

Dec. 11, 1928.

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H. G. KAMRATH

AIR CLEANER

Filed Jan. 8, 1926

2 Sheets-Sheet 1

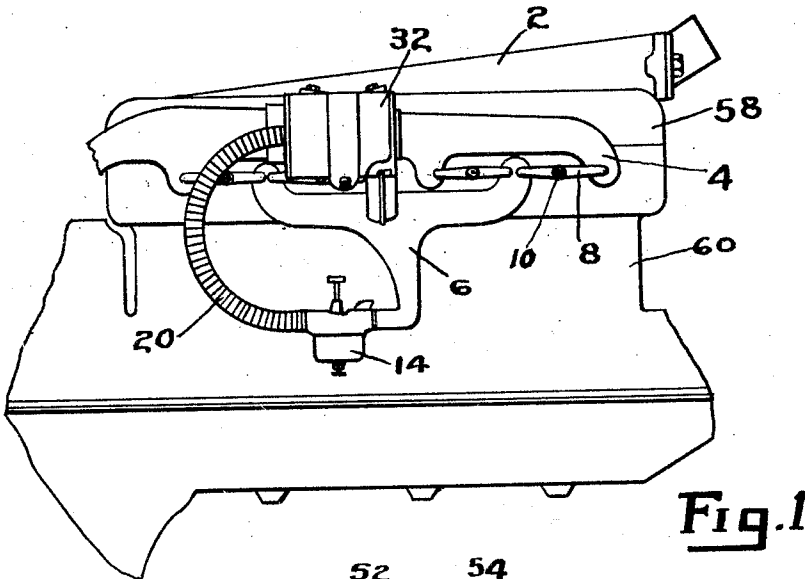
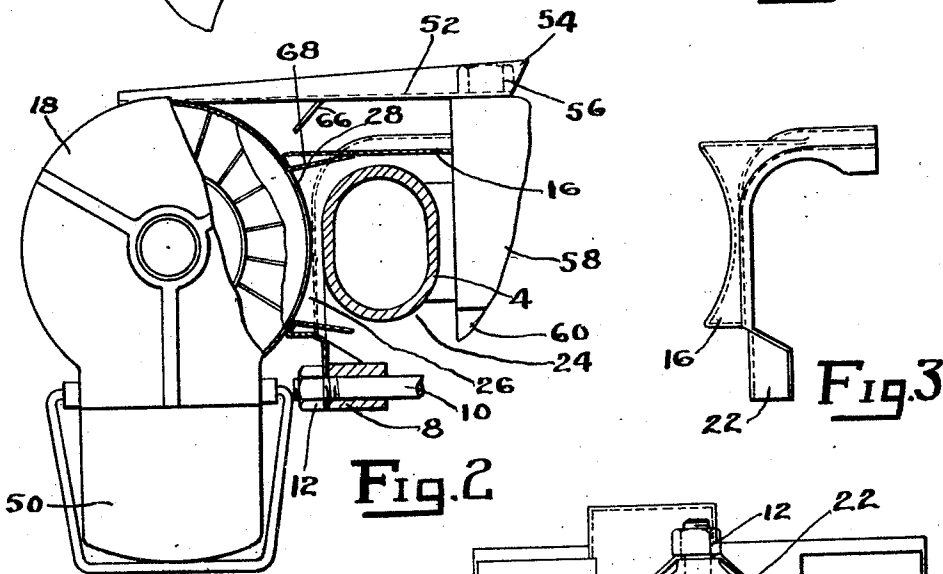
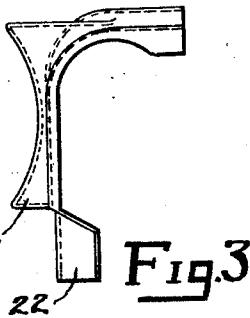
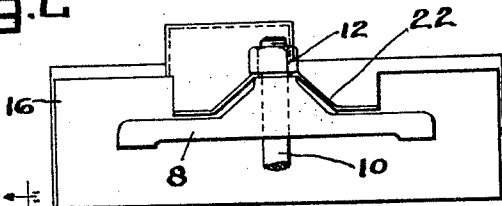
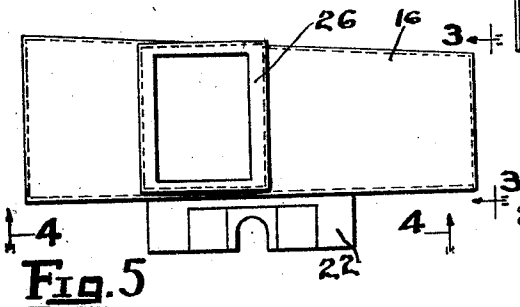


Fig. 4 Inventor
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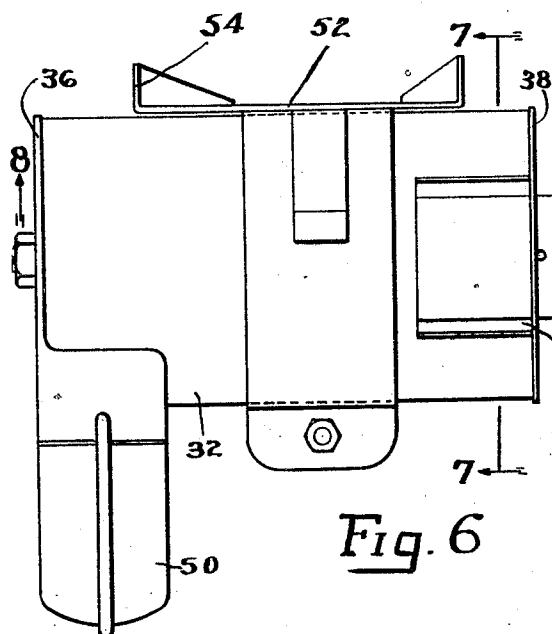


Fig. 6

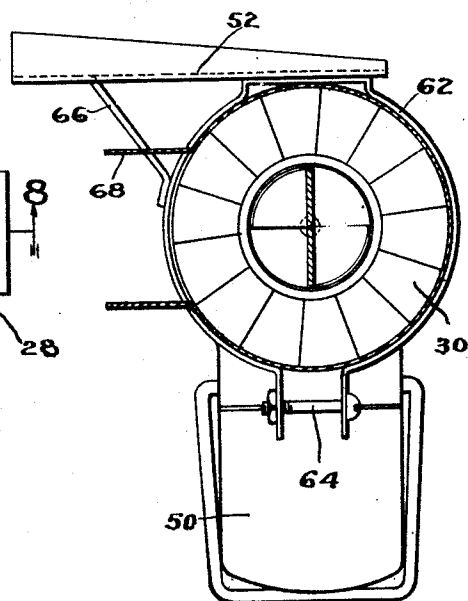


Fig. 7

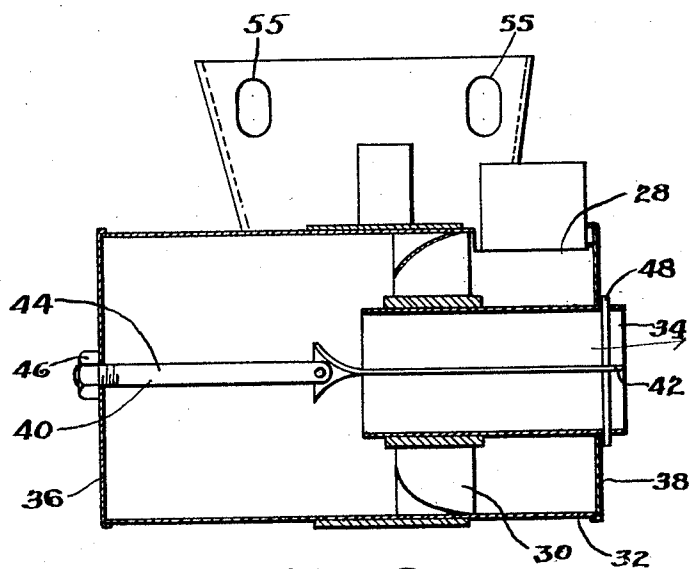


Fig. 8

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UNITED STATES PATENT OFFICE.

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AIR CLEANER.

Application filed January 8, 1926. Serial No. 80,004

This invention relates to an air cleaner assembly adapted for ready attachment to the well known Ford automobile. In the preferred form the assembly comprises a stove of somewhat conventional type adapted to be positioned over the usual exhaust conduit for the purpose of heating the incoming air supply. An air cleaner is supported in close proximity to the stove so that the air warmed by passage over the exhaust pipe is next subjected to a cleaning action whereupon it is discharged into a conduit leading to the carburetor.

In order to adapt such a construction to the Ford power plant I have devised a special construction of stove or heater which may be applied to the exhaust conduit preferably by the use of the fastening means which secures the conduit in place. I have preferably supported the cleaner by means of a bracket secured to the engine by clamping bolts which in this case function also to secure the cylindrical head to the cylinder block. I have preferably provided the cleaner and heater with interfitting parts which positively hold the discharge opening of the heater in alinement with the intake opening of the cleaner. These parts preferably consist of tongues bent outwardly from one of the members and projecting into the opening in the other.

Other features of novelty will be indicated in the following description and pointed out in the claims.

In the drawings.

Figure 1 is a side elevation of a portion of the Ford power plant with my air cleaner assembly applied thereto.

Figure 2 is an end elevation of the cleaner assembly, parts being shown in section.

Figure 3 is an end view of the stove or heater.

Figure 4 is a bottom plan view of the stove with one of the clamps shown in position.

Figure 5 is an elevation of the stove.

Figure 6 is a side elevation of the cleaner and its support looking from the side adjacent the motor.

Figure 7 is a section on line 7—7 of Figure 6.

Figure 8 is a horizontal section through the cleaner looking in an upward direction.

The reference character 2 indicates the

well known Ford power plant having exhaust manifold 4 and intake manifold 6 secured to the motor block by means of clamps 8 mounted on studs 10 provided with clamping nuts 12. The carburetor 14 is connected to the lower end of the intake manifold 6.

I have indicated my air heater or stove at 16 and the air cleaner at 18, a conduit 20 connecting the air cleaner to the carburetor 14.

The air heater or stove 16 is adapted to fit closely over the exhaust manifold 4 so that the air in passing through the stove is heated by contact with the hot walls of the manifold. The stove preferably consists of a sheet metal stamping secured in position over the manifold, preferably by means of the clamping devices 8—10—12 which, as previously described, secure the manifolds to the engine block. For this purpose the stove is provided with a depending portion shaped to overlie the clamp 8 and apertured or notched for the passage of the stud 10, the nut 12 serving to clamp the heater in position. Air enters the stove through the passage 24 provided at the bottom of the exhaust manifold. Heated air is discharged through the port 26 which is in direct communication with the opening 28 provided in the cleaner 18.

The air cleaner is preferably of the general type disclosed in application of Caleb E. Summers 754,007, filed December 5, 1924. As best shown in Figure 8 it comprises annularly arranged spiral blades 30 adjacent one end of the cylindrical casing 32, said blades surrounding an air discharge port or tube 34. The blades 30 may be secured in the casing in any preferred manner as by soldering or welding. The casing 32, in the form shown, is provided with end closures 36 and 38, the latter of annular form, and the portions of the casing are preferably secured together by a clamping device indicated at 40 and comprising an air straightening portion 42, and a stud portion 44 passing through the closure 36 and provided with a clamping nut 46. The straightener is secured against endwise movement by means of a pin 48 passing through alined openings in the tube 34 and the straightener 42.

With the described construction of cleaner it will be apparent that air entering the port

or opening 28 is given a whirling motion by the blades 30 which results in the dust particles being thrown outwardly against the walls of the casing along which they travel until ejected into the dust receptacle 50. The main portion of the air stream upon striking the closure 36 reverses its direction and passes out through the tube 34 the straightener 42 serving to assist its discharge and reduce the back pressure.

The means for supporting the cleaner comprises a bracket 52 provided with flanged edges 54 for strengthening it against bending strains. This bracket is slotted as at 55 for the reception of the shanks of the bolts 56 which serve to secure the cylinder head 58 to the engine block 60. To the outer end of the bracket 52 is secured strap 62 which, as shown in Figure 7, surrounds the cleaner and is provided with clamping means 64 at its free ends for clamping the strap tightly around the cleaner. Bracket 52 is also preferably provided with a downwardly bent brace portion 66 which assists in holding the cleaner against movement.

It will be noted that the cleaner casing bears against the heater or stove and thereby assists in positioning the latter. The cleaner and stove are also preferably provided with inter-engaging means, in this case comprising tongues 68 pressed outwardly from the metal of the cleaner casing and engaging in the port or opening 26 in the stove. These tongues serve to prevent relative endwise movement of the cleaner and heater as well as relative up and down movement.

It will be apparent that with the above assembly air received through the passage 24 is heated by contact with the hot exhaust conduit and discharged through port 26 in the stove into the interior of the cleaner casing where it is subjected to a whirling motion which results in the separation of dust particles. The air thus relieved of its dust content is then discharged through tube 34 and conduit 20 into the carburetor 14. The slots 55 permit the cleaner to be positioned close to the manifold or at a distance therefrom, thus when the cleaner is adjusted to its outermost position the heating action is reduced for air is admitted to the cleaner between tongues 68 without passing through the stove. This adjustment of the heating effect is more marked where the stove is omitted and the tongues 68 are alone relied upon to compel passage of air over the hot exhaust manifold.

The assembly is of such design that it may be easily secured in position in a manner to prevent rattling and vibration by utilizing fastening devices regularly provided for the securing together of portions of the motor. The structure is at the same time of such

character as to be capable of being cheaply manufactured out of sheet metal.

I claim:

1. An air cleaner comprising a cylindrical casing, closures for the ends of the casing, an air discharge conduit extending through one of said closures and projecting into the casing, spiral blades surrounding said conduit and arranged adjacent but slightly spaced from the said closure, an air entrance opening in said casing arranged between said blades and the said closure and an aperture for the discharge of dust by the centrifugal action produced by said spiral blades, said aperture being arranged at a point radially distant from the center of the casing.

2. In the structure as defined by claim 1, clamping means passing centrally through said casing and adapted to engage said closure members for securing the parts in assembled relation.

3. The combination of an internal combustion engine comprising an engine block, intake and exhaust conduits, a carburetor connected to said intake conduit, an air heating stove positioned over a portion of said exhaust conduit, means for holding said stove in position, and an air cleaner supported from said block and having parts adapted to engage said stove to assist in holding it in proper position.

4. The combination of an engine having a portion which is exposed to the heat of combustion, an air cleaner having an air entrance opening, means for supporting said cleaner with its entrance opening adjacent said heated portion, said last named means being adjustable to permit the entrance of more or less unheated air from the atmosphere to vary the degree of heating action.

5. The combination with an automobile engine provided with the customary cylinders, carburetor, and exhaust conduit leading to said cylinders for removing combustion products, an air heating stove overlying a portion of said exhaust conduit and provided with an air entrance and an air discharge port, an air cleaner supported closely adjacent said stove and provided with an opening adapted to register with the air discharge port therein to receive air therefrom and a conduit connecting said cleaner to the carburetor for supplying clean air thereto, said air cleaner and stove being provided with interfitting devices adjacent said aligned port and opening for holding the devices in proper alinement, said devices comprising tongues secured to one of said parts and projecting into the opening or port in the other.

In testimony whereof I affix my signature.

H. G. KAMRATH.