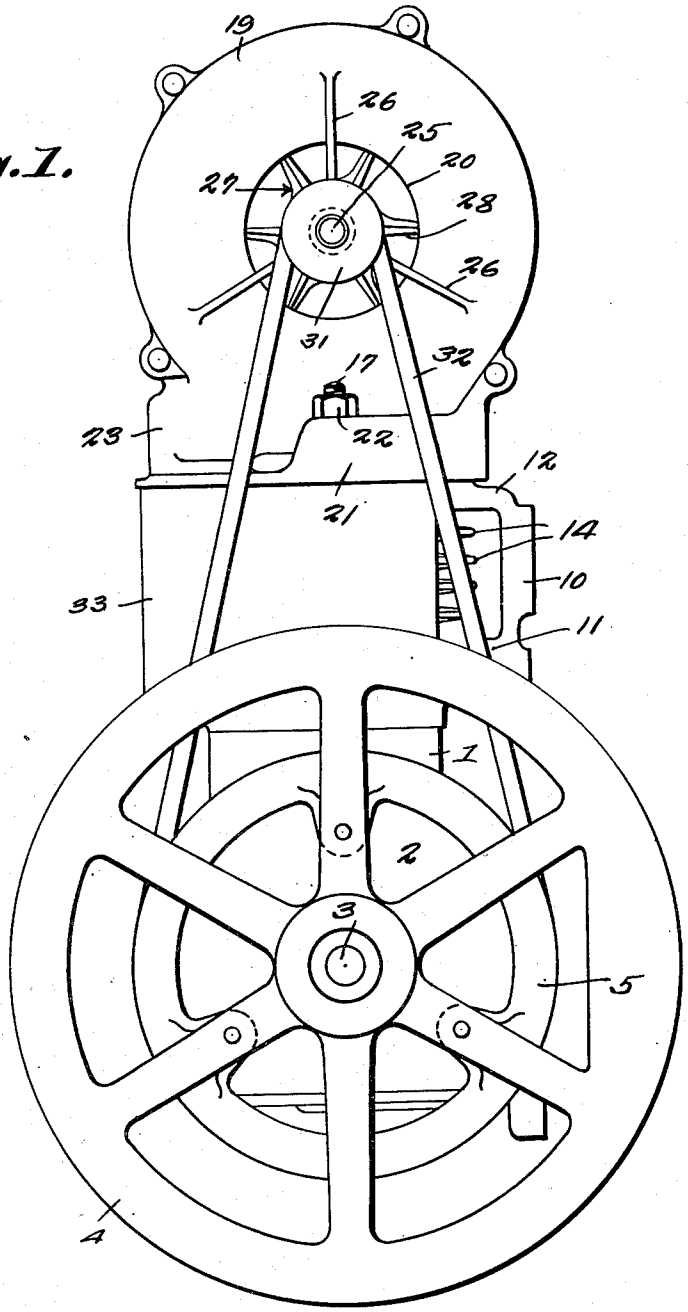
April 24, 1945. H. O. HANSEN 2,374,483

AIR COOLED ENGINE

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Fig. 1.




Harold O. Hansen INVENTOR.

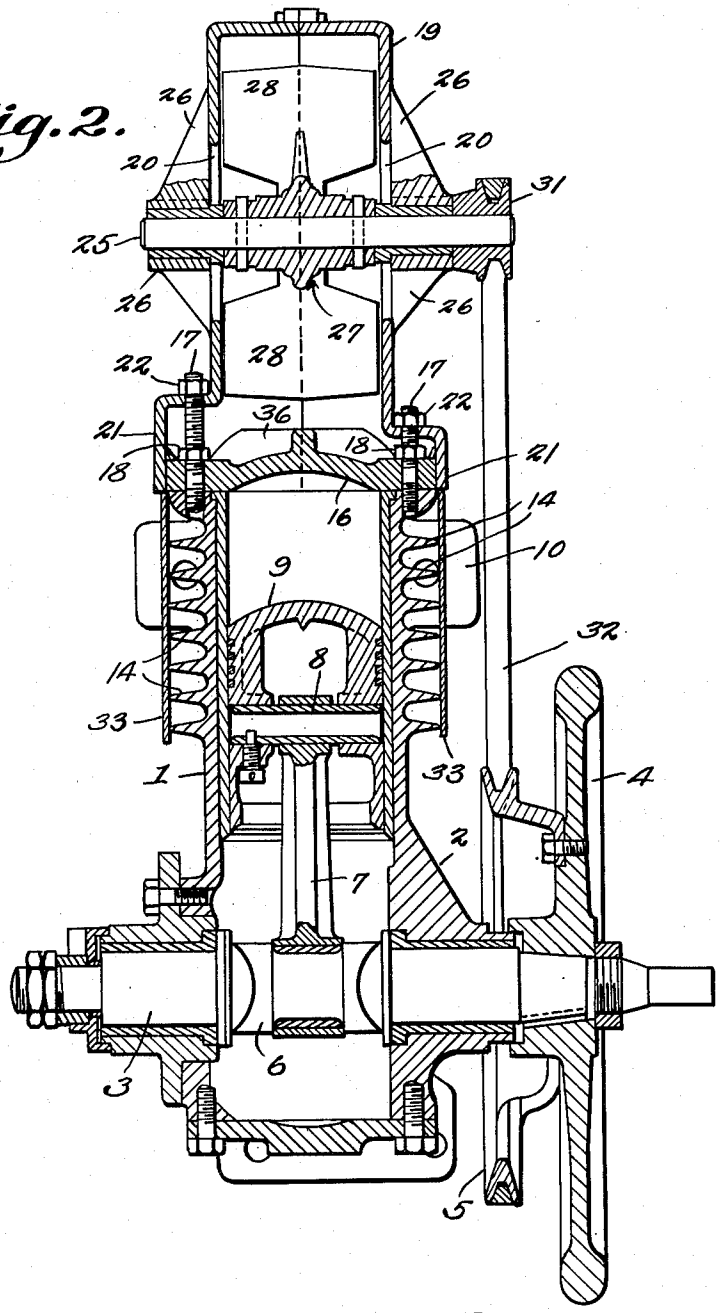
BY C. A. Snow & Co.

April 24, 1945. H. O. HANSEN 2,374,483

AIR COOLED ENGINE

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Fig. 2.




Harold O. Hansen INVENTOR.

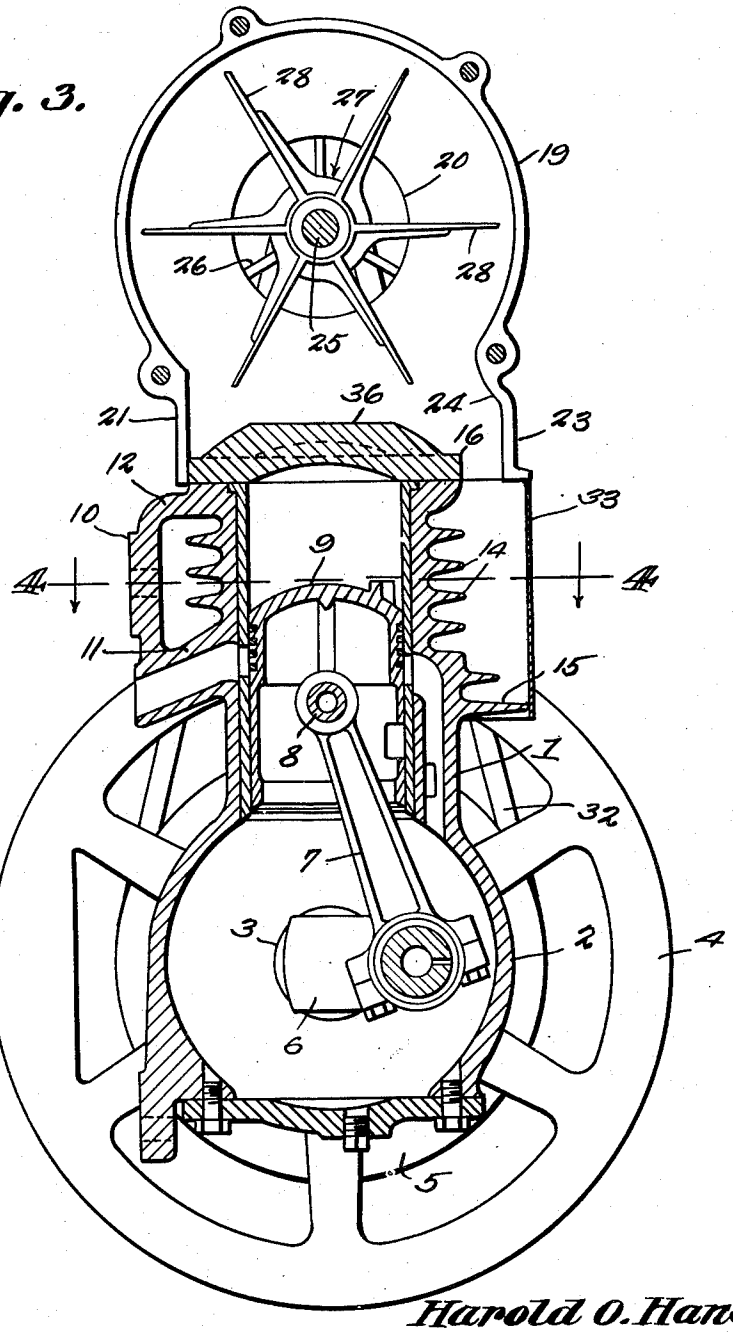
BY Albert & Co.

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Fig. 3.




Harold O. Hansen
INVENTOR.

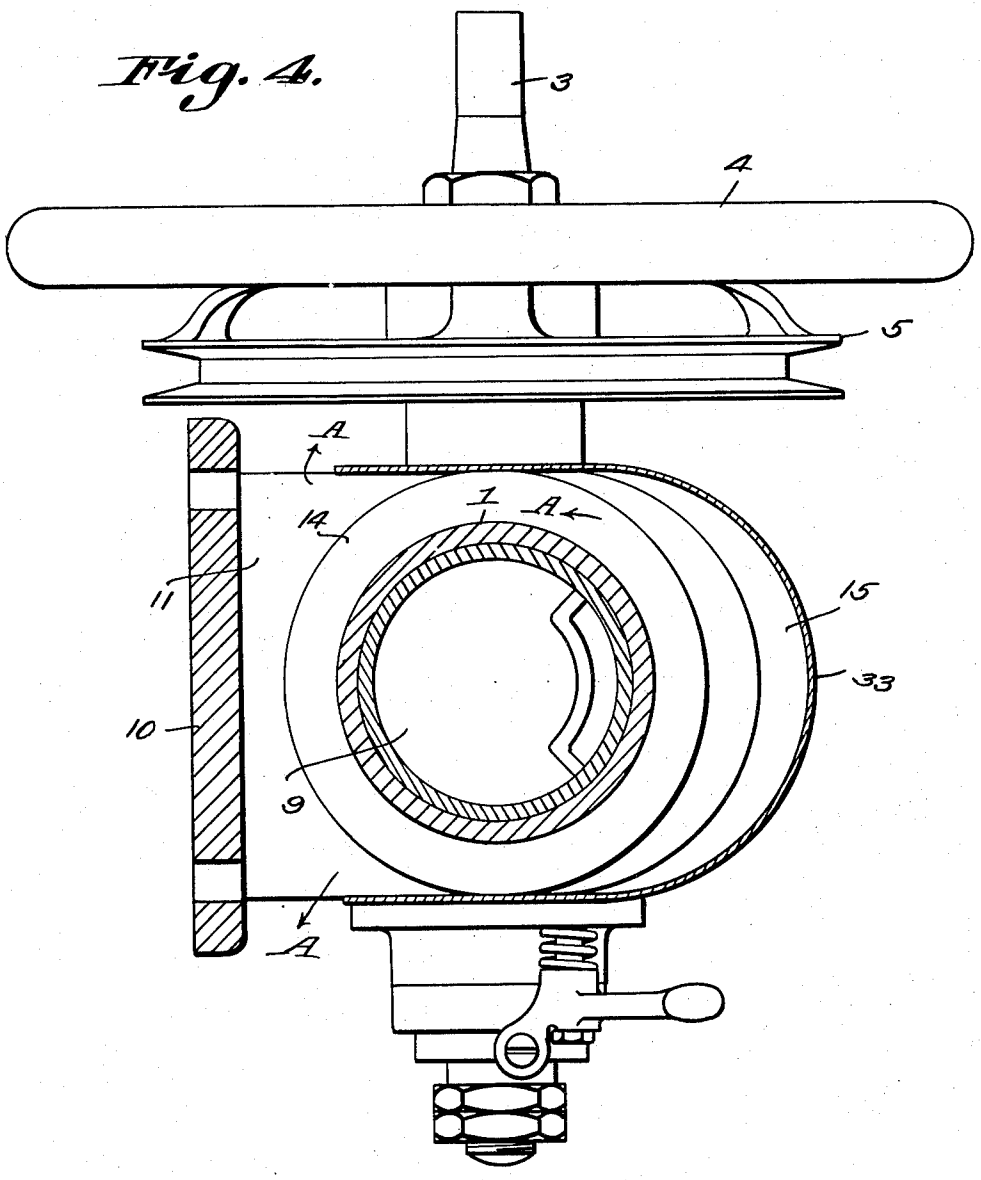
BY C. L. Knowles.

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AIR COOLED ENGINE

Filed June 8, 1943 4 Sheets-Sheet 4

Fig. 4.




Harold O. Hansen

INVENTOR.

BY Albert Lee.

Patented Apr. 24, 1945

2,374,483

# UNITED STATES PATENT OFFICE

2,374,483

## AIR-COOLED ENGINE

Harold O. Hansen, Eureka, Calif.

Application June 8, 1943, Serial No. 490,085

1 Claim. (Cl. 230—128)

This invention aims to provide, in combination with an air cooled, internal combustion engine, a novel fan structure for driving air downwardly about the cylinder of the engine, to aid in cooling it, the fan structure being effective, without attention on the part of an operator, to carry out the cooling operation regardless of whether or not the engine and the fan structure are operated directly or in reverse.

The invention aims to provide novel means for assembling the fan structure and associated parts with an engine.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 shows, in side elevation, a device constructed in accordance with the invention;

Fig. 2 is a vertical longitudinal section taken in a plane parallel to the axis of rotation of the crank shaft;

Fig. 3 is a vertical longitudinal section taken in a plane at right angles to the cutting plane in Fig. 2;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

The device forming the subject matter of this application is adapted to be used in connection with air cooled internal combustion engines of widely different sorts, but by way of illustration, the drawings show the body of an internal combustion engine, comprising a cylinder 1, connected to a crank case 2 wherein a shaft 3 rotates. A fly wheel 4 is fixed to the shaft 3, and a pulley 5 is connected to the fly wheel, to rotate therewith. The crank of the shaft 3 is marked by the numeral 6 and is operated by a piston rod 7, pivoted on a crank pin 8, carried by a piston 9, mounted to reciprocate in the cylinder 1.

Undescribed parts of the engine body, shown in the drawings, are conventional, and may be of any preferred sort, their function being readily understood by those skilled in the art.

An attaching plate 10 is provided, and is connected to the cylinder 1 by a lower arm 11 and an upper arm 12. The cylinder 1 is supplied with a plurality of radiating fins 14, and the lowermost of these fins is prolonged throughout a portion of its circumference, as shown at 15 in Figs. 4 and 3, for a purpose which will be described hereinafter.

A head 16 is mounted on the cylinder 1 and is connected thereby by securing elements 17, such as bolts threaded into the cylinder, the securing elements carrying nuts 18, which engage the cylinder head. The securing elements 17 are prolonged above the nuts 18.

The numeral 19 designates a laterally separable fan casing, having air inlet openings 20 on its opposite sides. The fan casing 19 is provided at its outer end with a laterally offset, depending skirt 21, disposed about the engine head 16, the bolts 17 extending through the upper, horizontal wall of the skirt, nuts 22 being threaded on the bolts and engaging the upper wall of the skirt. The skirt 21 includes a depending neck 23, spaced from the periphery of the head 16, best shown in Fig. 3. The neck 23 has an inward inclination at its upper end and is provided with a downwardly and outwardly inclined surface 24, located approximately at the place of juncture between the upper portion of the neck and the main part of the fan casing 19.

A horizontal shaft 25 passes through the air inlet openings 20 of the fan casing 19 and is journaled for rotation in external bearings 26 on the fan casing. The shaft 25 carries a fan 27, including a plurality of blades 28, preferably disposed radially with respect to the shaft 25. The blades 28 are long enough (Fig. 3) so that they can force air into the neck 23 of the casing 19.

A pulley 31 is secured to one end of the shaft 25, the said pulley being of appreciably smaller diameter than the pulley 5 on the shaft 3. About the pulleys 31 and 5 is engaged a belt 32.

A U-shaped casing 33 (Fig. 4) extends downwardly from the skirt 21 to the radiating fins 14 on the cylinder and is closed at its lower end by the part 15 of the lowermost fin (Fig. 4). The casing 33 is secured to the peripheries of the fins 14, and the side arms of the casing extends backwardly with respect to the places of tangential contact between the arms and the fins, as Fig. 4 will disclose, the casing, thus, being open at the back. It can be seen in Fig. 3 that the neck or outlet 23 of the fan housing 19 discharges downwardly into the casing 33, the casing affording a chamber about the fins.

Referring to Fig. 3, when clockwise rotation is imparted to the fan 27, by means of the pulley 5,

the belt 32, the pulley 31 and the shaft 25, air drawn into the fan casing through the openings 20, will move downwardly through the neck 23, into the casing 33, the air moving (Fig. 4) backwardly about the cylinder 1 and the fins 14, the air finding an exit, to the rear of the side arms of the casing, as indicated by the arrows A in Fig. 4.

If counterclockwise rotation is imparted to the fan 27, the air, moving along the surface 26 of Fig. 3, will likewise pass downwardly through the neck 23 and through the casing 33 in the manner hereinbefore set forth, it being observed that the arms or blades 28 of the fan are long enough to impel air against the surface 24.

The general construction of the device is such that, regardless of whether the fan 27 is rotated directly or in reverse, there will always be a downdraft about the engine, to cool the cylinder thereof. The fan 27 of course impels air upon the cylinder head 16 and its fins 36, thereby to cool the head.

Having thus described the invention, what is claimed is:

In a mechanism for cooling a support by air, a substantially vertical support, a housing mounted on the upper end surface of the support and having at one side a depending neck, the inner wall of the bore of the neck being in substantially vertical alinement with the outermost lateral portion of the support, whereby air moving downwardly through the neck will have blast-contact with said portion of the support, as soon as air leaves the neck, a casing partially enclosing the support circumferentially and having an outlet spaced from the neck, the neck discharging downwardly into the casing, a horizontal shaft journaled in the housing and located directly above the support, a fan carried by the shaft and located within the housing and directly above the support, and means for rotating the fan, the fan comprising blades of such length as to overhang the neck and force air downwardly through it when the fan is rotated in one direction, the housing having in its interior a downwardly and outwardly inclined surface located at the upper end of the neck and overhanging the bore of the neck, said surface being in substantially horizontal alinement with the lowermost blades of the fan, whereby said blades will direct air horizontally upon said surface, said surface constituting means for directing air downwardly through the neck when the fan is rotated in an opposite direction.

HAROLD O. HANSEN.