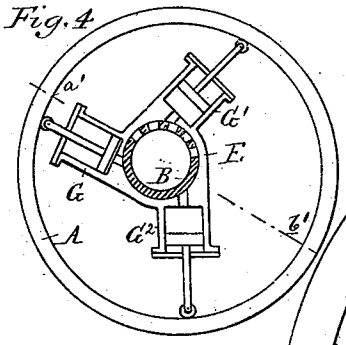



Fig. 1

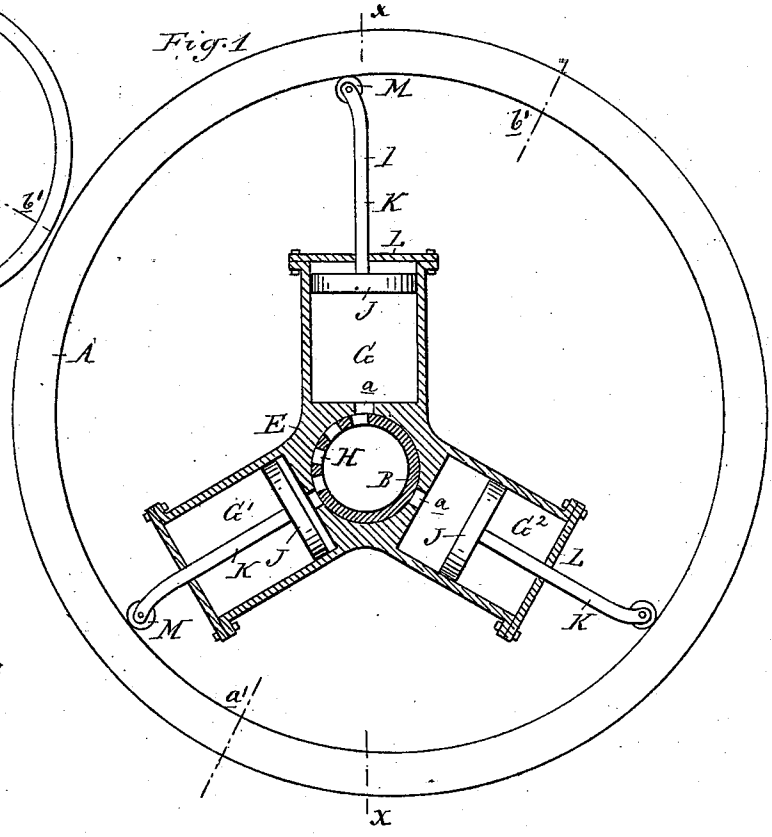



Fig. 2

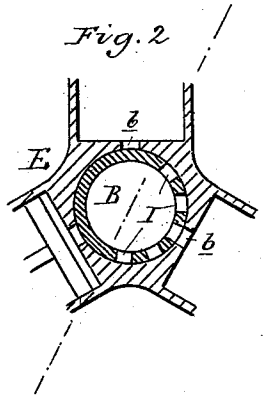
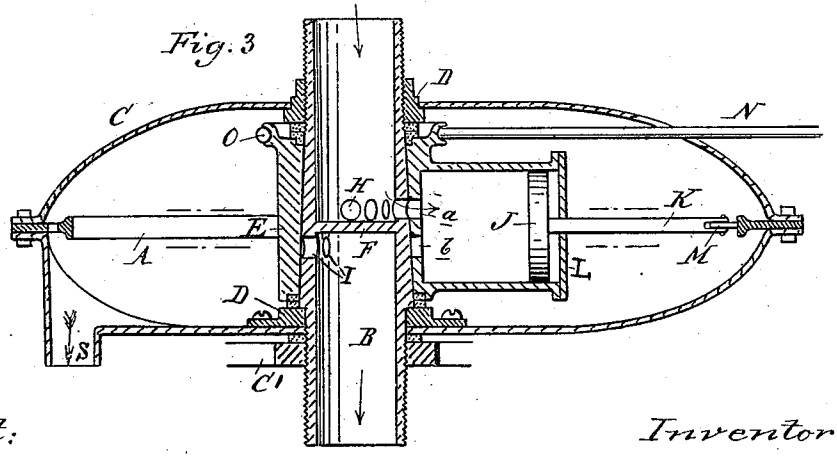



Fig. 3




Attest:

A. Bartpel

Inventor:

George Lenhardt

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# UNITED STATES PATENT OFFICE.

GEORGE LENHARDT, OF DETROIT, MICHIGAN.

## ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 272,562, dated February 20, 1883.

Application filed October 25, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE LENHARDT, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Rotary Motors; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to an improved rotary motor specially adapted for the development of power on a scale suited to domestic uses, and, although it may be constructed of any size and be impelled by water, steam, or compressed air, I prefer to operate it by means of a small stream of water, such as can conveniently be conveyed to and from the device.

The invention consists in the peculiar construction, combination, and operation of the parts, as more fully hereinafter described.

Figure 1 is a vertical central cross-section. Fig. 2 is a similar section on the line of the exit parts. Fig. 3 is a horizontal central cross-section on the line of *x x* in Fig. 1; and Fig. 4 is a modified form of my rotary motor.

In the accompanying drawings, which form a part of this specification, A represents a circular track secured eccentrically with respect to the axis of the spindle B and supported by the shell C and bracket C′. This spindle itself, or the bracket, may be secured in any suitable way to the device to be driven, or in a position near the same, so that the spindle and track are held firmly and rigidly in position. In the drawings a shell is shown as being preferable to the brackets for supporting the track in case water or steam is used as the motor, in order to give the device a better finish by inclosing all the operating parts and preventing dripping from any water that might possibly leak from the cylinders. The spindle is slightly conical in shape between the bearings or supports D, which are furnished by the shell and bracket, and upon this conical portion of the spindle the hub E of the device rotates. The spindle itself is hollow, receiving the water or other material employed at the end in the direction of the entering arrow in Fig. 3; and this spindle is provided with a diaphragm, F, centrally situated, which entirely prevents communication between the two ends of the spindle, except as hereinafter explained.

G G′ G² are cylinders, cast upon or secured otherwise to the hub E, which rotates upon the spindle B.

In the spindle, for less than one-half its diameter, on one side of the diaphragm F, are a series of openings, H, which, during the rotation of the hub, register successively with an orifice or port, *a*, therein, which leads into the end of the cylinder adjacent to the hub. Upon the opposite side of the diaphragm are another series of holes, I, which have a similar communication with a second orifice or port, *b*, during a different part of the revolution. The series of holes H extend but a little more than one-third of the way around the periphery of the spindle, and through these holes the water or other medium employed enters the inner end of the cylinder, under whatever pressure such medium may have, and, after the cylinder has made a partial rotation of the hub and its piston has completed its stroke in an outward direction, the holes I allow the outflow of the contents of the cylinder through the ports *b* as the piston travels upon its return-stroke. Each of these cylinders—there being three of them, situated with relation to each other at equidistant points upon the hub—is provided with a piston, J, and a piston-rod, K, which latter reciprocates through a hole or guide in the piston-head L. Each of these piston-rods at its outer end is curved to the rear of its line of travel, and has a small traction-wheel, M, pivotally secured to its outer end.

It will be noticed that the track upon which the small wheels M travel is eccentric to the axis of the spindle B, such eccentricity increasing from *a′* to *b′* and diminishing from the latter to the former-named point, so that water or other suitable media under pressure, being sent through the spindle and through the orifices H into the cylinder G, would tend to force the piston outwardly, and were the track concentric, instead of eccentric, to the axis of the spindle such motion would be arrested, because it would be directly at right angles to the track; but such track being eccentric the wheel in the end of the piston travels, so to speak, downhill until it arrives at the point *b′*. On arriving at the point *b′* in its further rotation the diminishing eccentricity of the track forces the piston upon its return-stroke, whereby its contents are discharged through the holes

or ports I, which now become effective for that purpose, into the spindle, under no pressure except that of its own friction, and whence it is carried off.

The hub E is further provided with a groove, O, apertured to carry a belt, N, by which the power developed by the operation of the device may be transmitted.

At the lower portion of the casing C is located a suitable drip-pipe, S, through which any water leaking from the cylinders may be carried off.

What I claim as my invention is—

1. The combination, with suitable cylinders, G G′ G², a conically-apertured hub, E, and the fixed conical spindle B, of the shell or casing C, provided with bearings D D, and suitable outlet-pipe, S, substantially as shown and described.

2. In a motor, and in combination with the hollow conical spindle B and conically-apertured hub E, rotated thereon, and cylinders secured to said hub and provided with pistons and piston-rods, substantially as described, a rigid track eccentric to the axis of the spindle, substantially as and for the purposes specified.

3. In a motor constructed substantially as described, in combination with the cylinders and eccentric track thereof, the piston-rods with their outer ends curved to the rear of the line of travel, and carrying in such curved ends traction or friction wheels, substantially as and for the purposes set forth.

4. The combination, with cylinders G G′ G², conically-apertured hub E, and the stationary conical spindle B, formed with diaphragm F and suitable apertures, H and I, of the fixed shell or casing C, bearings D, and track A, substantially as shown and described.

5. In a motor consisting essentially of three or more cylinders secured equidistant from each other on a hub adapted to rotate around a hollow spindle, the casing C, adapted to contain said hub and cylinders and to form a support for said hollow spindle, and the circular track A, secured within said casing, substantially as set forth.

GEORGE LENHARDT.

Witnesses:
H. S. SPRAGUE,
CHAS. J. HUNT.