This invention relates to replaceable air filter structure particularly applicable to dynamo-electric machines, such as used on automotive vehicles.

The principal object of this invention is the production of an air filter structure that will occupy unused limited space adjacent an automotive dynamo and effectively remove foreign matter from air as it is forced through a wall of the dynamo to the interior for removing destructive heat incident to electric overloads that are imposed on the windings, commutator and brushes and has a direct application to the principles of generator cooling set forth in applicant's co-pending application, Ser. No. 641,481.

A further object is the accomplishment of the above stated object with positive and inexpensive equipment and of a type that can be readily understood and sufficiently accessible and easily manipulated to insure the desideratum.

The means employed according to this invention constitutes structure wherein the special air filter or cleaning equipment can be built into the unit during its manufacture or it can be subsequently lodged adjacent, or to same, and organized to function as if it has been originally built into the apparatus.

It is at once apparent that the apparatus provided by this invention for maintaining the generator at full normal capacity would enable a given size of generator unit to care for a greater volt-ampere output than if the unit were not so equipped.

Other objects and advantages of the structure are hereinafter set forth in detail and will be apparent to persons skilled in the art to which the invention relates and to these advantages in so far as they are patentably novel I will claim, the same as hereinafter set forth.

**Drawing**

The preferred forms are particularly illustrated in the accompanying drawing, which form part of this application for Letters Patent, and wherein corresponding characters refer to like parts in the several different views.

Figure 1 represents a partial side elevation of an internal combustion engine on which is installed a specially prepared type generator shown partially cut away to expose rotating parts, including the end of the armature shaft, and two fans disposed on same and details of an external air filter.

Fig. 2 is an elevation of the air filter arcuately apertured face plate shown in cross section in Fig. 1, also in Fig. 6.

Figs. 3 and 3A represent respectively the top and elevational views of the air filter strap or cover.

Fig. 4 is a perspective view of the air filter medium on an enlarged scale.

Fig. 5 is an elevation of the end view of the drive end housing member of the generator to disclose the part as prepared for admitting air, the dotted lines indicate the filter location.

Fig. 6 is a cross sectional view of Fig. 5 along line 6, 6, together with the filter strap of Fig. 3, and the filter face plate of Fig. 2 added and forming a housing or frame for the filter medium shown in Fig. 4.

Fig. 7 is a plan view of a section of the air filter strap, while Fig. 8 is a cross section of Fig. 7 along the line 8, 8.

Fig. 9 is a side elevational view of a modified structure of an air filter strap or cover.

Fig. 10 is a cross sectional view of an end plate of the generator to which is attached the air filter strap Fig. 9, with an air filter medium lodged therein.

**Structure**

Numeral 10 indicates an electric generator, 11 a radiator cooling fan, both of which are attached to and operated by internal combustion engine 12 by belt 13 in the conventional way, there being pulley 12A attached to the main crank shaft of the engine, pulley 11A fixed on the shaft that operates the radiator fan and pulley 10A fixed on to shaft 14 of the generator mounted in bearings 15, 16. This shaft 14 carries the armature on which are mounted the commutator, laminae and windings after the conventional practice.

Bearing 15 is a part of end housing 17 which is altered to provide openings 18 to admit air currents, indicated by arrows, created by fan blades 10B disposed between pulley 10A and the end housing, also by auxiliary fan 19 fixed to shaft 14 and disposed between said housing and the windings.

Between fan blades 10B and housing 17 there is located a special type of air filter medium 20, disposed in a very special type of housing or matrix consisting of face plate 21 secured to end housing 17 by screws 22 and a strap member 23 which surrounds the face plate and is lodged on same as well as on the end plate 17. It is essential to keep filter pad 20 clean, therefore easy means are provided by employing a flimsy amorphous medium which is incompetent, by reason...
of its structure, to take and keep a sufficiently
definite form and still function as a filter under
the encountered conditions. This medium is easy
to remove, clean and return to a frame or matrix
provided on the generator, the mere insertion of
which results in an effective filter.

It will be noted that strap 23 is of sufficient
width to extend over the area in which fan blades
10 rotate. This strap serves not only to pro-
tect the fan from injury, but to assist in directing
air currents through openings 21A and 18 which
communicate with the interior of the generator,
where the air currents are again accelerated by
interior fan 19. Both fans work together to expel
air from openings 24 disposed at the outer end
of the generator, preferably in commutator strap
26. While these fans are of the same general
structure, the blades of fan 19 have an increased
pitch according to the velocity of the air, as a
means of deriving the full benefit of both groups
of blades which would not be the case if both sets
of blades had the same pitch owing to the fact
that when the air reaches blades 19 it is already
well accelerated.

25 Operation

Inasmuch as these generators are disposed
under the hoods of automobiles, it was found de-
sirable to provide means for an easy and quick
removal of the filter medium that becomes laden
with foreign matter, and to be able to instantly
replace it with a fresh medium. Therefore the
filter strap 23 is provided with a latch 23A, which
is arranged to engage the eye 23B, when in place,
at the other end of the strap, and thereby secure
same in a permanent way and confine the medi-
um. Therefore the latch can be sprung, strap
removed, used media removed, a media replaced
and strap returned, all in a very brief period of
time.

It will be noted that this filter normally is in
a bar form shown in Fig. 4 and that it is radially
applied to the circular filter housing and forced
to take up a generally circular form. To assist in
locating this strap, lip 26, which is pressed or
bent out of the strap 23 as illustrated in Figs. 7
and 8, is provided and so located that it will en-
gage the inner surface of face plate 21 and there-
by prevent the strap from displacement.

50 Modification

The strap 30 shown in Fig. 9 is made with de-
pending walls 31, 32, the object being to suitably
attach filter media 20 to the strap and to further
increase the facilities with which the filter can be
changed. It will be noted that depending wall
is arranged to fit into groove 33 of end housing 17
which serves to lock and secure the filter.

Scope

With the object of this invention and the struc-
ture of the means for accomplishing same having
been disclosed, many further modifications, sub-
stitutions or eliminations can be indulged and
the means for accomplishing same can be varied
without departing from the spirit of this inven-
tion, therefore I do not wish to be limited to the
specific forms shown and described, and desire to
be limited only by the appended claims.

I claim:

1. In a dynamo-electric machine having an
enclosing housing with an outlet at one end and
an inlet at the other end, a shaft mounted in
bearings carried by said ends, a fan carried by
said shaft and cooperating with the inlet to force
air through said housing via the inlet and the
outlet, a removable filter medium associated
with said inlet, a fixed frame for said medium,
and a detachable band encompassing said frame
and extended to embrace at least a portion of said
fan.

2. In a dynamo-electric machine having an
enclosing housing with an outlet at one end and
an inlet at the other end, a shaft mounted in
bearings carried by said ends, a fan carried by
said shaft and cooperating with the inlet to force
air through said housing via the inlet and the
outlet, and having a removable filter medium
associated with said inlet, a fixed frame for said medium,
said frame being disposed between the fan and
the inlet and a detachable band encompassing
said frame and longitudinally extended to em-
brace at least a portion of said fan.

3. In a dynamo-electric machine having an
enclosing housing with an outlet at one end and
an inlet at the other end, a shaft mounted in
bearings carried by said ends, a fan carried by
said shaft and cooperating with the inlet to force
air through said housing via the inlet and the
outlet, a removable filter medium associated
with said inlet, a fixed frame for said medium,
said frame comprising a pair of discal juxtapositioned
members and a detachable band encompassing
said frame.

4. In a dynamo-electric machine having an
enclosing housing with an outlet at one end and
an inlet at the other end, a shaft mounted in
bearings carried by said ends, a fan carried by
said shaft and cooperating with the inlet to force
air through said housing via the inlet and the
outlet, a removable filter medium associated with said
inlet, a fixed frame for said medium, said frame
comprising a pair of discal juxtapositioned mem-
bers and a detachable band encompassing said
frame and extended to embrace at least a portion
of said fan.

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