No. 763,133.

PATENTED JUNE 21, 1904.

J. D. WHEELER.

MOTOR ENGINE.

APPLICATION FILED AUG. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

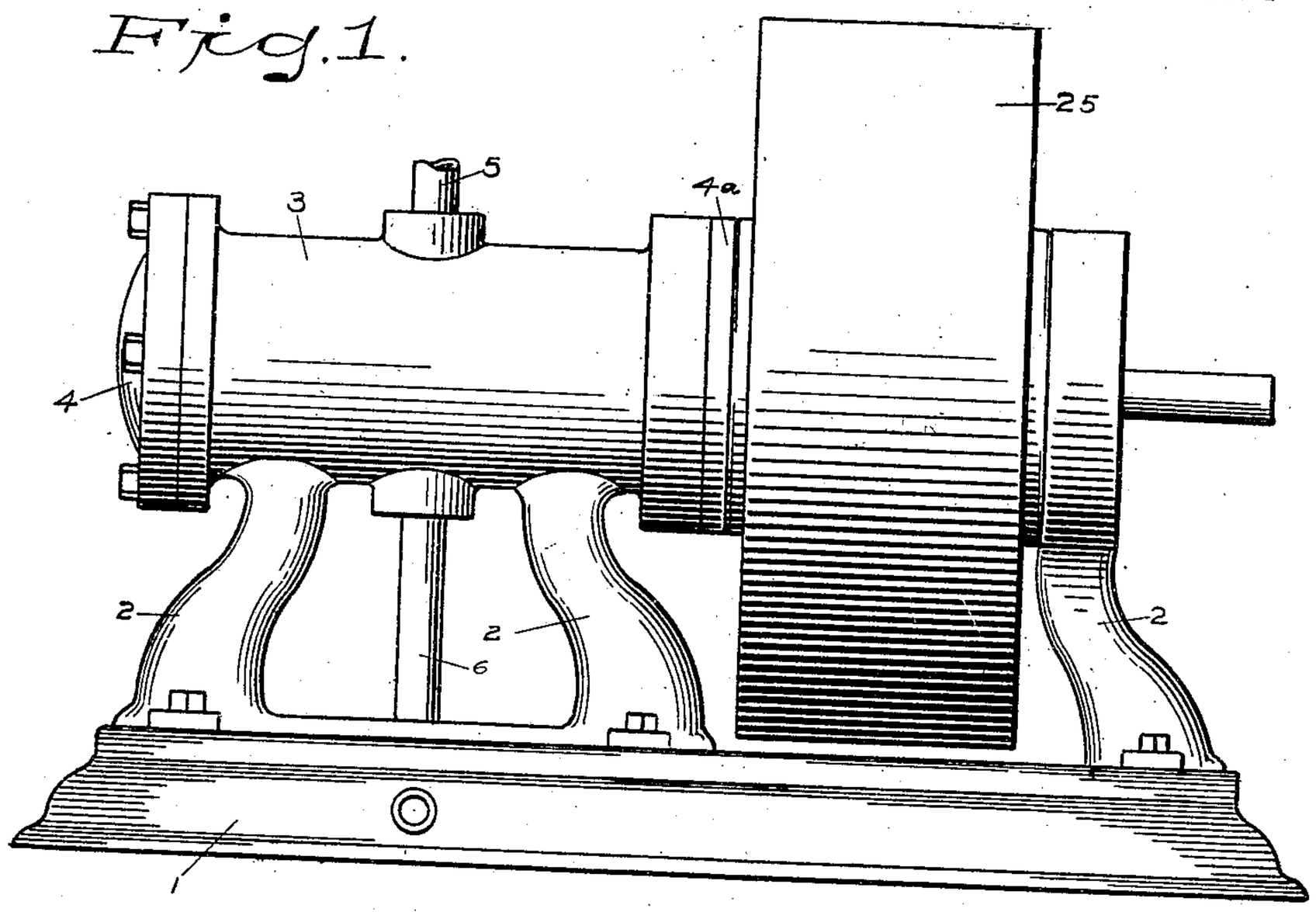
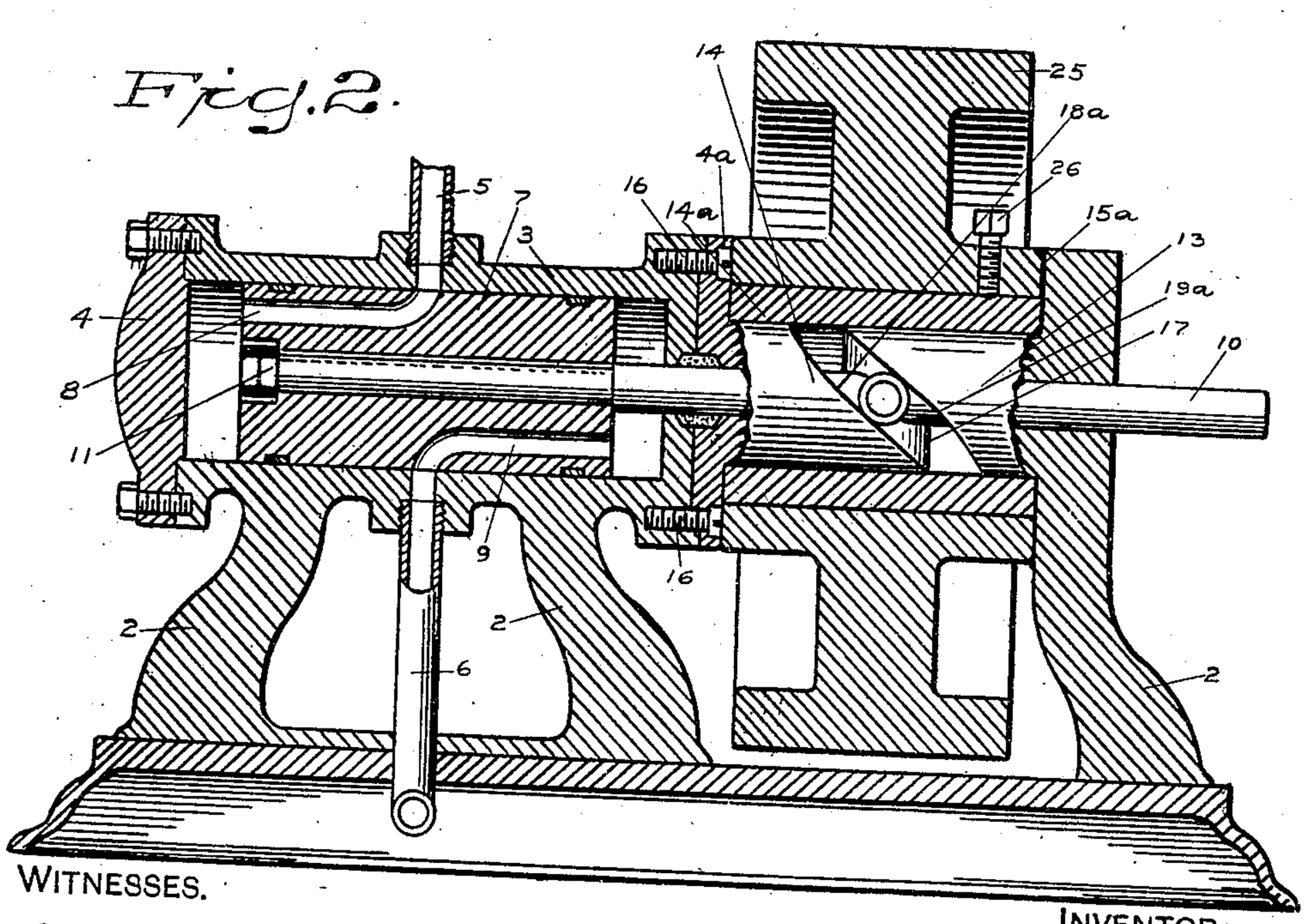


Fig. 2.



WITNESSES.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

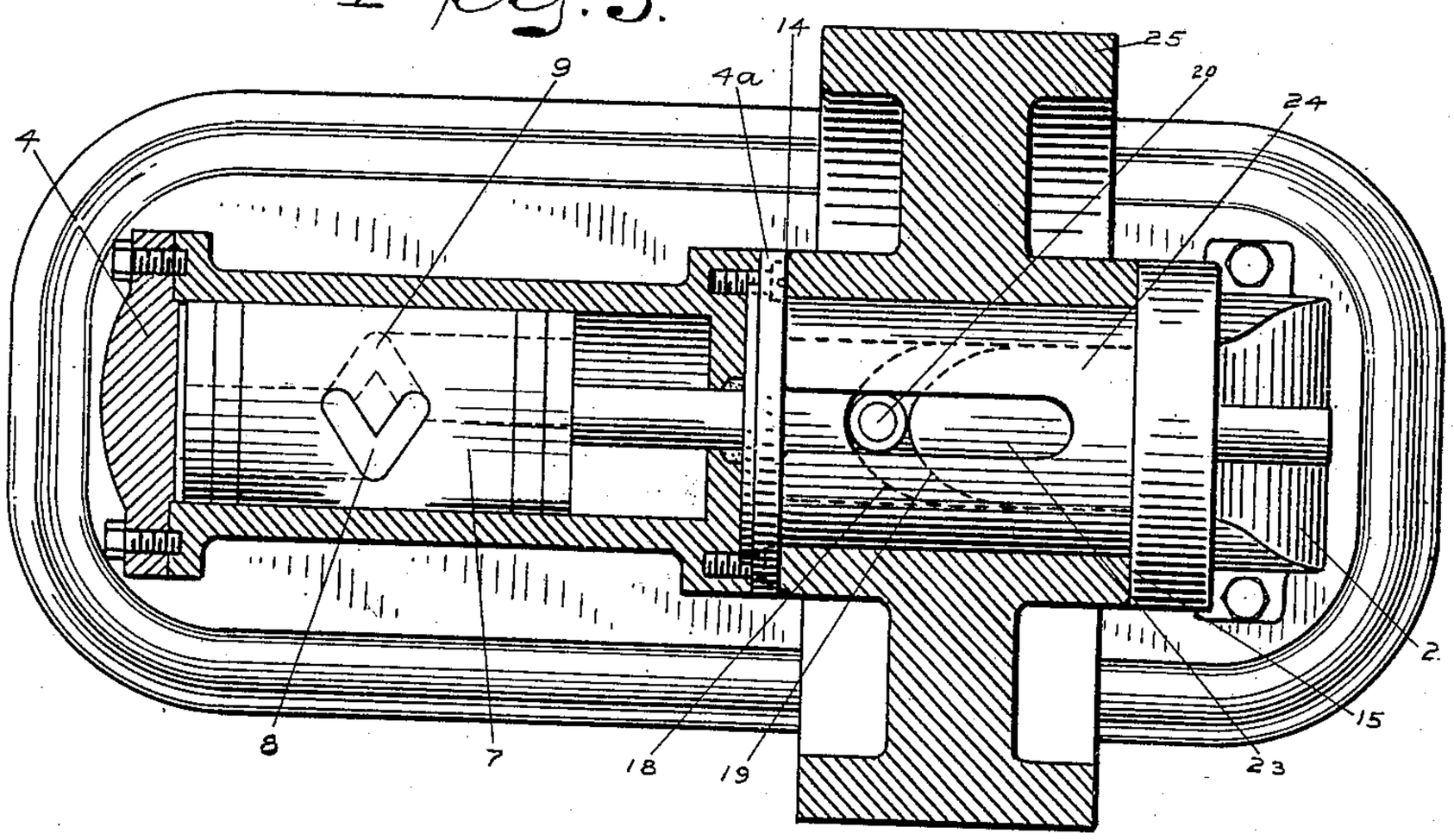


Fig. 4.

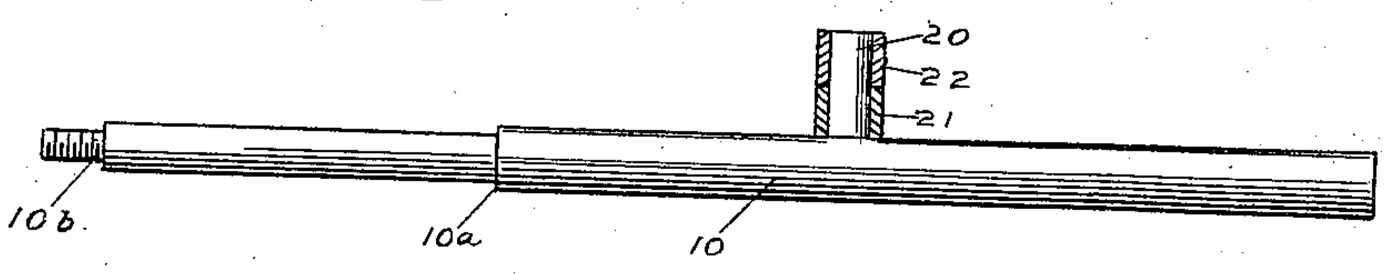


Fig. 5.

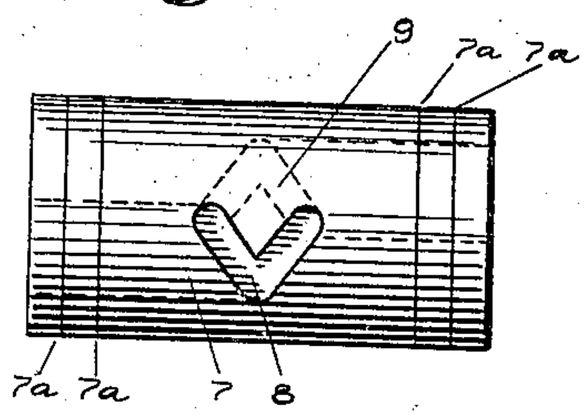


Fig. 6.

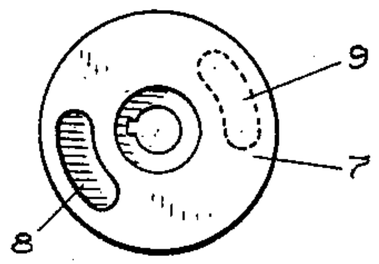
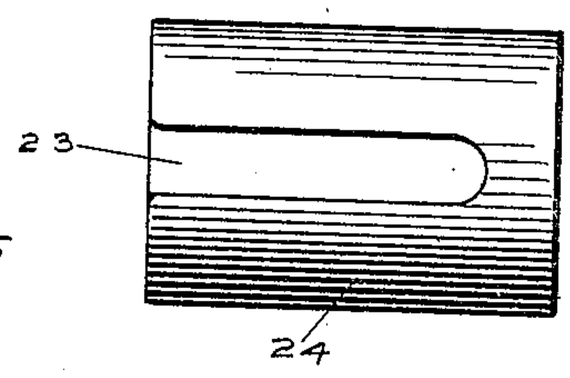


Fig. 7.



WITNESSES.

H. A. Lamb.

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ATT'YS.

No. 763,133. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

JAMES D. WHEELER, OF BRIDGEPORT, CONNECTICUT.

MOTOR-ENGINE.

SPECIFICATION forming part of Letters Patent No. 763,133, dated June 21, 1904.

Application filed August 14, 1903. Serial No. 169,428. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. WHEELER, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Motor-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a motor-engine, and consists of the mechanism hereinafter more fully pointed out and claimed.

The object and purpose of my invention is to provide at the minimum cost a strong durable high-speed motor-engine for utilizing and transmitting power at the lowest cost where steam, gases, oil-vapors, or other expanding gases are employed for generating power and for use where liquids are employed, such as water, as a means for generating power. In case combustible gases or vapors are used as a means for generating power in the cylinder an electric spark may be used to ignite the gases in the cylinder of the motor-engine, and a carbonator for mixing the gases and vapors for preparing the same for combustion may be used.

The more particular features of my invention consist in the use of a reciprocating rotating valve and the independent means outside of the cylinder for rotating the valve in its reciprocating motion, whereby the receiving and exhaust ports are alternately changed in each half-revolution of the piston.

In the drawings a two-horse-power motor-engine of full size is shown with the use of two hundred pounds steam-pressure.

In the drawings, Figure 1 illustrates a side elevation of my motor-engine. Fig. 2 is a vertical central sectional view of the same. Fig. 3 is a top or plan view of a horizontal sectional view of my motor-engine, the slotted tubular sleeve within the driving-hub being shown in full lines. Fig. 4 is a side view of the piston-rod and the projecting stud, the stud being shown in full lines and the anti-friction-rolls of the stud being shown in vertical sections. Fig. 5 is a side elevation or view of the piston, showing the packing-grooves and ports. Fig. 6 is an end view of the pistons and the location of the ports, the full port being shown in full lines and the port at the opposite end being shown in dotted lines. Fig. 7 is a plan view of the tubular slotted or grooved sleeve.

Having described my invention with reference to the figures illustrated in the drawings, I will now proceed to describe the same more in detail, in which similar numerals of reference refer to corresponding parts throughout.

In the drawings, 1 is the base for supporting my motor-engine.

2 illustrates the pillar-blocks, supported on the base, and two of these pillar-blocks are cast with the cylinder, thereby forming rigid connections, and the third or right-hand pillar-block is cast separately in this instance.

3 is the cylinder, having a central bore. 4 and 4^a are the cylinder-heads, the cylinder-head being bolted to the end of the cylinder by ordinary tap-bolts, and cylinder-head 4^a has a central bore through the same for the passage and reciprocation of the piston-rod. In the cylinder, 5 indicates the intake-port, and 6 the exhaust-port. Piston 7 is provided with a series of packing-grooves 7^a, Fig. 5. The piston is provided with two ports on opposite sides of the piston. Port 8 leads downward and outward to the left end of the cylinder, and exhaust-port 9 leads from the periphery of the cylinder to the opposite end of the cylinder. These ports are alternately used as intake and exhaust ports in each half-revolution of the piston. (Best illustrated in Fig. 2.) These ports may be located in the piston so as to use the steam or gases expansively, so that the instant the maximum pressure is obtained in the receiving-port the exhaust-port at the opposite end of the cylinder is opened to prevent back pressure on the piston. The piston is cylindrical in form and provided with a central bore, into which is fitted piston-rod 10, which for the purposes of this specification will hereinafter be called a "rod," and in this instance it has shoulder 10^a with screw-threaded shoulder end 10^b, Fig. 4, and is rigidly secured from rotating in the piston. The extension end of the rod works through the opening in the right-hand cylinder-head, and the end of the

rod beyond the cylinder-head is provided with a stud or its equivalent.

The piston and rod are reciprocated in the direction of their length, and the piston is continuously rotated for admitting and exhausting the power employed in generating the energy in the motor-engine. The distinguishing features of my invention consist in the mechanism employed outside of the cylinder for rotating the piston, and consist, essentially, of an independent cylinder formed within the driving-hub, which is provided with a central tubular bore and which bore in the direction of its length is provided with a slot or groove for engaging the head or free end of the stud on the piston-rod, so as to retain the rod and piston concurrent with the rotation of the driving-hub. The piston and rod are rotated concurrent with the driving-hub and are also reciprocated in the direction of their length. In the instance shown in the drawings I provide in this independent cylinder within the driving-hub cams 13 and 14, Fig. 2, which are provided with shoulders 18^a and 19^a. The cam 13 in this instance is formed by the projecting end of the pillar-block, and cam 14 is rigidly secured to the piston-head 4^a by a tap-bolt 16. Both cams are held from rotating, and each cam has a central bore through which the rod extends, and the cams are separated from each other to form a cam-track between them, in which stud 20 on the rod works. These cams are made to fit inside of the sleeve or central opening in the driving-hub, as best indicated at 18 and 19, Fig. 3. The inclined cams are oppositely disposed in the tubular sleeve. The stud 20, Fig. 4, extending from the side of rod 10, travels up and down on the inclined cam-surfaces. In this instance the stud is provided with antifriction-rolls 21 and 22, which reduce the friction and which can be readily replaced in case of wear, and, if desired, the cams and stud may be relieved from further friction by ball-bearings. (Not shown.) Each of the cams is provided with inclined or wedge oppositely-disposed faces and is curved at its extremities. In this instance I have provided sleeve 24, which is provided with a slot 23 in the direction of its length, Fig. 7. This sleeve is tubular in form and is fitted into the central bore in the driving-hub and forms an independent cam-cylinder. In this instance a longitudinal slot 23 is cut through the wall of the sleeve for convenience in manufacture and for replacing when the same becomes worn. It is obvious the slot 23 need not be cut through the wall of the sleeve, but may be formed in a groove in the internal bore in the cylindrical sleeve to receive the head of the stud. It is obvious that instead of using the independent sleeve inserted in the bore of the driving-hub the bore for the driving-hub itself may be grooved in the direction of its length and the bore of the driving-hub used instead of the sleeve, so that wherever the term "sleeve" is used it may consist either of the independent sleeve then bored or the bore of the driving-hub as the sleeve. The driving-hub 25, which in this instance is illustrated in the drawings, is bored to receive sleeve 24, the sleeve being held in the driving-hub from rotation by set-screw 26, Fig. 2. As before stated, the sleeve may be dispensed with and the internal bore of the driving-hub grooved in the direction of the bore for receiving the head of the stud. I prefer, however, to use the sleeve, because it can be tempered and hardened independently of the driving-hub and can be replaced in case of wear, although the sleeve is not independently necessary, as the same conditions can be provided in the bore of the driving-hub that are found in the sleeve itself. The sleeve or the driving-hub run in contact with shoulders 14^a and 15^a, so that the cams which extend into the bore or opening in the sleeve or hub run in an independent cylinder into which oil can be inserted through a suitable oil-hole and the working parts of the mechanism within the independent cylinder may be run in oil for reducing friction and wear. In this instance driving-wheel 25 is made in the form of a balance as well as a driving wheel. It should, however, be noted that the driving means may consist in a sprocket and chain or in a gear without departing from the spirit of my invention.

Changes and modifications may be made to my motor-engine by those skilled in the art of constructing similar types of machines without departing from the spirit of my invention.

The curved ends of the inclined cams are best illustrated at 18 and 19 in Fig. 3 and the inclined cams are best illustrated at 18^a and 19^a, and the pitch of these inclined cams are governed by the length of the stroke and the size of the engine. As the piston and rod are reciprocated the stud on the rod extends through and between the cams and the upper end of the stud works in the longitudinal slot in the sleeve or hub, which has the effect to rotate the piston concurrent with the rotation of the driving-hub. By this arrangement a very high speed can be obtained in my motor-engine without producing much friction or wear in the parts outside of the power-cylinder.

The cylinder-heads are packed to prevent the escape of steam or gases in the ordinary way.

In the instance illustrated in the drawings the mechanism for rotating the piston is located within the hub of the driver. It is obvious that the driver may be omitted and the piston-rotating mechanism formed outside of the steam-chest in a separate cam-cylinder and the same results obtained, and by a slight structural change a double steam-cylinder motor-engine can be operated.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston having ports registering with the receiving and exhaust ports on opposite sides of the cylinder leading to the ends of the piston, an independent cylinder outside of the main cylinder within the driving-hub, a pair of oppositely-inclined face-cams held stationary within the hub, a longitudinal groove in the direction of the bore of the driving-hub, a stud inserted in the rod and extending into the opening between the cams and into engagement with the slot in the longitudinal bore of the driving-hub, substantially as set forth.

2. In a motor-engine of the type set forth, the combination of the cylinder and piston and piston-rod, the independent cylinder outside of the main cylinder and within the driving-hub, a pair of stationary independent oppositely-disposed inclined cams within the bore of the driving-hub, a stud rigid with the extension end of the rod working between the inclined cams and extending into engagement in the slot in the driving-hub for rotating the piston, substantially as set forth.

3. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston having ports registering with the receiving and exhaust ports on opposite sides of the cylinder leading to the ends of the piston, a piston-rod rigid with the piston, an independent cylinder within the driving-hub, a pair of oppositely-inclined face-cams curved at the extremities of each inclined cam and held stationary within the hub, a longitudinal groove in the direction of the bore of the driving-hub, a stud inserted in the rod and extending into the opening between the cams and into engagement with the slot in the longitudinal bore of the driving-hub, substantially as set forth.

4. In a motor-engine of the type set forth, the combination of the cylinder and piston and piston-rod, the independent cylinder outside of the main cylinder and within the driving-hub, a pair of stationary independent oppositely-disposed inclined cams curved at the extremities of each inclined cam within the bore of the driving-hub, a stud rigid with the extension end of the rod working between the inclined cams and extending into engagement in the slot in the driving-hub for rotating the piston, substantially as set forth.

5. In a motor-engine having a cylinder with intake and exhaust ports on substantially opposite sides of the cylinder, a reciprocating rotating valve having oppositely-arranged ports registering with the intake and exhaust ports leading to the opposite ends of the piston, a piston-rod rigid with the piston and extending through the cylinder-head and supported in a suitable bearing at its free end, in combination with a driver outside of the cylinder having a central bore and a longitudinal slot in the wall of the bore, of the driver, a pair of stationary cylindrical cams having oppositely-disposed inclined or wedge-shape faces curved at the extremity of each cam inserted at the opposite ends of the bore in the driver, a stud in the piston-rod extending through the openings between the oppositely-disposed cam-surfaces and into engagement with the longitudinal slot in the bore of the driver for rotating the piston concurrent with the rotation of the driver, substantially as set forth.

6. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston with ports registering with the ports in the cylinder, a grooved sleeve rigidly held within the hub of the driver, a pair of stationary oppositely-inclined face-cams, each cam curved at its extremities, a piston-rod rigid with the piston and having a projecting stud outside of the main cylinder to register with the space between the inclined face-cams and extending into engagement with the longitudinal slot in the sleeve, substantially as set forth.

7. In a motor-engine of the type set forth, the combination of the piston-rod rigid with the piston extending through the cylinder-head and supported at its end in a suitable bearing, a pair of stationary tubular oppositely-disposed inclined cam-faces, each cam curved at the extremity of the cam-face, inserted in a grooved sleeve and into its opposite ends, and a driver having a central bore to receive the sleeve and rigidly held therein, a stud in the extension end of the piston-rod located between the inclined face-cams and extending into engagement with the longitudinal groove in the sleeve, whereby the piston is rotated concurrent with the driver, substantially as set forth.

8. In a motor-engine of the type set forth, the combination of the cylinder, the piston and piston-rod, the non-rotating cams having oppositely-disposed inclined faces and curved at the extremity of each of the cams and each cam provided with a shoulder and inserted in the cylindrical bore of the hub of the driver from its opposed faces, a cylindrical driving-hub having a slot in the direction of the length of the cylindrical bore running in contact with the cam-shoulder, a stud in the piston-rod extending into engagement with the oppositely-disposed inclined face-cams and into engagement with the longitudinal slot in the bore of the driver, whereby an oil-cylinder is formed and by means of which the piston is rotated concurrent with the rotation of the driver, substantially as set forth.

9. In a motor-engine of the type set forth, the combination of the cylinder, the piston and piston-rod, the non-rotating cams having oppositely-disposed inclined faces and curved

at the extremities of each of the cams and each cam provided with a shoulder and inserted in a sleeve, the driver-hub having cylindrical bore to receive the sleeve, the sleeve and hub being rigidly secured together and the sleeve being provided with a groove on its inner face and extending into engagement with the shoulder on the cams, a stud projecting between the inclined face-cams and into engagement with the slot in the sleeve, whereby an oil-cylinder is formed and the piston rotated concurrent with the rotation of the driver, substantially as set forth.

10. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston having ports registering with the receiving and exhaust ports on opposite sides of the cylinder leading to the ends of the piston, a piston-rod rigid with the piston, an independent cylinder within the driving-hub, a pair of oppositely-inclined face-cams held stationary within the hub, a longitudinal groove in the direction of the bore of the driving-hub, a stud provided with antifriction-rings inserted in the rod and extending into the opening between the cams and into engagement with the slot in the longitudinal bore of the driving-hub, substantially as set forth.

11. In a motor-engine of the type set forth, the combination of the cylinder and piston and piston-rod, the independent cylinder outside of the main cylinder and within the driving-hub, a pair of stationary independent oppositely-disposed inclined cams within the bore of the driving-hub, the stud and the antifriction-rolls, the stud rigid with the extension end of the rod working between the inclined cams and extending into engagement in the slot in the driving-hub for rotating the piston, substantially as set forth.

12. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston having ports registering with the receiving and exhaust ports leading to the ends of the piston, a piston-rod rigid with the piston, an independent cylinder within the driving-hub, a pair of oppositely-inclined face-cams curved at the extremities of each inclined cam and held stationary within the hub-cylinder, a longitudinal groove in the direction of the bore of the driving-hub cylinder, a stud provided with antifriction-rings inserted in the rod and extending into the opening between the cams and into engagement with the slot in the longitudinal bore of the driving-hub cylinder whereby the piston and rod are rotated concurrent with the rotation of the driving-hub, substantially as set forth.

13. In a motor-engine of the type set forth, the combination of the cylinder and piston and piston-rod, the independent cylinder outside of the main cylinder and within the driving-hub, a pair of stationary independent oppositely-disposed inclined cams curved at the extremities of each inclined cam within the bore of the driving-hub, the stud and the antifriction-rolls, the stud rigid with the extension end of the rod working between the inclined cams and extending into engagement in the slot in the driving-hub for rotating the piston, substantially as set forth.

14. In a motor-engine having a cylinder with intake and exhaust ports on substantially opposite sides of the cylinder, a reciprocating rotating piston having oppositely-arranged ports registering with the intake and exhaust ports leading to the opposite ends of the piston, a piston-rod rigid with the piston and extending through the cylinder-head and supported in a suitable bearing at its free end, in combination with a driver outside of the cylinder having a central bore and a longitudinal slot in the wall of the bore of the driver, a pair of stationary cylindrical cams having oppositely-disposed inclined or wedge-shaped faces curved at the extremity of each cam inserted at the opposite ends of the bore in the driver, a stud provided with antifriction-rings in the piston-rod extending through the openings between the oppositely-disposed cam-surfaces and into engagement with the longitudinal slot in the bore of the driver for rotating the piston concurrent with the rotation of the driver, substantially as set forth.

15. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston with ports registering with the ports in the cylinder, a grooved sleeve rigidly held within the hub of the driver, a pair of stationary oppositely-inclined face-cams, each cam curved at its extremities, a piston-rod rigid with the piston and having a projecting stud provided with antifriction-rings outside of the main cylinder to register with the space between the inclined face-cams and extending into engagement with the longitudinal slot in the sleeve, substantially as set forth.

16. In a motor-engine of the type set forth, the combination of the piston-rod rigid with the piston extending through the cylinder-head and supported at its end in a suitable bearing, a pair of stationary tubular oppositely-disposed inclined cam-faces, each cam curved at the extremity of the cam-face, inserted in a grooved sleeve and into its opposite ends, and a driver having a central bore to receive the sleeve and rigidly held therein, a stud provided with antifriction-rolls in the extension end of the piston located between the inclined face-cams and extending into engagement with the longitudinal groove in the sleeve, whereby the piston is rotated concurrent with the driver, substantially as set forth.

17. In a motor-engine of the type set forth, the combination of the cylinder, the piston and piston-rod, the non-rotating cams having oppositely-disposed inclined faces and curved

at the extremity of each of the cams and each cam provided with a shoulder and inserted in the cylindrical bore of the hub of the driver from its opposed faces, a cylindrical driving-hub having a slot in the direction of the length of the cylindrical bore running in contact with the cam-shoulder, a stud provided with anti-friction-rolls held in the piston-rod extending into engagement with the oppositely-disposed inclined face-cams and into engagement with the longitudinal slot in the bore of the driver, whereby an oil-cylinder is formed and by means of which the piston is rotated concurrent with the rotation of the driver, substantially as set forth.

18. In a motor-engine of the type set forth, the combination of the cylinder, the piston and piston-rod, the non-rotating cams having oppositely-disposed inclined faces and curved at the extremities of each of the cams and each cam provided with a shoulder and inserted in a sleeve, the driver-hub having cylindrical bore to receive the sleeve, the sleeve and hub being rigidly secured together and the sleeve being provided with a groove on its inner face and extending into engagement with the shoulder on the cams, a stud provided with antifriction-rolls projecting between the inclined face-cams and into engagement with the slot in the sleeve, whereby an oil-cylinder is formed and the piston rotated concurrent with the rotation of the driver, substantially as set forth.

19. In a motor-engine, having a cylinder with a receiving and exhaust port located substantially on opposite sides of the cylinder, in combination with a reciprocating and rotating piston having receiving and exhaust ports registering at times with the receiving and exhaust ports of the cylinder, the receiving and exhaust ports in the piston leading to the opposite ends of the piston, a piston-rod having a stud rigid with the piston, the latter being rigidly connected to the piston-head, a tubular cam-cylinder having a groove in the direction of its length, a pair of tubular cams having oppositely-inclined faces, the cams being held stationary within the cam-cylinder, the cams forming a space or track between their oppositely-inclined faces in which the stud on the piston-rod moves the projecting end of the stud engaging and working in the longitudinal slot in the tubular cylinder, substantially as set forth.

20. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, a reciprocating and rotating piston having receiving and exhaust ports leading to opposite ends of the piston and registering with the receiving and exhaust ports, a piston-rod connected with the piston and extending through the cylinder-head, and mechanism outside of the cylinder for rotating the piston and rod in their reciprocating movements, substantially as set forth.

21. In a motor-engine, the combination of a cylinder having receiving and exhaust ports, the reciprocating and rotating piston and piston-rod, the latter extending through the cylinder-head and mechanism outside of the cylinder for rotating the piston and the piston-rod in their reciprocating movements, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES D. WHEELER.

Witnesses:
E. T. De Giorgi,
C. Jones.