E. R. BURTNETT.

AIR COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED OCT. 4, 1918.

1,323,010. Patented Nov. 25, 1919.

Fig. 1.

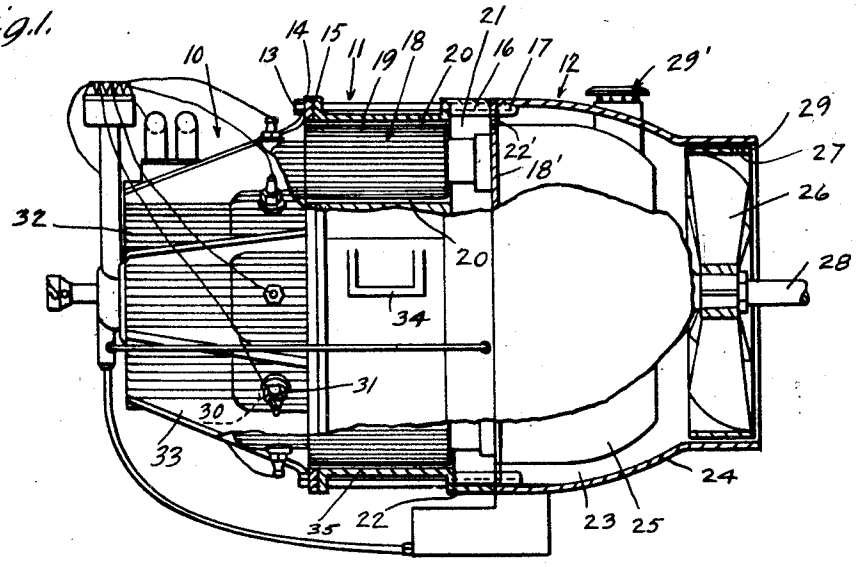


Fig. 2.

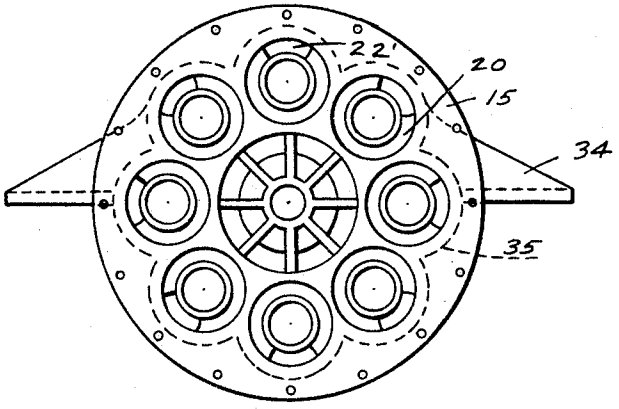
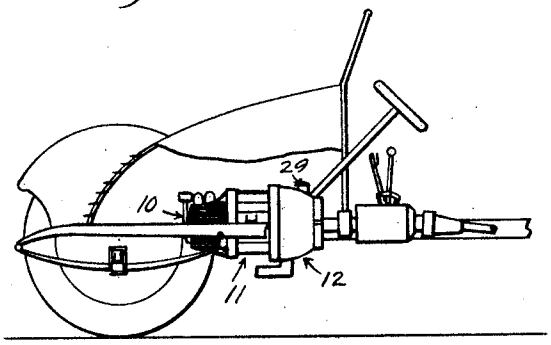


Fig. 3.



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EVERETT R. BURTNETT, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO TITUS E. BERRY, OF LOS ANGELES, CALIFORNIA.

AIR-COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,323,010. Specification of Letters Patent. Patented Nov. 25, 1919.

Original application filed May 2, 1918, Serial No. 232,122. Divided and this application filed October 4, 1918. Serial No. 256,897.

To all whom it may concern:

Be it known that I, EVERETT R. BURTNETT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Air-Cooling Systems for Internal-Combustion Engines, of which the following is a specification.

My invention relates to an air cooling system for internal combustion engines and particularly for engines which have their cylinders arranged concentrically around the engine shaft and parallel thereto.

The object of my invention is to provide for cooling valve casings, combustion chambers and cylinders by causing air currents to pass through the engine over and around these parts.

The present invention is a division of my co-pending application, Serial No. 232,122, filed May 2, 1918 for an internal combustion engine in which the present invention is shown and described but not claimed.

On the accompanying drawings Figure 1 is a side elevation of an engine of the type referred to with parts broken away and shown in section.

Fig. 2 is a view in elevation of the middle or cylinder section of the engine casing looking into the front end.

Fig. 3 is a fragmentary view of an automobile in side elevation showing the position of the engine when applied to an automobile.

As shown in Fig. 1, the engine casing is made up of three parts: a front part 10 inclosing a rotary valve common to all the cylinders; a middle part 11 within which the cylinders are mounted; and a rear part 12 which serves as an air distributing head and also as a housing for the drive mechanism. Parts 10, 11 and 12 comprising the valve casing, cylinder casing, and air distributing head respectively are held together by stud bolts 13 which extend through a flange 14 formed on the rear end of the valve casing a flange 15 formed on the front end of the cylinder casing and backward through bosses 16 formed in the rear end of the cylinder casing and screw into bosses 17 formed in the front end of the air distributing head.

Cylinders 18, whose forward ends are fixed in the rear head of the valve casing and whose rear ends are fixed in the rear head 18′ of the cylinder casing, are mounted within the outer cylinder casing. Longitudinal radiating ribs 19 are formed on the inner cylinder casing so as to leave a small air space 20 between inner and outer cylinder casings. This space opens into an enlarged air space 21 formed by an enlargement 22 on the rear end of the cylinder casing. This air chamber communicates through openings 22′ formed in the cylinder casing head 18′ with an annular air chamber 23 in the air distributing head between the outer casing 24 and an outer casing 25 which incloses the drive mechanism.

A fan 26, the outer end of whose blades terminate in a heavy rim 27, is mounted on the engine shaft 28 within the rear opening 29 of the air distributing head, said fan serving as a fly wheel as well as fan. The screened pipe 29′ leading into the inner casing 25 of the air distributing head admits air to the inner parts of the engine as shown in my co-pending application.

Combustion chambers 30, which connect with the forward ends of the cylinders, are formed in the valve casing; and spark plugs 31 are mounted therein in the usual way. The combustion chambers and the forward part of the cylinder chamber 32 are provided with longitudinal radiating ribs similar to those on the inner cylinder casing. Bracing ribs 33 are formed around the valve casing between the combustion chambers. Suspension brackets 34, cast integral with the cylinder casing, extend outwardly therefrom.

As shown in the dotted lines 35 in Fig. 2, the outer cylinder casing is made to conform to the curvature of the inner cylinder casings rather closely so as to confine the air currents close around and between the radiating ribs of the inner cylinder casings.

The operation is evident. As the crank shaft 28 revolves carrying the fan 26 with it, air is drawn from front to rear through the engine over the valve casing and the combustion chambers, and between and around the radiating ribs of the cylinder casing, through air chamber 21 and air openings 22′ into an air chamber 23, and out through the rear opening of the distribut-

ing head. A thorough circulation of air is thus produced over and around all heated parts effectively cooling them.

Various changes may be made without departing from the spirit of my invention as claimed.

I claim:

1. In an internal combustion engine having a series of cylinders arranged concentrically around its shaft and parallel thereto, an outer casing surrounding said cylinders and forming an air space between said cylinders and said outer casing, an air distributing head connected to said outer casing, and means for producing air currents through said distributing head and between the said outer casing and said cylinders.

2. In an internal combustion engine having a series of cylinders arranged concentrically around the shaft and parallel thereto, an outer casing surrounding said cylinders and forming an air space between said outer casing and said cylinders, an air distributing head connected to said outer casing, and a fan fly wheel mounted on the engine shaft within the outer opening of said air distributing head to produce air currents through said air distributing head and between said outer casing and said cylinders.

3. In an internal combustion engine having a series of cylinders arranged concentrically around a drive shaft and parallel thereto, an outer casing surrounding the cylinders and forming an air space between the outer casing and the cylinders, longitudinal radiating ribs formed on the cylinder casings and extending into the air space, means forming an enlargement of the air space behind the cylinders, a casing extending backwardly from the enlargement and covering the drive mechanism, an air distributing head concentric with the casing and forming a chamber extending backwardly from the enlargement, and a fan mounted in the distributing head behind the casing.

4. In an internal combustion engine having a series of cylinders arranged concentrically around the shaft and parallel thereto, an outer casing surrounding the cylinders and forming a limited air space, longitudinal ribs extending from the cylinders into the air space and forming an enlargement of the air space behind the cylinders, a casing extending from the cylinders and covering the driving mechanism, a distributing head extending from the first casing concentric to the second casing and forming an air passage leading from the enlargement, and a fan mounted in the distributing head behind the first casing.

In testimony whereof I have signed my name to this specification.

EVERETT R. BURTNETT.