No. 879,428.

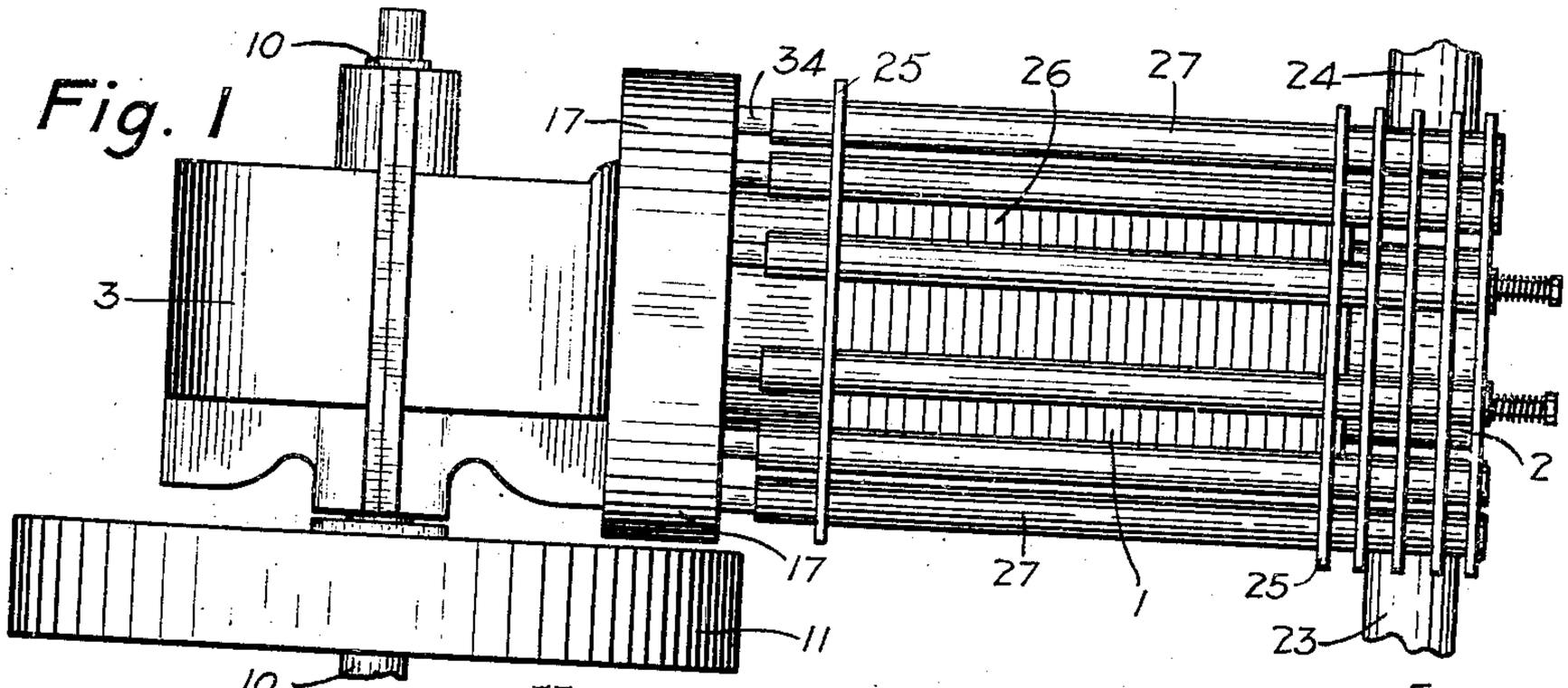
G. WOLKE. PATENTED FEB. 18, 1908.

COOLING DEVICE FOR ENGINES.

APPLICATION FILED AUG. 9, 1906.

2 SHEETS—SHEET 1

Fig. 1



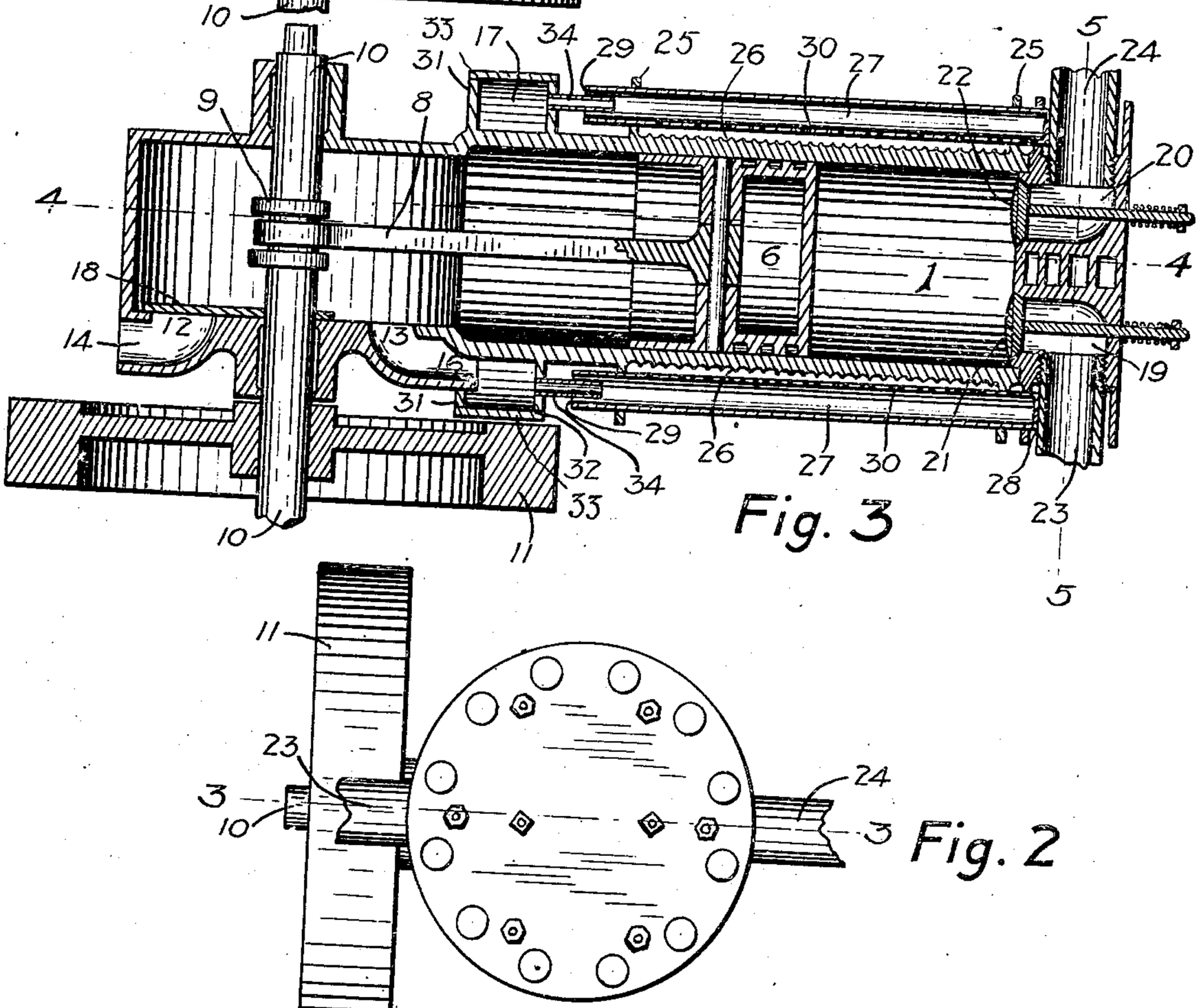


Fig. 3

Fig. 2

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2 SHEETS—SHEET 2.

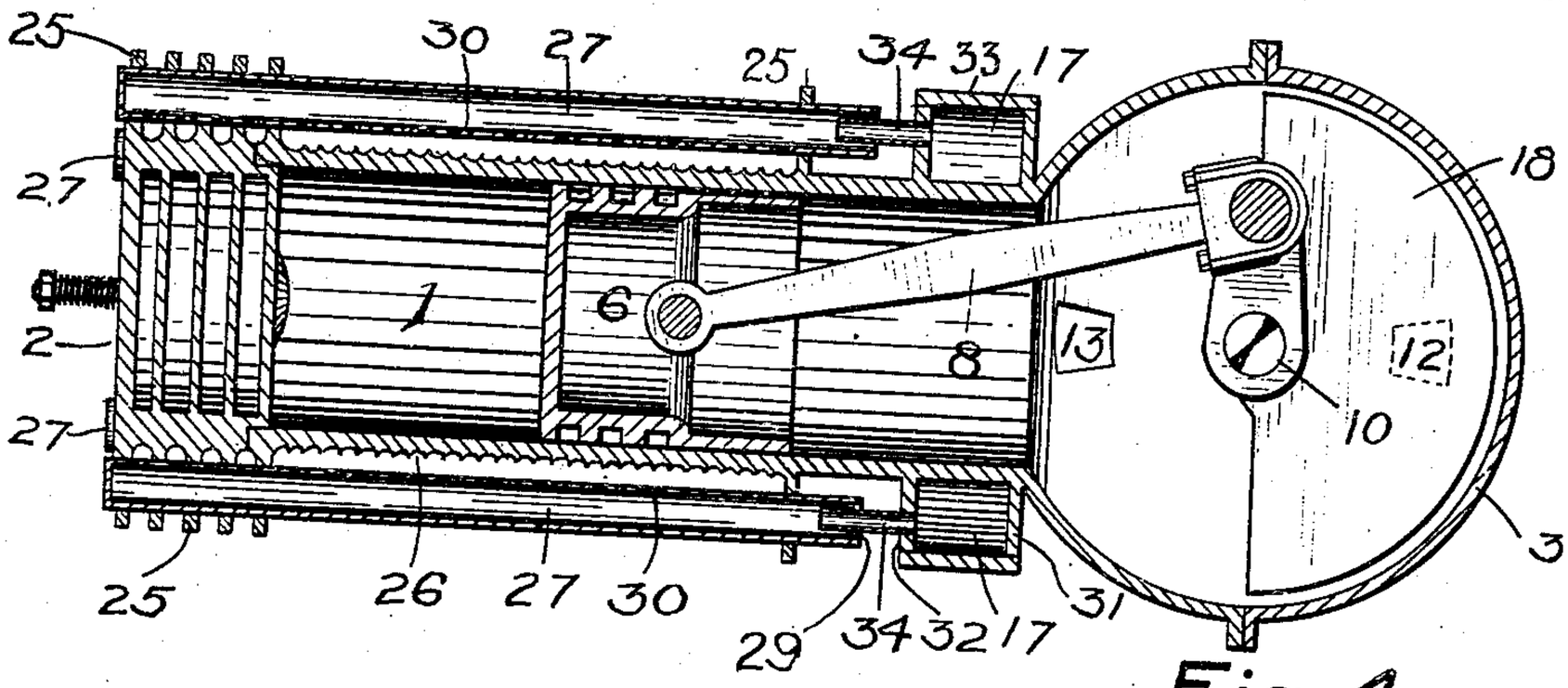

Fig. 4

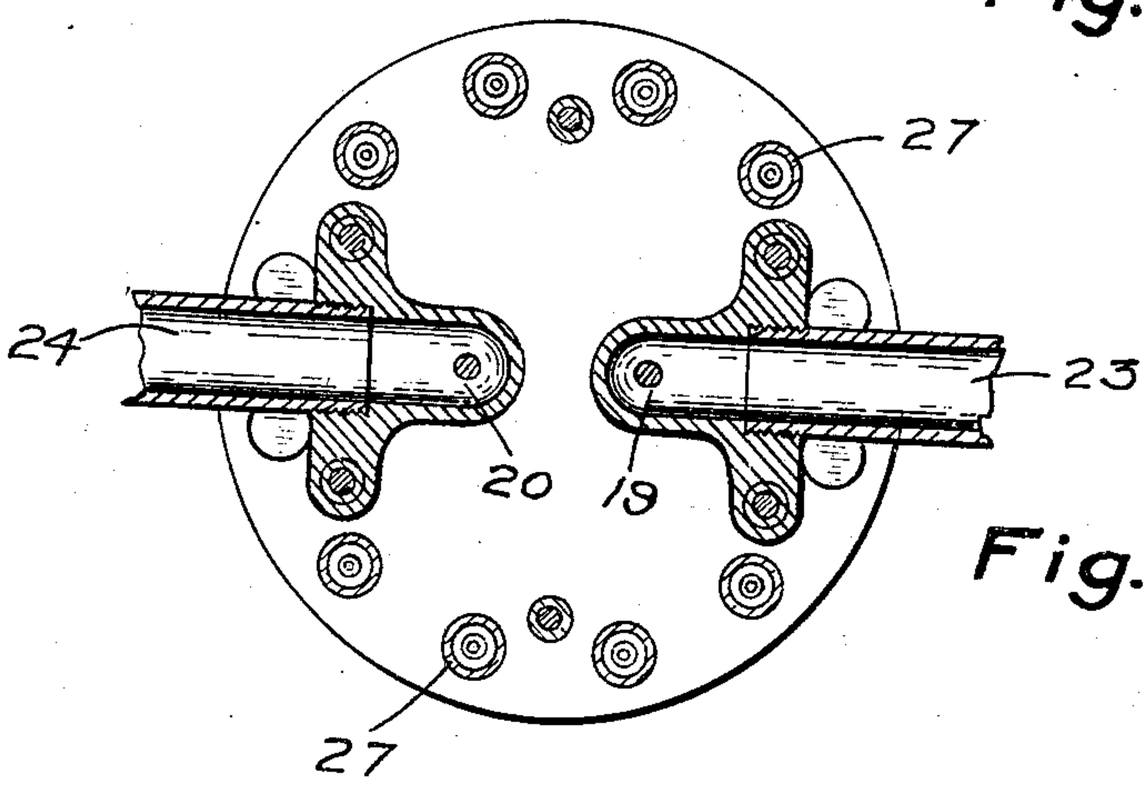

Fig. 5

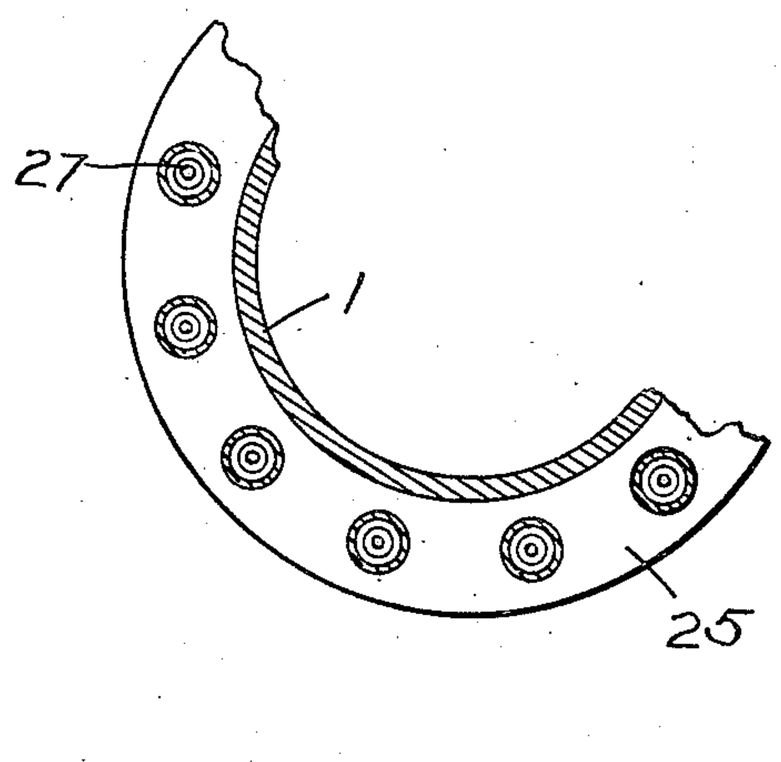

Fig. 6

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UNITED STATES PATENT OFFICE.

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COOLING DEVICE FOR ENGINES.

No. 879,428. Specification of Letters Patent. Patented Feb. 18, 1908.

Application filed August 9, 1906. Serial No. 329,919.

To all whom it may concern:

Be it known that I, GEORGE WOLKE, a citizen of the United States, residing at Jacksonville, in the county of Morgan and State of Illinois, have invented certain new and useful Improvements in Cooling Devices for Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in cooling devices for internal combustion motors, and more particularly to a device of the character set forth in Letters-Patent #798,247 granted to me August 29, 1905.

The object of the present invention is to render the device more effective in operation, that is, in cooling the cylinder and other heated parts of the engine or motor. In the patent above mentioned the air or cooling medium was first drawn into the crank chamber and then forced into an annular distributing chamber from which projected apertured discharge tubes for directing the cooling jets against the cylinder. While this construction is ordinarily very efficient in accomplishing its purpose, I have found that under certain conditions the air in passing through said chambers becomes heated to such an extent that its cooling effect upon the engine cylinder is but slight. This objection I overcome by so constructing the device that cool outside air will be injected or drawn into the apertured discharge tubes, by the streams or jets of partially heated air, which jets are forced from the distributing chamber into said tubes.

Another object of the invention is to simplify the construction of devices of this character and thereby reduce the cost of manufacturing the same and at the same time render them more effective.

With the above and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings, wherein a preferable embodiment of my invention is shown and in which like numerals of reference refer to similar parts in the several views:—Figure 1 is a top plan view of a gasolene engine or motor constructed in accordance with my invention; Fig. 2 is an end elevation of the same; Fig. 3 is a sectional view taken on the plane indicated by the line 3—3 in Fig. 2; Fig. 4 is a sectional view taken on the plane indicated by the line 4—4 in Fig. 2; Fig. 5 is a sectional view taken on the plane indicated by the line 5—5 in Fig. 3; and Fig. 6 is a detail sectional view, on an enlarged scale, through a portion of the engine cylinder and several of the apertured discharge tubes.

Referring now more particularly to the drawings, the numeral 1 denotes an engine cylinder having its outer end closed by a head 2 and its inner end in open communication with a closed crank chamber or casing 3. A piston 6 is adapted to reciprocate in the cylinder 1 and is connected by a pitman rod 8 to a crank 9 upon a shaft 10 which is journaled in suitable bearings in the casing 3 and has upon one of its ends the usual fly wheel 11.

The closed crank chamber 3 has formed in one of its side walls, air inlet and outlet ports or openings 12 and 13 which are disposed upon opposite sides of the shaft, as shown. The intake port 12 communicates with a passage 14 formed in the casing and opening to the atmosphere, or if desired, to a suitable connection (not shown) leading from a source of supply of cold air or other cooling medium. The outlet port 13 communicates with a passage 16 formed in said casing and communicating with an annular air receiving chamber 17, which surrounds the inner end of the cylinder 1, preferably as shown. Coacting with the said inlet and outlet ports 12 and 13, is a rotary valve 18 in the form of a semi-circular disk secured to the crank shaft 10. This valve rotates with the shaft and alternately opens and closes said ports 12 and 13, so that the rear end of the piston 6 and the closed crank chamber will serve as an air pump. Upon the outward movement of the piston 6 or the stroke toward the combustion end of the cylinder, the valve 18 will close the port 13 and open the port 12 to suck or draw air into the chamber 3 through said port 12, and upon the return of the piston toward the crank chamber or on its instroke, the valve 18 will open the port 13 and close the port 12, so that the air drawn into the crank chamber will be forced from the same through said

port 13 and said passage 16 and into the air receiving chamber 17.

In the head 2 of the cylinder are arranged inlet and exhaust passages 19, 20 which communicate with the interior of the cylinder 1 and are formed with seats to receive inlet and exhaust valves 21, 22. These valves have their stems suitably guided in the head 2 and may be actuated by any suitable mechanisms (not shown), so that fresh charges of gas will be admitted through a supply pipe 23 opening into the chamber 19, and the spent gases will be discharged through an exhaust or outlet pipe 24 leading from the passage 20. A sparking or igniting device of any suitable form may be provided for igniting the charges of gas within the cylinder. The cylinder 1 and its head 2 are formed with annular heat radiating flanges or webs 25, which are preferably arranged as clearly shown in Figs. 1 and 3 of the drawings. As shown, four are provided on the head which serves as a casing for the valves, and two are provided on the cylinder, one adjacent to either of its ends. The outer surface of the cylinder, between its two flanges or webs 25, is formed with a plurality of annular grooves, which form between them parallel ribs 26. The flanges 25 are formed at suitable points with longitudinally alining openings to receive apertured air discharge tubes 27. The latter extend longitudinally and are arranged in an annular row around the cylinder, their outer ends being closed as shown at 28, and their inner ends open as shown at 29 and terminating a short distance from the air receiving chamber 17. The apertures or orifices 30 in the tubes 27 are arranged so that one or more are located between each of the flanges 25, and those between the two flanges on the cylinder 1 are so arranged that they are opposite the annular ribs 26 on said cylinder.

The air receiving chamber 17, which is preferably formed of two annular flanges 31, 32 connected by a ring or band 33, has projecting from its inner wall a series of injector or jet tubes 34. These tubes 34 are of less diameter than the interior diameter of the distributing or discharge tubes 27, into the open ends of which latter said tubes 34 extend, as shown in Fig. 3. It will be seen that when the air in the receiving chamber 17 is forced through the tubes 34, cool outside air will be sucked or drawn through the open ends 29 of the tubes 27 and into the latter. The jet tubes 34 thus serve as injectors to draw in the outside air which is of a lower temperature than the air forced through said jet tubes, owing to the fact that this forced stream of air becomes somewhat heated in its passage through the crank chamber 3 and the chamber 17. The cool outside air materially lowers the temperature of the multitude of cooling jets forced out of the orifices 30 against the heated parts of the motor and thereby renders the device exceedingly effective in accomplishing its purpose.

The operation and advantages of this invention will be readily comprehended from the foregoing description, taken in connection with the accompanying drawings and the following brief statement. Upon each outstroke of the piston air will be drawn into the crank chamber and upon its in-stroke will be forced into the annular air receiving chamber 17, from which it is discharged through the small jet tubes 34 and into the distributing or discharge tubes 27. These forced jets of partially heated air will draw into the tubes 27 the cool outside air, and the mixture will be discharged through the orifices 30 in a multitude of streams or jets against the heated parts of the motor to effectively cool the same.

While I have shown and described the preferred embodiment of my invention, it will be understood that I do not wish to be limited to the precise construction herein set forth, since various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters-Patent is:—

1. An internal combustion motor comprising a cylinder, a crank chamber communicating therewith, a piston arranged in the cylinder, a crank-shaft housed in the chamber and connected for operation by the piston, a fluid receiving chamber communicating with the crank chamber, means for controlling the admission of fluid from the crank chamber to the fluid-receiving chamber, jet tubes opening into and projecting from the latter, and perforated fluid-distributing tubes sustained around the cylinder and open ends to receive the respective jet tubes, the open ends of the distributing tubes being of greater internal diameter than the external diameter of the jet tubes.

2. An internal combustion motor comprising a cylinder, a crank chamber communicating therewith, a piston arranged in the cylinder, a crank shaft extended through the chamber and operatively connected with the piston, said chamber having an inlet and an outlet port and the cylinder being provided with a series of circumferential grooves, a fluid-receiving chamber communicating with the crank chamber through the medium of said outlet port, a series of perforated fluid-distributing tubes sustained around the cylinder and having their perforations disposed to direct fluid into said grooves, and a series of jet tubes opening into and projecting from the fluid-receiving chamber with their

discharge ends disposed severally in the open ends of the respective distributing tubes.

3. In an internal combustion motor, the combination with a cylinder, a piston, a crank-shaft and crank chamber, of air-distributing means to direct cooling streams of air against said cylinder and having inlets opening to the outer air, an air-receiving means having a port in communication with said crank chamber, said crank chamber also having an air inlet, a valve actuated by said crank and common to both the said port and the said inlet, and jet tubes for directing the air in said air receiving means into said air distributing means through the air inlet opening thereof and thereby causing outside air of a lower temperature to be drawn or injected into the same, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE WOLKE.

Witnesses:
THOS. V. FINNEY,
WALTER AYERS.