C. I. HENRIKSON.

ENGINE.

APPLICATION FILED MAR. 13, 1908.

911,590. Patented Feb. 9, 1909.

Fig. 1

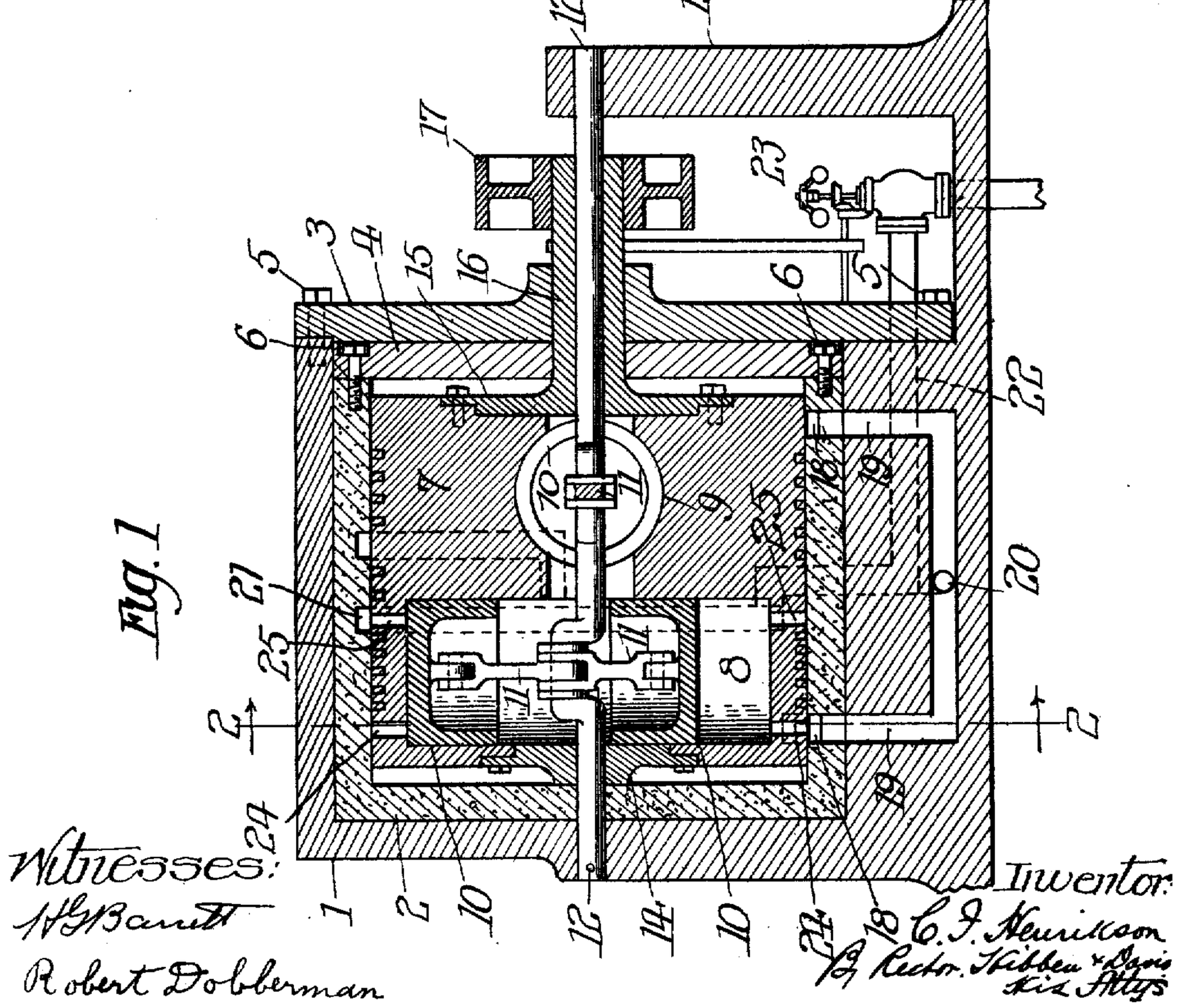

Fig. 2

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UNITED STATES PATENT OFFICE.

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ENGINE.

No. 911,590. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed March 13, 1908. Serial No. 420,963.

To all whom it may concern:

Be it known that I, CARL I. HENRIKSON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Engines, of which the following is a specification.

My invention relates to engines operated by a suitable motive fluid such as steam, air and the like, and the object thereof is to produce an engine which is simple and inexpensive in construction and efficient and reliable in operation, the same being made without employment of any of the usual valves as commonly used in engines generally.

The various features of advantage and utility of my new construction of engine will be apparent from the description hereinafter given.

In the accompanying drawing, Figure 1 is a central vertical section of my engine taken on the line 1—1 of Fig. 2; and Fig. 2 a cross section thereof taken on the line 2—2 of Fig. 1.

Referring to the embodiment of my invention illustrated in the drawing, such engine comprises essentially a main casing and a rotatable cylinder provided with a plurality of sets of pistons coöperating with a stationary crank shaft, which cylinder acts as its own valve or valves in connection with ports and passages on the inner face or surface of said main casing. The movement or rotation of this cylinder is communicated to the driving element, whatever it may be, such as a gear wheel, sprocket wheel, pulley or the like.

As shown particularly in Fig. 1, the main casing is in the present instance made in two parts, an outer casing 1 and inner casing 2. The outer casing, which may be of any suitable form and dimensions, forms the main casing of the machine or engine and the same is provided with a large bore entering from one side thereof to receive the inner casing 2 which fits closely therewithin. The outer casing 1 is closed at its open side or end by means of a cover plate 3, while the inner casing is similarly closed at its open end by means of the cover plate 4, both of said cover plates being secured by suitable means to their respective casings, as by means of the bolts 5 and 6 respectively.

The inner casing 2 is hollow, it being provided with a circular bore into which is fitted a rotating cylinder 7, the latter being solid except for a plurality of piston chambers corresponding in number to the number of sets or pairs of pistons employed. As stated, a plurality of sets or pairs of pistons may be employed, and in the present instance I have shown two of such piston chambers, although a greater number thereof may be employed if desired. These two piston chambers 8 and 9 extend radially of the cylinder 7 and as there are two of these piston chambers the same are positioned at right angles to each other but in two different parallel planes, as clearly indicated in the drawings. In each piston chamber travels a pair of single acting pistons 10 which are connected by means of the connecting rods 11 to the stationary crank shaft 12, which extends through the cylinder 7 from end to end thereof. One end of the crank shaft is secured to the end wall of the outer casing 1, while the other end is secured to the post or pedestal 13 at the other side or end of the machine. As stated, this crank shaft is stationary, and as the connecting rods 11 of the pistons are connected to the crank portions of such shaft, the cylinder 7 is caused to rotate by the fluid pressure which is alternately admitted to and exhausted from opposite ends of said piston chambers. One end of the cylinder 7 is provided with an end plate 14 closing one side of one of the piston chambers while the other end of the cylinder is provided with an end plate 15 provided with a hub portion 16 extending laterally through the cover plates 3 and 4 to a position outside the casings where it is provided with the driving element which in the present instance is a pulley 17. This end plate 15 and its hub portion has a central bore which receives the stationary crank shaft, so that such shaft forms the axis of rotation, not only for the cylinder 7 but also for said hub portion and the pulley.

Referring next to the ports and passages for the admission and exhaust of the motive fluid, I provide on the inner surface of the inner casing 2 two parallel circular grooves or channels 18 extending substantially half way around the bore of said inner casing and constituting the exhaust passages for the two piston chambers in the cylinder 7 with the opposite ends of which chambers they communicate at the proper times in the rotation of such cylinder. These exhaust

grooves or passages 18 communicate at their lower end with passages 19 in the base or main casing of the machine, which passages connect with the final exhaust passage 20. The inner casing 2 is provided with a pair of similar grooves or channels 21, which constitute the inlet grooves or passages. These passages communicate in suitable manner with an inlet pipe 22 which is automatically throttled in any well-known manner, as by means of the governor 23 and the throttle valve (not shown) operated thereby.

As indicated in the drawings, the various grooves and passages are so disposed relative to each other as indicated particularly in Fig. 2 that the ends of the different piston chambers will be placed in communication with the inlet passage or the exhaust passage as the case may be at the proper time and alternately.

It will be observed from an inspection of Fig. 2 that according to the position of the parts there shown the exhaust passages 18 are on the right hand side of said figure, while the inlet passages are on the left hand side thereof, said passages or grooves extending slightly more than one half of the circular extent of the inner bore of the casing 2. The engine is therefore of the valveless type, no special valves being employed for the admission and exhaust of the motive fluid, the functions of said valves being performed by the rotating cylinder 7 itself.

The construction and arrangement of the parts, as well as the supply and the inlet and exhaust ports, having been fully described, it will be unnecessary to describe the operation in detail except to say that, as shown in Fig. 1, when the left hand piston chamber is in the position shown its lower end is at exhaust through the exhaust port 24, which about this time is communicating with its exhaust groove or passage 18 while the other end of such piston chamber is in communication with the inlet port 21 through the medium of its inlet port 25. At the same time, in respect to the other piston chamber and its pistons the motive fluid is being exhausted from one end and admitted to the other.

It will be understood that the engine may be reversed by reversing the inlet and exhaust passages and also that the cut-off may be regulated by blocking the inlet grooves and thereby shortening the same.

I claim:

1. In a valveless fluid pressure engine, the combination of a casing having a bore provided on its inner walls with pairs of substantially semi-circular channels extending along opposite sides of said walls and forming inlet and exhaust passages for the motive fluid, a cylinder fitting and rotatable in said bore and having a plurality of piston chambers arranged in different planes and closed at their outer ends by end walls which are provided with separate inlet and exhaust ports, said ports being located in the same planes as said inlet and exhaust channels respectively, a crank shaft forming the axis of rotation of the cylinder, and pistons operating in said piston chambers and operatively connected with the crank shaft.

2. In a valveless fluid pressure engine, the combination of a casing having a bore provided on its inner walls with pairs of substantially semi-circular channels extending along opposite sides of said walls and forming inlet and exhaust passages for the motive fluid, said channels being in different but parallel planes and slightly exceeding a half circle so that the ends of the channels overlap in extent, a cylinder fitting and rotatable in said bore and having a plurality of piston chambers arranged in different planes and closed at their outer ends except for separate inlet and exhaust ports, said ports being arranged in planes corresponding with the inlet and exhaust channels respectively, a stationary crank shaft forming the axis of rotation of the cylinder, and pistons operating in said piston chambers and operatively connected with the crank shaft.

3. In a valveless fluid pressure engine, the combination of an outer casing 1, a bushing 2 therein provided on its inner face with the substantially semi-circular exhaust channels 18 and inlet channels 21 arranged in different but parallel planes, a cylinder 7 rotatable in said bushing and having a plurality of diametrically disposed piston chambers 8 and 9, a pair of pistons 10 in each piston chamber, each piston chamber extending to near the periphery of the cylinder and closed by end walls except for the exhaust ports 24 and inlet ports 25 which pass through the end walls and are located in position to communicate with the exhaust and inlet grooves respectively in the rotation of the cylinder, and a stationary crank shaft which passes axially through the cylinder and to which the pistons are connected.

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Witnesses:
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