Oct. 16, 1928. 1,687,541

W. F. CARMICHAEL

TURBINE FAN STRUCTURE

Filed Oct. 22, 1925

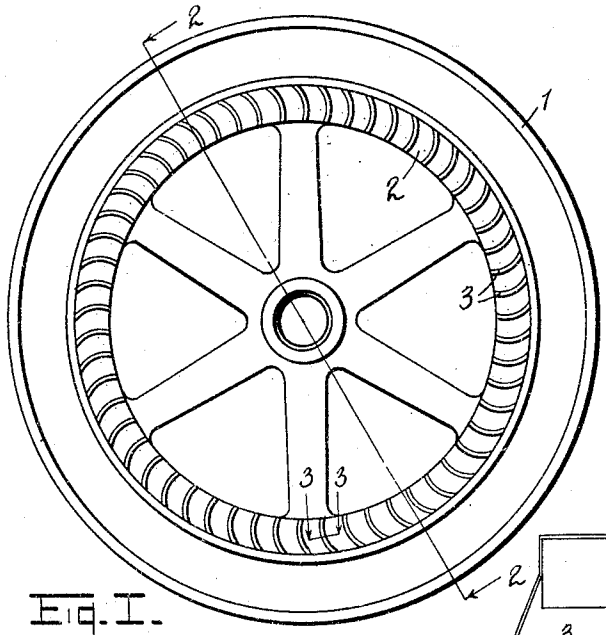


Fig. I.

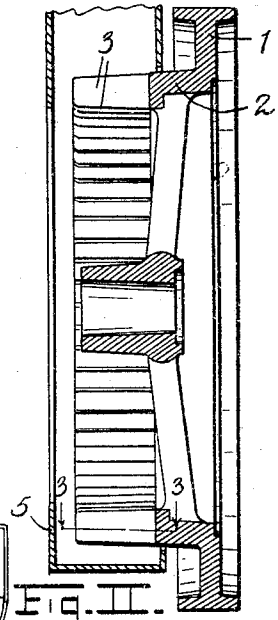


Fig. II.

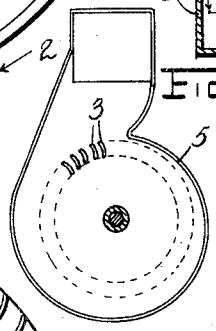


Fig. VI.

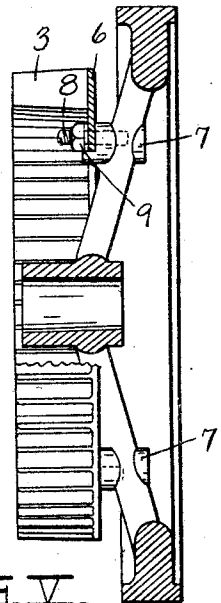


Fig. V.

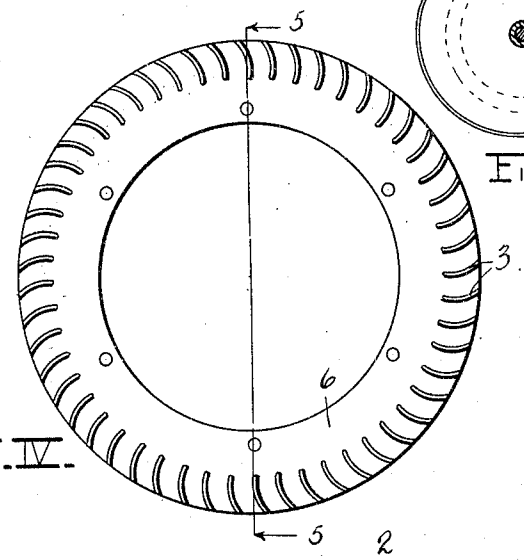


Fig. IV.

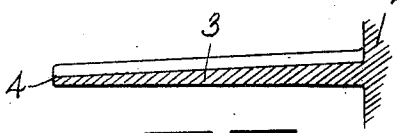


Fig. III.

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UNITED STATES PATENT OFFICE.

WILLIAM F. CARMICHAEL, OF LANSING, MICHIGAN, ASSIGNOR TO NEW WAY MOTOR COMPANY, OF LANSING, MICHIGAN.

TURBINE-FAN STRUCTURE.

Application filed October 22, 1925. Serial No. 64,160.

This invention relates to an improved turbine fan structure especially organized for cooling air-cooled internal combustion engines.

The main object of the invention is to provide such a structure which is very effective in use and very economical to produce.

Objects pertaining to details and economies of my invention will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I is a detail elevation view of the fly-wheel of an internal combustion engine with my improved turbine fan on its face.

Fig. II is a detail sectional view on a line 2—2 of Fig. I showing details of construction.

Fig. III is an enlarged detail sectional view on a line 3—3 of Figs. I and II showing the fan blade and its tapered form to enable production by casting.

Fig. IV is a modified form in which the fan is cast in a separate piece.

Fig. V is a sectional view on line 5—5 of Fig. IV through the fly-wheel showing the means of securing this separate cast fan structure to the fly-wheel by stud bolts.

Fig. VI is a small detail view of the volute casing of an internal combustion structure in its relation to the fan rotor.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts throughout the several views.

In the description the parts of the drawing will be indicated by their numerals of reference. 1 is the fly-wheel. 2 is the auxiliary fan rim of the fly-wheel. 3 are the driven blades of the fan cast integral with the auxiliary rim and the fly-wheel. The blades of the usual turbine form as used in a peripherally bladed fan are curved and tapered to draw from the mold in casting as seen in Fig. III. The outer end 4 is comparatively sharp and free to revolve in the volute to carry a maximum amount of air for the weight of the fan part. 5 is the volute casing of the usual form and open at both sides, the fan being open to receive air direct to the blades from both sides and discharging through the volute to cool the engine.

In the modified form the fan is preferably made as an aluminum casting on an auxiliary fan ring 6 which is secured to bosses 7 on the spokes of the fly-wheel by stud-bolts 8 having nuts 9 thereon as clearly appears in Figs. IV and V. This form of fan has the maximum of efficiency because the blades are unobstructed at their ends.

I have thus described my invention in detail and I desire to claim the same specifically as well as broadly as pointed out in the appended claims.

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

1. In a cooling fan structure for an internal combustion engine, the combination with the fly-wheel, of an auxiliary peripherally bladed fan rim cast thereon with integral curved turbine peripheral fan blades free at their outer ends and tapered to permit of casting, and a volute open at both sides surrounding the same to provide intakes to deliver air to the fan blades at both sides of the fan, coacting as specified.

2. In a cooling fan structure for an internal combustion engine, the combination with the fly-wheel, of an auxiliary peripherally bladed fan rim cast thereon with integral curved turbine peripheral fan blades free at their outer ends, and a volute open at both sides surrounding the same to provide intakes to deliver air to the fan blades at both sides of the fan, coacting as specified.

In witness whereof I have hereunto set my hand.

WILLIAM F. CARMICHAEL.