No. 766,410. PATENTED AUG. 2, 1904.

M. ALGER.

MOTOR.

APPLICATION FILED NOV. 19, 1903.

NO MODEL.

Fig. 1.

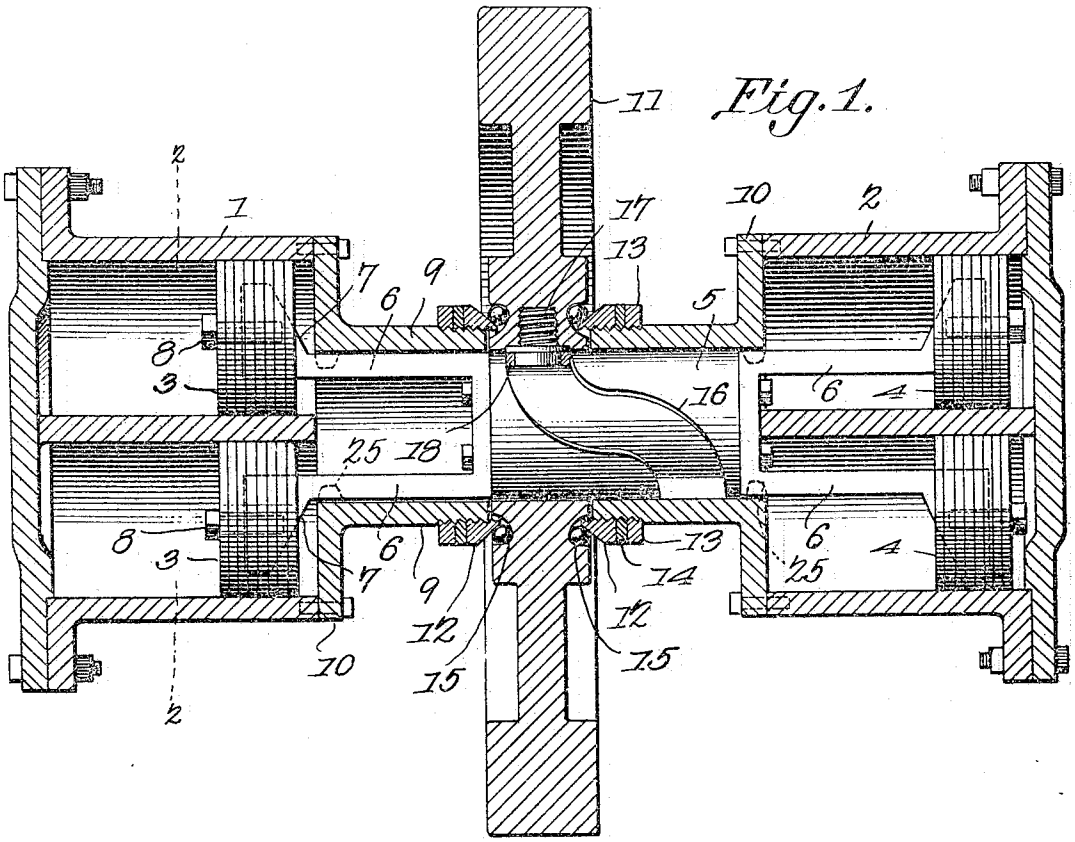
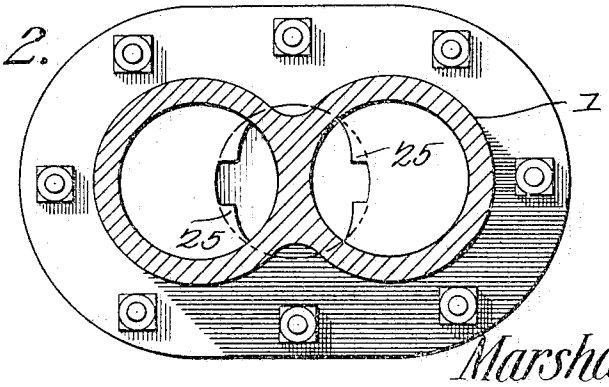


Fig. 2.



Witnesses

E. F. Stewart

Jno. C. Parker

Marshall Alger,

Inventor.

by Church & Church

Attorneys

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UNITED STATES PATENT OFFICE.

MARSHALL ALGER, OF WHEELING, WEST VIRGINIA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 766,410, dated August 2, 1904.

Application filed November 19, 1903. Serial No. 181,871. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL ALGER, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Motor, of which the following is a specification.

This invention relates to certain improvements in motors, and has for its principal object to provide improved means for converting reciprocatory into rotary motion.

A further object of the invention is to provide a simple and self-contained motor of novel construction in which the power and speed will be uniform.

With these and other objects in view, as will hereinafter more fully appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a sectional plan view of a motor constructed in accordance with the invention. Fig. 2 is a transverse sectional elevation of the same on the line 2 2 of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts throughout both figures of the drawings.

The device forming the subject of the present invention is intended principally for the conversion of reciprocatory into rotary motion in such manner as to develop very high speeds that could not be successfully attained in engines of ordinary construction.

In the drawings, 1 and 2 designate pairs of cylinders, the cylinders of each pair being disposed side by side in parallel relation and all of such cylinders being of the same length and diameter. In the cylinders are arranged pistons 3 and 4, said pistons being of the usual form and provided each with grooves for the reception of packing-rings. The four pistons are rigidly connected together by a frame including an intermediate cylinder 5 and piston-rods 6. In order to lessen the diameter of the cylinder 5, the rods proper, 6, are not in an axial line with the power-cylinders; but the connections between the pistons and rods are made at a central point by widening the piston-attaching end of each rod, as indicated at 7, the pistons and rods being then rigidly secured together by bolts 8. The outer heads of the cylinders may be of any ordinary construction, while the inner heads 9, through which the piston-rods pass, are provided with enlarged annular flanges 10, that in part form guides for the cylindrical portion 5 of the piston-connecting frame. The adjacent ends of the flanges 10 are spaced from each other for the reception of a balance-wheel 11, and the outer end of each flange is threaded for the reception of a threaded ring 12 and lock-nut 13, a washer 14 being preferably introduced between the ring and nut. The outer face of each ring 12 is beveled or rounded to form one-half of a ball-race, the opposite member of which is formed by an annular groove 15, cut in the hub porton of the balance-wheel, and in the ball-races thus formed are placed antifriction balls on which the balance-wheel is supported and on which it may rotate with minimum friction.

In the periphery of the cylinder 5 is formed a cam-groove 16, arranged in a substantially helical line and extending continuously around the cylinder. The effective length of the groove as related to the longitudinal axis of the cylinder 5 is equal to the stroke of the pistons.

Extending into the groove 16 is a stud 17, that is screwed into a suitable opening in the hub of the balance-wheel and serves as a support for an antifriction-roller 18 of a diameter about equal to the width of the cam-groove, so that during the operation of the engine there will be no opportunity for lost motion between the walls of the groove and the roller.

In the operation of the motor a fluid under pressure—such as steam, air, or an explosive mixture—is admitted to the several cylinders by means of any ordinary form of valve mechanism, (not shown,) and the pistons reciprocate in unison with the grooved cylinder 5 and the connecting means. The cam-faces of the groove act on the antifriction-roller 18 and

serve through said roller to impart rotary movement to the balance-wheel 11. At the end of each stroke of the pistons when the roller has traversed the full length of the groove and is about to return the balance-wheel will carry the roller across the turning-point of the groove, so that at the next stroke of the engine the full power of the fluid under pressure may be utilized.

Where the four-cylinder construction is used, it is not necessary to employ any auxiliary means for holding the cylinder 5 from rotative movement; but where only one or two cylinders are used it is advisable to employ means for guiding the cylinder 5, and for this purpose I have illustrated spaced guides 25 for engaging the opposite sides of the piston-rod 6. This construction may be modified in a number of ways for the purpose of preventing rotative movement of the grooved cylinder.

Having thus described the invention, what is claimed is—

1. In a motor, oppositely-disposed cylinders having flanged heads, a balance-wheel having a hub portion supported by said heads, an antifriction-roller carried by said hub, pistons disposed in the cylinders, and a cylinder connected to the pistons, said cylinder having a winding groove for the reception of the antifriction-roller.

2. In a motor, a plurality of pairs of cylinders, the cylinders of each pair being arranged side by side in parallel relation, pistons in the several cylinders, a grooved cylinder rigidly connected with all of the pistons, cylinder-heads having annular flanges forming a partial housing for the grooved cylinder and the rods, a balance-wheel supported by said flanges, and a stud or roller carried by the balance-wheel and entering the groove of the cylinder.

3. In combination, oppositely-disposed cylinders having flanged heads, said flanges being spaced from each other and threaded for the reception of ball-bearing rings, pistons disposed in the cylinders, a grooved cylinder rigidly connected to the several pistons, a balance-wheel having annular grooves forming ball-races, bearing-balls disposed in the races, and a stud or roller carried by the balance-wheel and entering the groove in the cylinder.

4. In combination, a plurality of pairs of cylinders, the cylinders of each pair being arranged side by side in parallel relation, a grooved cylinder, rods connecting the grooved cylinder to the several pistons, said rods being arranged out of axial alinement with the pistons, flanged heads for the several cylinders, said flanges being threaded, ball-bearing rings mounted on the threaded flanges, lock-nuts for holding said rings in position, a balance-wheel having a central opening for the passage of the grooved cylinder and being provided with annular grooves forming ball-races, bearing-balls in the several races, a stud carried by the balance-wheel, and an antifriction-roller mounted on the stud and entering the groove of the cylinder.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MARSHALL ALGER.

Witnesses:
ROBT. WHITE,
W. E. KRUPP.