

(No Model.)

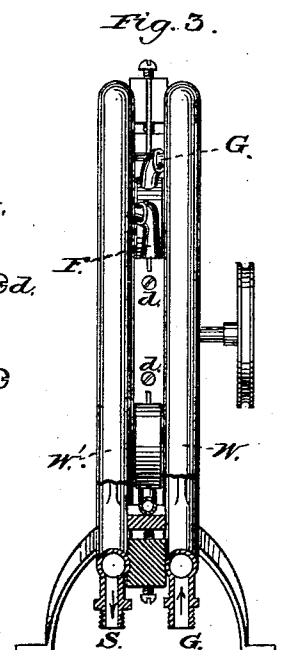
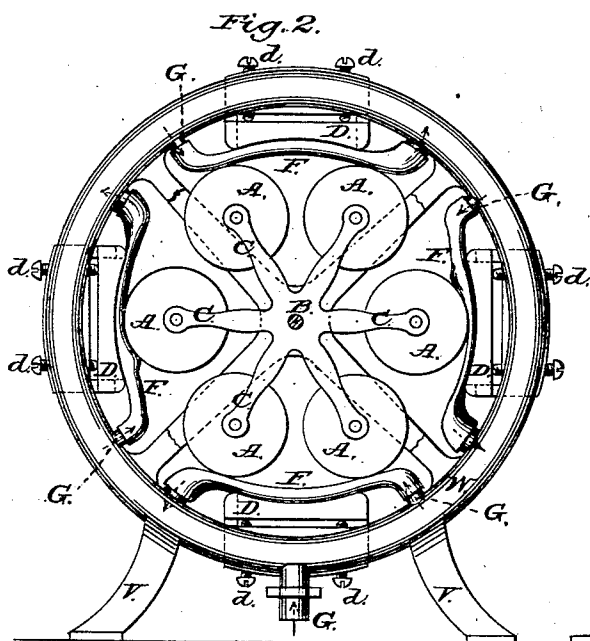
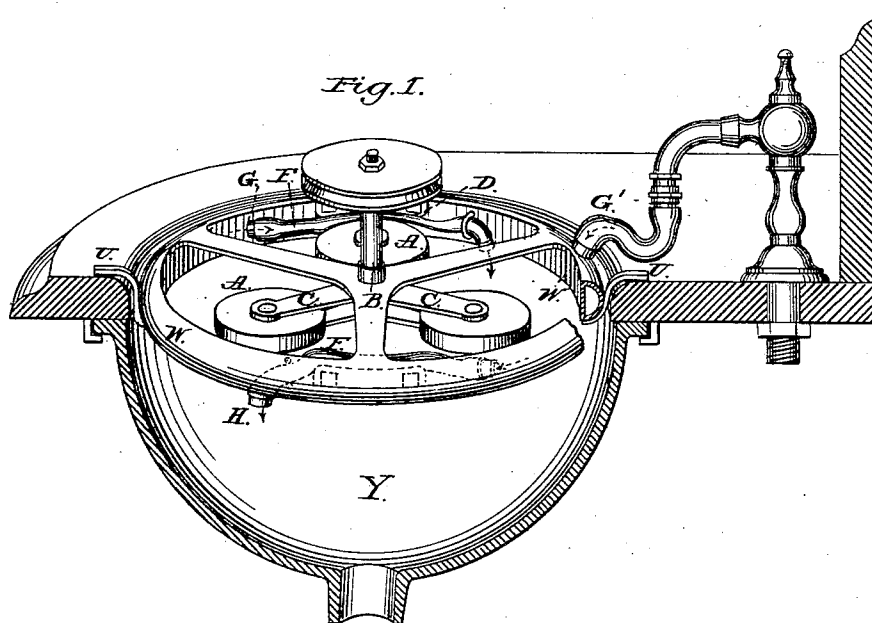
3 Sheets—Sheet 1.

W. J. MORTON.

FLUID MOTOR.

No. 271,257.

Patented Jan. 30, 1883.



WITNESSES

John A. Ellis
J. H. H. H.

INVENTOR=

William J. Morton
By David A. Burr atty.

(No Model.)

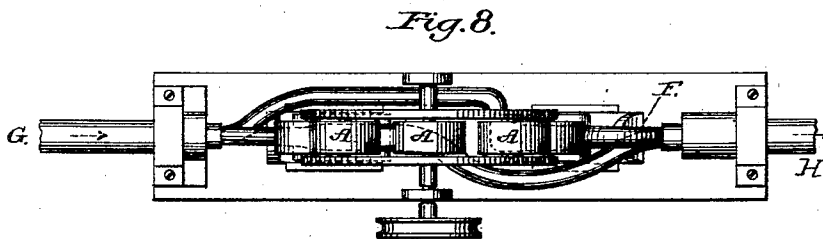
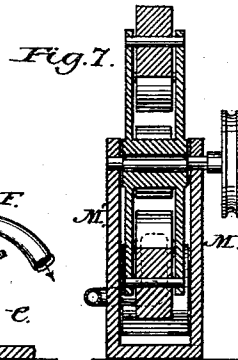
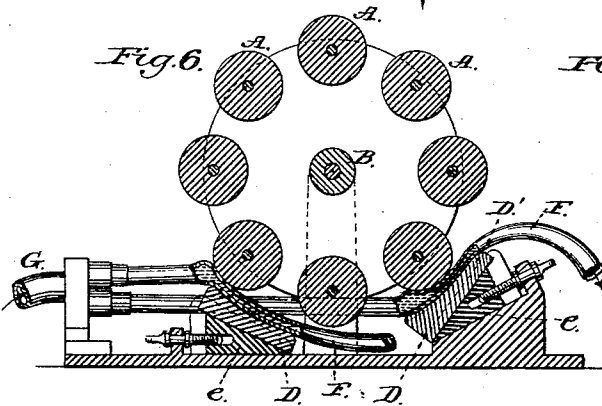
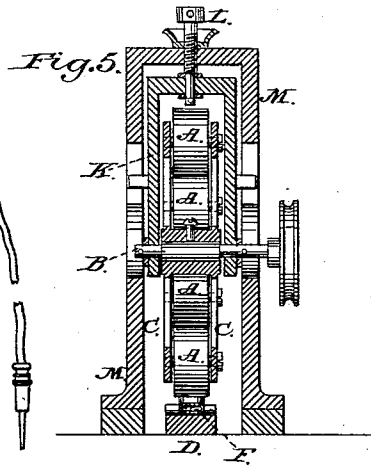
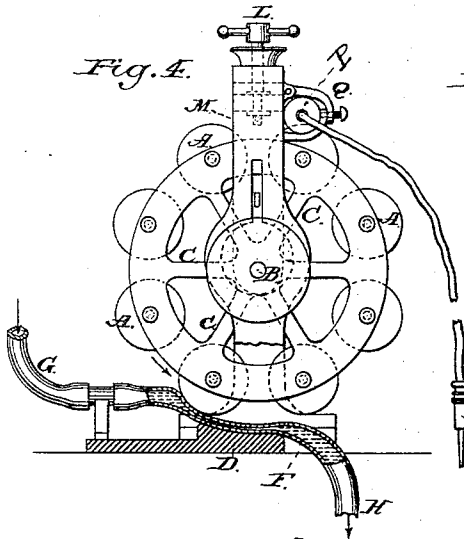
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FLUID MOTOR.

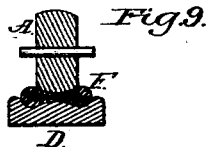
No. 271,257.

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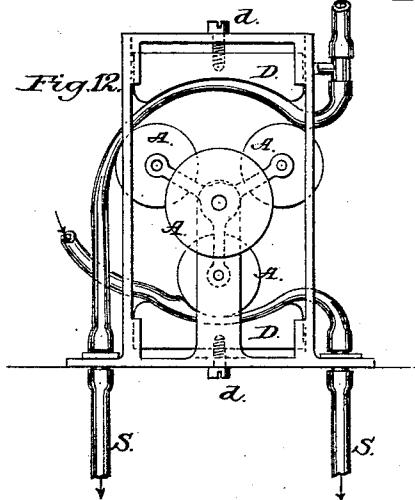
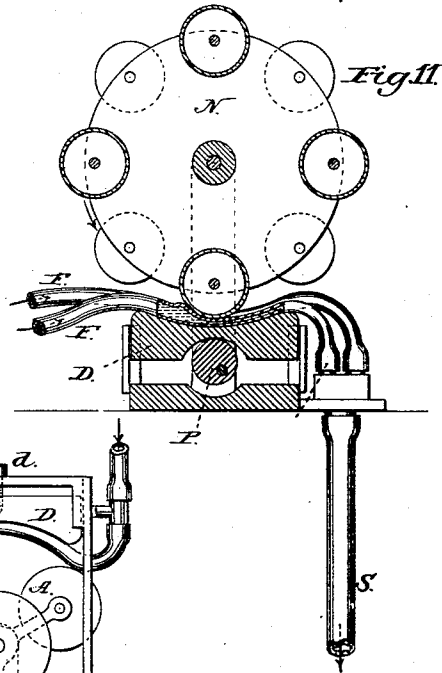
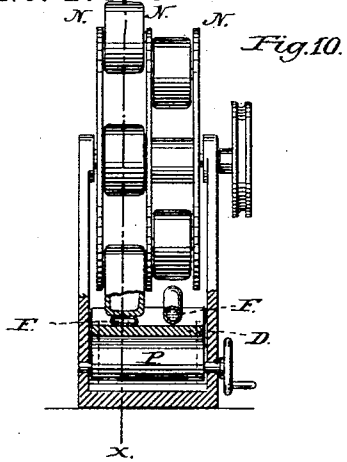
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FLUID MOTOR.

No. 271,257.

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UNITED STATES PATENT OFFICE.

WILLIAM J. MORTON, OF NEW YORK, N. Y.

FLUID-MOTOR.

SPECIFICATION forming part of Letters Patent No. 271,257, dated January 30, 1883.

Application filed February 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. MORTON, a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Fluid-Motors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to that class of prime movers in which a wheel bearing upon and compressing an elastic tube is propelled by the distention of the tube under and behind the wheel.

The objects of my invention are, first, to secure the advantage of a high velocity in the fluid column employed to distend the tube and a diminution of loss from its friction in passing through the tube by imparting to the engine a constant, rapid succession of distinct impulses from a short pressure-tube, instead of longer-continued pressure from an extended tube; second, to secure a prompt, rapid discharge or exhaust of the motive fluid from the elastic propelling-tube so soon as it has performed its work; third, to secure, in combination with a plenum in the supply-pipe on the one side, the advantage of an exhaust of pressure in the discharge-pipe on the opposite side to increase the power of the engine; fourth, to produce an effective combination of the supply and of the discharge pipes within the frame or casing of the engine, rendering it neater and more compact. I attain these objects by means of the devices hereinafter fully described.

In the accompanying drawings, Figure 1 is a perspective view, partly in section, of my improved motor adapted to rotate in a horizontal plane within an annular tubular casing, through which the water is conducted to the elastic tubes, the motor being represented as fitted upon and exhausting into a wash-basin. Fig. 2 is a side elevation, and Fig. 3 an end view, partly in section, of the motor adapted to rotate in a vertical plane within a double annular casing to which the elastic tubes are connected, both for their supply and exhaust, and with an increased number of motor-wheels and elastic tubes. Fig. 4 is a side elevation,

and Fig. 5 a central transverse section, of the motor in a simple form without casing and with but a single elastic tube. Fig. 6 is a central longitudinal section, Fig. 7 a central transverse section, and Fig. 8 a top view, of a modification of the motor constructed to rotate in a vertical plane over two elastic propelling-tubes adapted to avoid a dead-center. Fig. 9 is a transverse sectional view of a motor-wheel and bearing-block detached, illustrating an improved shape of both wheel and block. Fig. 10 is an end view or front elevation, and Fig. 11 a transverse section in line *xx* of Fig. 10, illustrating the motor when constructed with a double set of motor-wheels on the same shaft, and illustrating, also, the extension of the discharge-pipe to produce a siphonal action. Fig. 12 illustrates the motor constructed with three large motor-wheels, as in Fig. 1, but adapted to rotate in a vertical plane with separate supply-pipes for each propelling-tube, and siphonal exhaust-pipes.

A A are the propelling or motor wheels, and B the central shaft or spindle, of my improved motor. The wheels all rotate freely at equal distances from the central shaft, each preferably upon an axis parallel thereto, which is supported by radial arms or flanges C C projecting therefrom, although in a modification of my invention illustrated in Fig. 13 the propelling-wheels rotate upon axes which are radial to the shaft.

The shaft may be made to rotate equally well in a horizontal plane, as shown in Fig. 1, or in a vertical plane, as shown in Fig. 2.

D D are short segmental blocks, each having an inner face conforming to the arc of a circle having the axis of the shaft as its center, and which are placed in the line of travel of the propelling or motor wheels A A, so that the latter may revolve in close proximity thereto. The interval between each bearing-block and the motor-wheels passing over it is adjusted by devices designed to produce a movement of the block to and from the shaft—such as set-screws *d d*, Figs. 2 and 12, or sliding wedges *e e*, as shown in Fig. 6, or otherwise by an adjustment of the bearings of the central shaft itself through the interposition of a set-screw, L, as shown in Figs. 4 and 5.

Short elastic tubes F are led over each of

the segmental bearing-blocks D, so as to be compressed by the motor-wheels A A as they revolve over it, each tube being connected with a supply-pipe, G.

- 5 The outer end of each tube may be left open for a free discharge, as shown in Fig. 1, or be connected with a suitable discharge-pipe, S, which may be very advantageously extended, as shown in Figs. 11 and 12, so as to produce
10 a siphonal or exhaustive action upon the contents of the elastic tube F in the operation of the machine.

- The supply-pipe or both the supply and discharge pipes may be arranged in the form of
15 an annular casing to encircle the motor, the elastic tubes F being readily connected to the one pipe and the other by means of suitable nipples formed or fitted thereon, as shown in Figs. 1 and 2.

- 20 The blocks D are so proportioned in length as that one wheel shall pass upon the tube as the other leaves it. The elastic tubes F F may be protected against wear or undue strain by inclosing each in an outer tube or sleeve of
25 suitable textile material, inelastic, yet soft and flexible, and so proportioned in diameter as to permit the necessary expansion or dilation of the inclosed tube under pressure, and yet prevent its undue expansion and afford it proper
30 support.

Projecting edges or flaps may be left upon the outer sleeves to facilitate their attachment to the bearing-blocks.

- The outer periphery or rim of each motor-wheel A is by preference made slightly convex in cross-section, and the center of each bearing-block D is likewise made somewhat convex in cross-section, as illustrated in Fig. 9, so that in the compression of the interposed
40 elastic tubes F the folded edges of the tubes shall be relieved from undue compression, the greatest pressure being brought to bear upon the center thereof. (See Fig. 9.)

- The motor may be constructed with a large
45 number of motor-wheels A A, revolving over a single bearing-block D and elastic tube F, as shown in Figs. 4 and 5, and the adjustment of the wheels to the bearing-block be made by fitting the bearings of the central shaft, B, in
50 a hanger, K, (see Fig. 5,) to be suspended by one or more set-screws, L, from a frame, M M, over the bearing-block. To avoid the dead-point possible in the operation of a motor constructed as last above described, two bearing-
55 blocks D D may be used, supporting two elastic propelling-tubes F F, which may each be connected with a single supply-pipe G and a single discharge-pipe, H, as shown in Figs. 6 and 8. In this case one of the series of motor-
60 wheels on the central shaft, B, will always be under pressure, so that no dead-point can occur in its movement. The drawings, Fig. 6, illustrate, also, the use of sliding wedges actuated by set-screws for the purpose of adjusting the bearing-blocks D D, the bearings for
65 the shaft being fixed in the frame M M.

In the form of the motor illustrated by Figs. 10 and 11 a double set of motor-wheels are supported around the central shaft between three parallel radial flanges, N N N, the wheels between the central flange and the outer flange
70 on one side alternating in their position with the wheels between the central and outer flanges on the other side, as shown in Fig. 10 and dotted lines, Fig. 11. In such case two
75 elastic tubes F are employed—one for each set of wheels—and are laid side by side upon a single bearing-block D, which is adjusted by means of an eccentric shaft or roller, P, interposed between the bearing-blocks and bed-
80 plate of the frame, as clearly shown in Fig. 11.

When the frame supporting the shaft, motor-wheels, bearing-blocks, and elastic tubes of the engine is constructed in the form of an annular, tubular, or hollow casing, it may embrace either
85 a single conduit for the supply of water to the elastic propelling-tubes, as shown in Fig. 1, or double conduits, as shown in Figs. 2 and 3, through which both the supply to and the discharge of the water from the elastic tubes may
90 be effected.

If the annular tubular casing be made single, it may be fitted with lugs V V to engage the rim of a wash-basin or receiving-vessel, Y, and thus support the motor thereon in a horizontal position, as shown in Fig. 1. In this
95 case the elastic propelling-tubes are connected to nipples on the inner side of the rim, and after being led thence over the bearing-blocks are left free to discharge into the basin or vessel beneath. An outside nipple adapted to
100 receive a flexible pipe, G', facilitates the connection of the motor with a cock or faucet for its water-supply, as shown in Fig. 1. When the annular casing is made double, as shown
105 in Figs. 2 and 3, one division thereof is coupled with a supply-pipe, G, and the second division with a discharge-pipe, S, the elastic propelling-tubes being each attached at one end to a suitable nipple upon the annular supply-conduit
110 W, and after passing over the bearing-blocks is connected to the annular discharge-conduit W' at the other, as shown in Figs. 2 and 3.

In the operation of my improved motor the fluid, upon entering the short elastic tube f,
115 which has been compressed by the bearing of one of the motor-wheels A thereon, will, by causing a distention of the tube against the periphery of the wheel, force it forward, and as the continued supply produces a continuous
120 distention following closely after the moving wheel, a constant pressure is thereby maintained against said wheel to drive it forward until it has passed off from the bearing-block upon which the tube is supported,
125 whereupon the latter will exhaust itself into the discharge-pipe and be thus relieved. The pressure from the supply is meantime cut off by the approach of the next wheel in the series, which will thereupon, under the influence of said pressure, be in turn driven forward in the same direction.
130

By a multiplication of small motor-wheels, in combination with one or two short bearing-blocks and interposed elastic tubes, a quick succession of powerful impulses is imparted to the central shaft under the full pressure of the head in the supply-pipe without appreciable loss from friction, and a high velocity may be readily attained therein. Each wheel receives in turn an impulse due to the full force of the pressure in the supply-pipe exerted upon the periphery of the wheel by the distention of the tube against it. This pressure is increased by making the discharge-pipe air-tight and so lengthening it as that the discharge of water through it shall exhaust the air therefrom, thus calling into play atmospheric pressure upon the column of water bearing against the wheel.

This improved motor is especially adapted for driving sewing-machines, small lathes, dental engines, and other light work. It may be readily adapted to operate a pneumatic dental hammer, or pneumatic perforating-pen for making autographic stencil-plates, &c., by securing an elastic bulb or air-ball, P, in position (see Fig. 4) to be struck by the periphery of each of the motor-wheels A A in the rotation of the shaft B, so that each contact shall serve to produce a pulsation in the column of air confined in the transmitting-tube connected therewith, and I contemplate making this feature of my invention the subject-matter of a separate application for Letters Patent.

The apparatus constructed as described may be used as a pump by connecting either the supply or the discharge pipe with a reservoir of water and rotating the shaft and motor wheels toward the same. A suction will be thereby produced in the pipe sufficient to cause an ascent of water therein to a moderate height, and the water so introduced will be forced onward and outward through the flexible tube to a height proportionate to the power exerted in rotating the shaft.

I do not deem it necessary to enumerate the many advantages of my simple motor constructed as described.

I claim therein as new and desire to secure by Letters Patent—

1. The combination, with a series of motor-

wheels revolving about and carried by a central shaft, of one or more segmental bearing-blocks made adjustable to and from the shaft in a radial direction, and of one or more interposed elastic tubes adapted to be compressed by the wheels against said bearing-blocks, and which are each connected at one end with a supply-pipe and arranged to discharge freely at the other, substantially in the manner and for the purpose herein set forth.

2. The combination, with a series of motor-wheels revolving upon radial arms or flanges about a central shaft, and with an elastic tube connected with a suitable supply pipe or reservoir, and adapted to be compressed by said wheels against a circumferential curved bearing-block, of an extended siphonal pipe connected with the discharging end of the elastic tube, substantially in the manner and for the purpose herein set forth.

3. The combination, with a series of motor-wheels revolving upon radial arms or flanges about a central shaft, and with opposed segmental bearing-blocks and interposed elastic propelling-tubes adapted to be compressed by said wheels, of an annular supply-chamber encircling the shaft and wheels, connected with a supply-pipe, and to which the induction end of each elastic tube is fitted, substantially in the manner and for the purpose herein set forth.

4. The combination, with a series of motor-wheels revolving upon radial arms or flanges about a central shaft, and with opposed segmental bearing-blocks and interposed elastic propelling-tubes adapted to be compressed by said wheels, of an annular exhaust-chamber encircling the shaft and wheels, connected with a discharge-conduit, and to which the induction end of each elastic tube is fitted, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM J. MORTON.

Witnesses:

J. F. ACKER,

U. A. LA MONT.