July 7, 1931. G. F. KUEHN 1,813,808

MAGNETO VENTILATION

Filed Dec. 19, 1929 4 Sheets-Sheet 1

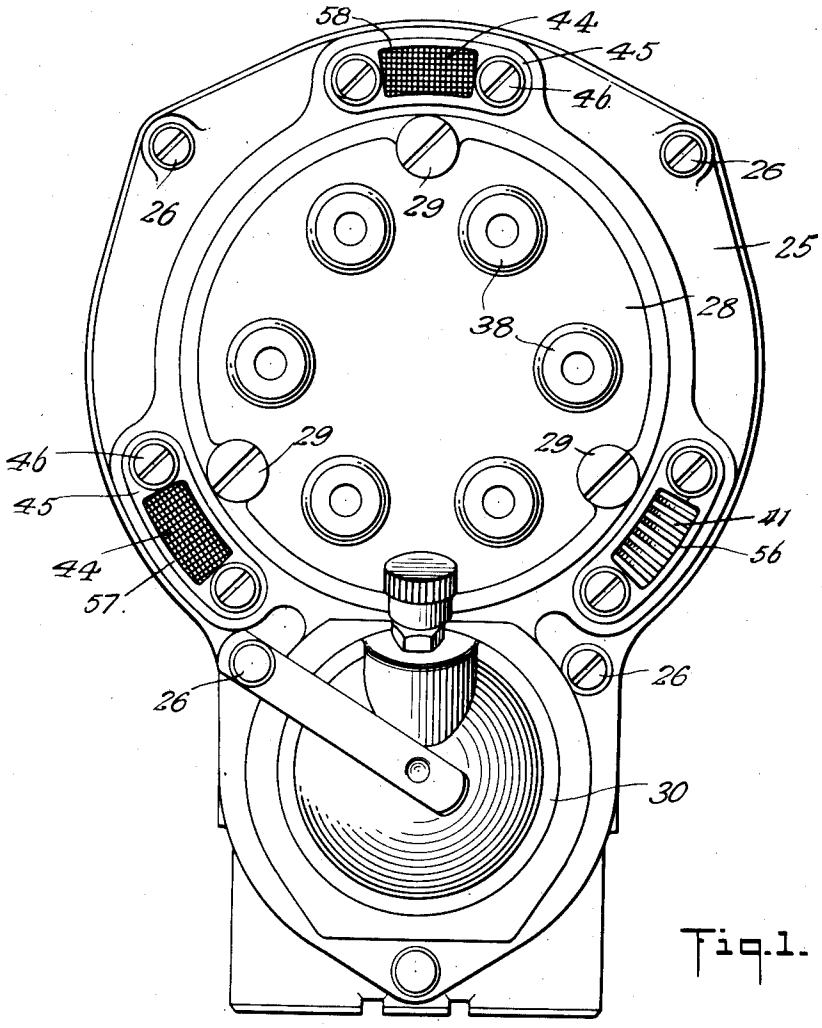


Fig. 1.

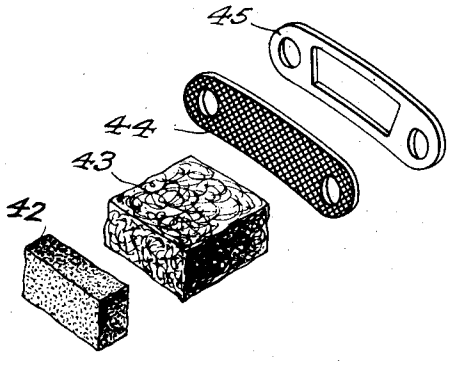


Fig. 2.

INVENTOR
GEORGE F. KUEHN
by his attorneys
Howson and Howson

July 7, 1931. G. F. KUEHN 1,813,808

MAGNETO VENTILATION

Filed Dec. 19, 1929 4 Sheets-Sheet. 2

Fig. 3.

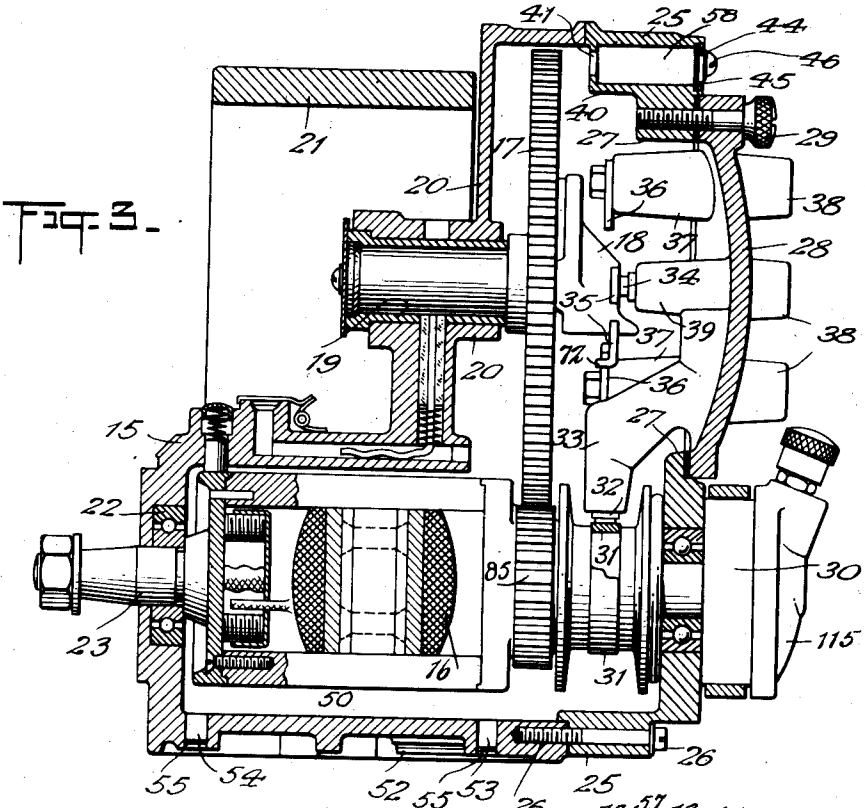


Fig. 4.

INVENTOR
GEORGE F. KUEHN
by his attorneys
Howson and Howson

July 7, 1931. G. F. KUEHN 1,813,808

MAGNETO VENTILATION

Filed Dec. 19, 1929 4 Sheets-Sheet 3

Fig. 5.

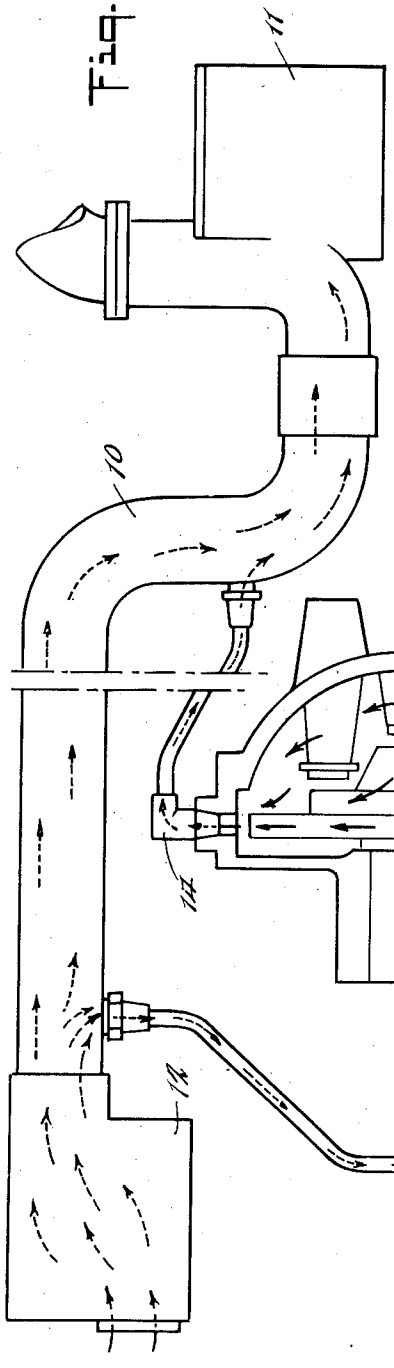


Fig. 7.

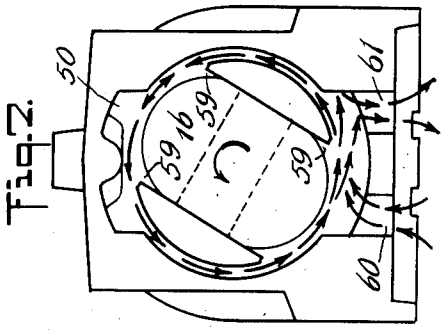
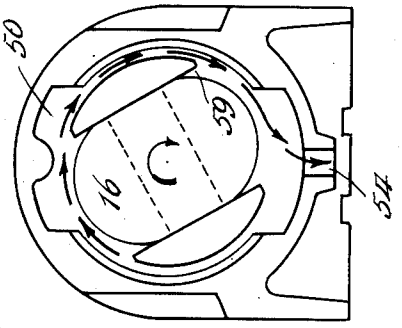


Fig. 6.



INVENTOR
GEORGE F. KUEHN
by his attorneys
Howson and Howson

July 7, 1931. G. F. KUEHN 1,813,808

MAGNETO VENTILATION

Filed Dec. 19, 1929 4 Sheets-Sheet 4

Fig. 8.

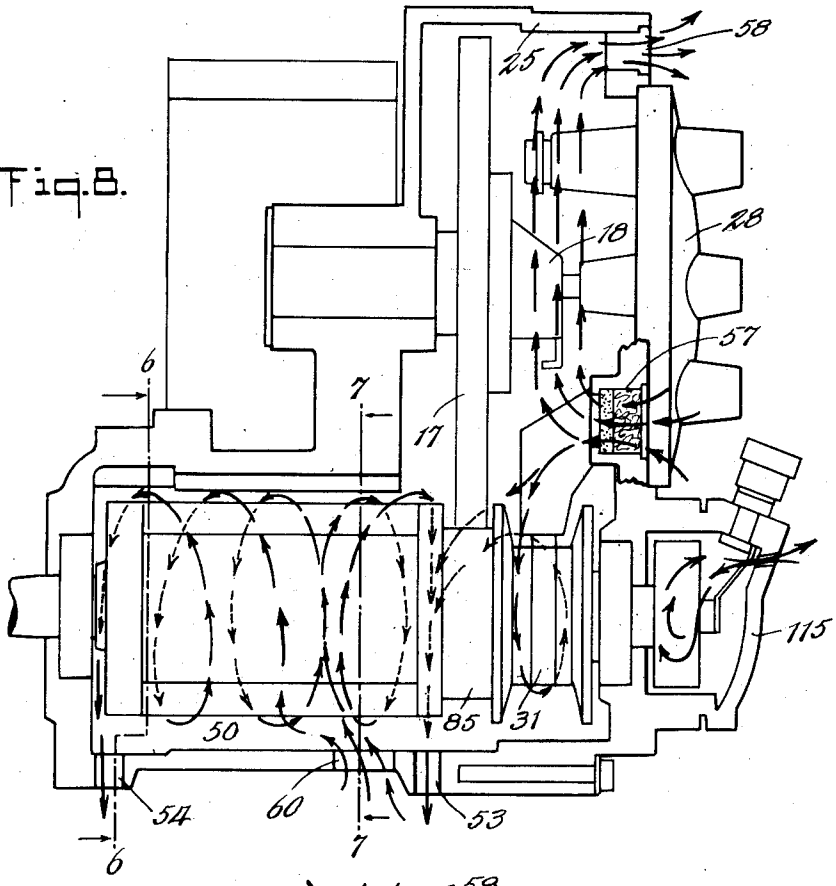
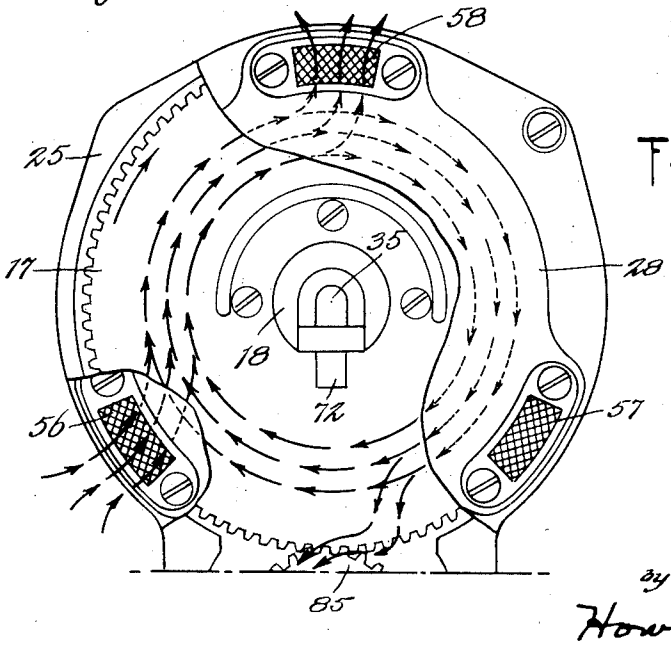


Fig. 9.



INVENTOR
GEORGE F. KUEHN
by his attorneys
Howson and Howson

Patented July 7, 1931 1,813,808

UNITED STATES PATENT OFFICE

GEORGE F. KUEHN, OF JACKSON HEIGHTS, NEW YORK, ASSIGNOR TO EISEMANN MAGNETO CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

MAGNETO VENTILATION

Application filed December 19, 1929. Serial No. 415,283.

This invention has to do with the ventilation of a magneto, especially one in which a "jump-spark" system of distribution is employed. The primary object is to provide for the admission or introduction of air to the interior, and for the removal of gases and the reduction of high temperatures caused by electric sparks or otherwise, and moreover to prevent the admission of dust and fines with the air that is passed through the magneto, and particularly through the distribution chamber, for the purpose of ventilation.

In the drawings:

Figure 1 is an end view of a magneto provided with ventilating openings in accordance with this invention.

Figure 2 is an exploded view in perspective of the parts making up a filter for a ventilating opening.

Figure 3 is a vertical section through the magneto shown in Figure 1.

Figure 4 is a bottom view of the same with a part broken away to show a ventilating opening with its filter.

Figure 5 is a schematic view of a section through a magneto connected with the intake line of an internal combustion engine for the purpose of providing ventilation, the arrows being used to show the direction of gas flow.

Figures 6 and 7 are similar schematic views of sections on the lines 6—6 and 7—7 of Figure 8, with arrows showing the direction of flow of the gas around the armature.

Figure 8 is a similar schematic view of the section shown as such in Figure 3, with arrows showing the direction of gas flow.

Figure 9 is a partial end view of the magneto as shown in Figure 1, with a part of the distributor cap and of the magneto casing broken away, and with arrows showing the direction of gas flow in the distributor chamber.

When the magneto is used with an internal combustion engine having a cleaner of any suitable design for the air entering the intake line, it is possible to put the magneto in the air line 10 (see Figure 5) between the carburetor 11 and the air cleaner 12. Nipples are provided on the casing of the magneto to permit this connection, one (13) at the end of the armature housing remote from the distributor and another (14) at the top of the distributor chamber. The cleaned air, in this case, passes in at the upper part of the armature casing and passes around the armature to the region of the distributor and breaker chambers where the objectionable gases are formed. From there the air together with these gases passes out at the upper part of the distributor due to the suction effort applied to the air line 10 on each stroke of the engine. This causes a movement of air in all parts of the casing and removes the gases formed therein. The addition of these gases to the combustible mixture does not seriously affect the value of the latter as their amount is relatively small. With this type of ventilation, the casing of the magneto is sealed to prevent the admission of dust or fines.

A different way of effecting much the same result and a way that for many conditions of use is preferable, is that shown in Figures 1 to 4 inclusive. The result of this other construction, in respect of air currents induced, is shown in Figures 6–9 inclusive. No external suction or pressure is utilized to cause an outflow of objectionable gases or an inflow of clean air but the casing of the magneto is provided with openings at certain points and with these openings are associated filters which prevent the inflow of solid particles, dust, fines, etc. The movement of air and gas within the magneto and the inflow and outflow of gas or air are brought about by the inequalities of pressure within the casing caused by the rotation of the armature and of the distributor gears. It seems very probable also that the temperature differences in different parts of the casing, due to the sparking, and the differences in densities between the gases formed in the casing and the air drawn in are also effective factors in causing the flow.

In the form shown here, the magneto casing has a main part 15 forming the casing for the end of the armature that carries the coils 16 and for the large gear 17 that turns the distributing arm 18. The gear 17 is

mounted on a spindle supported in a bearing 19 that is received in an opening in the upper part 20 of the casing section 15 within the loop of the magnet 21. The lower part of the main casing section 15 has a recess for a bearing 22 that supports one end of the armature spindle 23.

A second casing section 25 fits the rim of the open end of the main section 10 and is held thereto by screws 26. This second section has an opening 27 in an inward flange that has a flat outer face at the rim of the opening, and against this face rests the distributor cover 28 held by screws 29. Below this relatively large opening is a smaller one (not shown) which supports a bearing for the end of the armature shaft and also a ring member which affords a support and mounting for the breaker housing 30 into which the armature shaft extends. The details of the breaker housing construction are described in my application Serial No. 415,284, filed herewith.

A conductive ring 31 mounted on an insulating body turning with the armature spindle and suitably connected electrically with the secondary coil of the armature, rotates in contact with a spring-pressed carbon brush 32 mounted in a laterally extending arm 33 of the distributor cap 28. This brush is conductively connected, through the interior of the distributor cap 28 which is of molded insulating material, with the center inwardly extending brush 34 mounted in a central nipple 39 and bearing against the part of a conductive piece 35 on the distributor arm that is on the axis of the fibre gear 17. The end 72 of this conductive piece turns with the distributor arm in a circle such that it just clears the electrodes or terminal pieces 36 which are on the inner ends of the nipples 37 integral with the distributor cap. These nipples register with the exterior bosses 38 on the cover which form sockets for the ends of the cables leading to the spark plugs. In the interior of the nipples are suitable provision for connecting these cables electrically to the terminal pieces 36.

On the inner side of the second casing section 25 described above, at equally spaced points about the distributor cover opening 27, there are inwardly extending bosses 40 which are hollow. One of these is at the top of the magneto and all open at their inner ends to the distributor chamber and at their outer ends to the outside, close to the distributor cap. The hollow interiors of these bosses are rectangular in cross section and at the inner end of each is a grid 41 which may be formed as an integral part of the boss. This arrangement thus provides three passages between the atmosphere and the distributor chamber. Filtering elements are placed in certain of these passages which serve as inlets for atmospheric air. The grid is shown in Figure 1 wherein one passageway is shown with the filtering elements removed.

To filter the air passing through these inlet passages, a felt 42 is placed at the inner end against the grid 41 (see Figures 2 and 4). Next to this is placed a mass of coarse hair 43 filling the passage up to its outer end where there is a screen 44 of the sort providing tortuous passages between its wires. A guard or frame 45 bears on the edge of each screen and, being held to the casing by screws 46, holds the screen in place. The filtering elements thus are easily put in and taken out, making renewal a simple matter. As will be explained hereinafter, the passage at the top of the magneto serves as an outlet only and for that reason it is not provided with a felt or with the coarse hair. A screen 44 is desirable however.

In the bottom wall of the main casing section 10, beneath the armature chamber 50, are two vent openings covered by a screen 51 which is of the same sort as that just described and which is held in place by a guard 52. These openings are on opposite sides of the center line. Additional smaller openings 53 and 54 are also provided in the bottom wall at either end of the coil chamber and these have screens 55 of the same type at their outer ends and if it is found desirable either or both may be provided with filtering elements such as those described above or any equivalent.

Considering Figures 6 to 9 inclusive, the nature of the currents of air and gas that are set up, with the openings located as just described, will be set forth and the causes given as they are now understood. A study was made, allowing smoke to be drawn in with the air, and the showing and description here are based upon that and upon tests with a flame brought near the openings. Whatever the exact nature of the currents or of the causes, the practice of the invention is found to be very effective in providing ventilation without introducing dust and fines. The following description and the schematic views referred to are therefore to be deemed illustrative of the present theory of operation based on careful study but they are not to be considered as limiting the invention.

The principal inflow of air takes place at either one or the other of the screened openings 56, 57 in the lower part of the distributor casing at either side of the distributor cap 28 and approximately 120° from the opening 58 at the upper part. With the distributor turning in one direction, only one of these two inlet openings is actually being used to any considerable extent and that is the one that, in the direction of rotation, is beyond a vertical center line. As shown in Figure 9, for a direction of rotation of the distributor gear 17 that is clockwise as there viewed, the

air is passing in at the inlet 56 and the inlet 57 is practically out of use. The top opening 58 is the outlet for either direction of rotation. From this it will be apparent that the inlets 56 and 57 are to be provided with filtering elements and that the outlet 58 need not have them. There are two inlets to provide for the possible arrangement of the magneto for rotation in either direction under different conditions of use.

The principal cause of the inflow of air at the inlet 56, or at the other inlet 57, as the case may be, is thought to be the action of the teeth of the distributor gears 17 and 85 in turning past the openings. The teeth act as the vanes of an impeller and carry the air around with them. It may be also that the distributor arm 18 and other rotating parts create enough centrifugal force on the air in the mid region of the chamber to cause the gas generated around the electrodes to move radially outwardly to the region of the teeth where it is rotated and driven out. In any event the air and gas move to the upper part of the chamber and pass out by way of the outlet 58 while a less than atmospheric pressure is created in a lower part of the chamber at one side and fresh air passes in at that point, being cleaned in doing so by the air filters in the inlet.

A part of the air that passes in at the inlet, 56 or 57, moves downwardly in the casing, as indicated in Figures 8 and 9, apparently due to the action of the gear 85 which turns with the armature and drives the large gear 17. This gives a circulation of air around the slip ring 31 and into the armature casing. Additional currents are there set up by the armature itself due mainly, it seems, to the common incident of armature construction that there are small pockets 59 between the coils and the cores. (See Figures 6 and 7.)

The air, and gas if any, turn in the direction of the armature and it is found that the openings 60, 61 in the bottom, on either side of the center line, covered by the screen 51, serve respectively as inlet and outlet (see Figure 7). The smaller openings 53, 54 at the ends of the armature casing serve as vents or outlets, the opening 54 particularly inasmuch as some of the body of air and gas moves to the end of the armature remote from the distributor end and if allowed to become pocketed there would be heated excessively. The outlet at that end therefore permits a circulation over the full length of the armature, giving a desirable cooling action.

It is desirable also to provide a small screened opening in the breaker cap 115 to allow any gases there created to be vented and to permit air to flow in when conditions are such that it will. No doubt there is some flow to the breaker chamber from the region just below the distributor chamber. In any event, such an opening is helpful in ventilating the whole magneto.

For rotation in the opposite direction from that causing the currents indicated here, the opening 57 between the distributor chamber and the outside becomes an active inlet and the bottom openings 60, 61 exchange functions, the opening 61 that is shown here as an outlet, becoming an inlet and the other 60, becoming an outlet. The vents 53, 54 act in the same way in either case.

I claim—

1. A magneto having an inclosing casing forming a distributor chamber and a coil chamber below but in communication therewith, openings located to form inlet and outlet means between said distributor chamber and the outside, air filtering means for said inlet openings, and outlet openings through said casing from said coil chamber.

2. A magneto having an inclosing casing forming a distributor chamber and a coil chamber below but in communication therewith, openings located to form inlet and outlet means between both said chambers and the outside, and air filtering means for the inlet openings.

3. In a magneto, an inclosing casing, a coil chamber in the lower part and a distributor chamber in the upper part thereof, a gear turning with the armature about the axis of the latter and a gear in the distributor chamber driven thereby for turning the distributor, openings to the outside from the upper and lower parts of said distributor chamber located near the periphery of said distributor gear to act as outlet and inlet respectively, and openings to the outside from the lower part of said coil chamber and located with respect to the armature to serve as inlet and outlet, said inlet openings having air filters.

4. In a magneto, an inclosing casing, a coil chamber in the lower part and a distributor chamber in the upper part thereof, a gear turning with the armature about the axis of the latter and a gear in the distributor chamber driven thereby for turning the distributor, openings to the outside from the upper and lower parts of said distributor chamber located near the periphery of said distributor gear to act as outlet and inlet respectively, and openings to the outside from the lower part of said coil chamber and located with respect to the armature to serve as inlet and outlet, said inlet openings having air filters, and vent openings from said coil chamber to the outside.

5. A magneto having an inclosing casing formed with inwardly projecting hollow bosses open at their ends for the admission of air and for the outflow of air together with the gases created therein, in combination with air filters mounted in some of said bosses for filtering the air passing into said casing.

6. A magneto having an inclosing casing formed with inwardly projecting hollow bosses open at their ends and forming air inlet and outlet openings for said casing, air filtering material filling the bosses serving as inlets and screens retaining said material in position.

7. A magneto having an inclosing casing formed with inlet and outlet openings therein and an air filter projecting at said inlet opening.

8. In a magneto, a casing inclosing a distributor chamber, a distributor rotating therein, a series of electrodes about the circle of travel of the terminal of the distributor, inwardly projecting hollow bosses on said casing wall at the upper and lower portions of said distributor chamber, said bosses being open at their ends and forming inlet and outlet openings for said distributor chamber and air filtering material filling the bosses serving as air inlets.

9. In a magneto, a casing including a distributor chamber, an armature chamber communicating therewith, inlet and outlet openings to each of said chambers and means in each of said chambers to cause currents of air between said inlet and outlet openings which are local to each of said chambers.

10. In a magneto, a casing having an armature chamber, inlet and outlet openings to said chamber and an armature in said chamber causing air currents between the inlet and outlet openings of said chamber.

11. In a magneto, a casing including a distributor chamber and an armature chamber communicating therewith, inlet and outlet openings to said chambers and an armature in said armature chamber causing air currents between said inlet and outlet openings.

12. In a magneto, a casing including a distributor chamber and an armature chamber below said distributor chamber and communicating therewith, inlet and outlet openings to each of said chambers and an armature in said armature chamber adapted to cause currents of air between the inlet and outlet openings of said armature chamber which are local to said chamber.

13. In a magneto, a casing including a distributor chamber and an armature chamber, inlet and outlet openings to each of said chambers, an armature in said armature chamber adapted to cause currents of air between the inlet and outlet openings of said armature chamber and means in said distributor chamber to cause currents of air between the inlet and outlet openings of said distributor chamber.

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

GEORGE F. KUEHN.