

Dec. 22, 1970

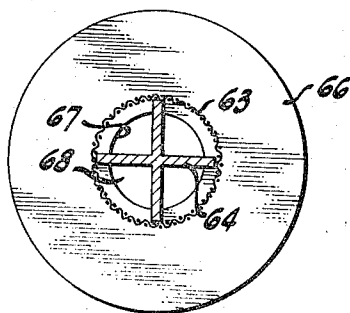
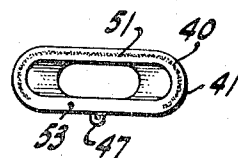
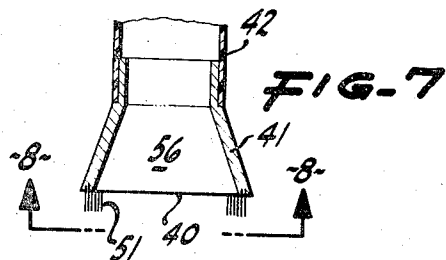
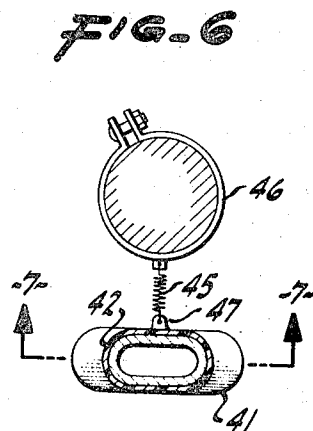
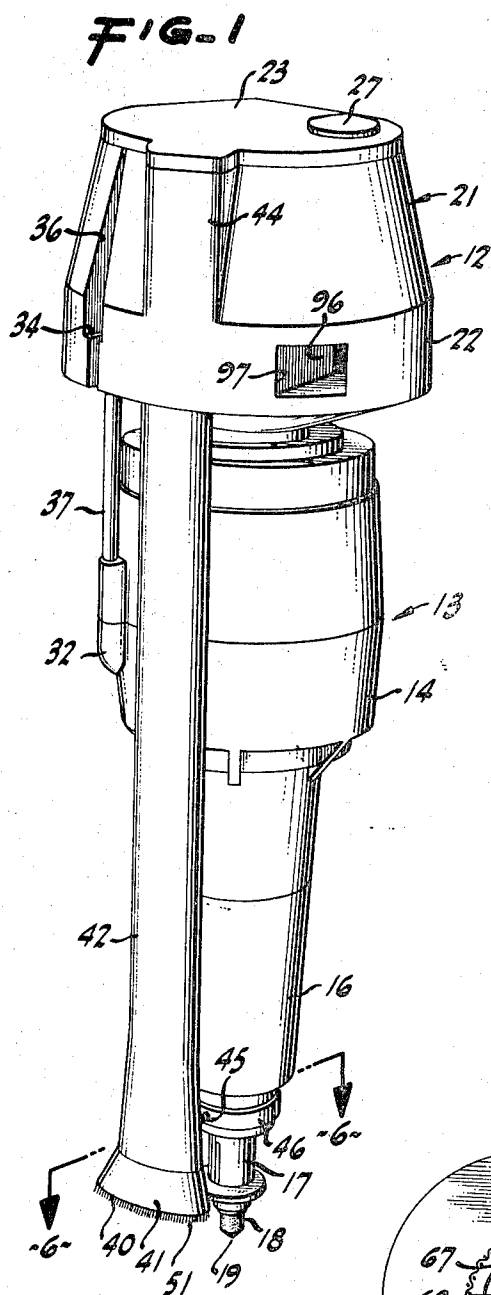
R. E. HENRICH

3,548,436

VACUUM CLEANER ATTACHMENT FOR ELECTRIC ERASING MACHINE

Filed Sept. 18, 1968

2 Sheets-Sheet 1



INVENTOR
RICHARD E. HENRICH

BY

Lothrop & West
ATTORNEYS

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R. E. HENRICH

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2 Sheets-Sheet 2

FIG-2

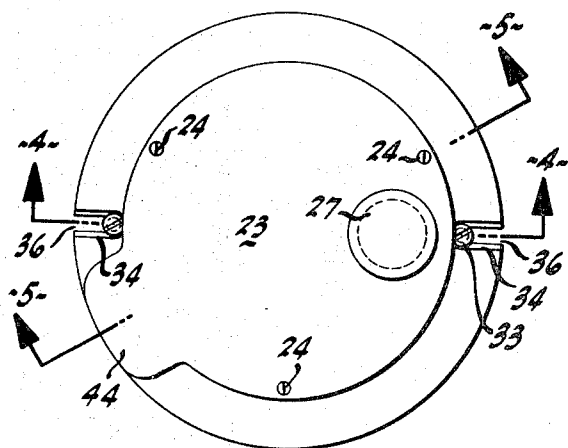


FIG-3

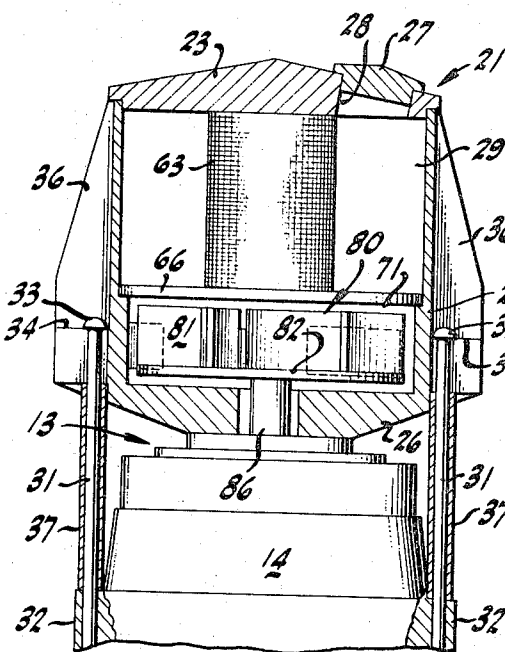
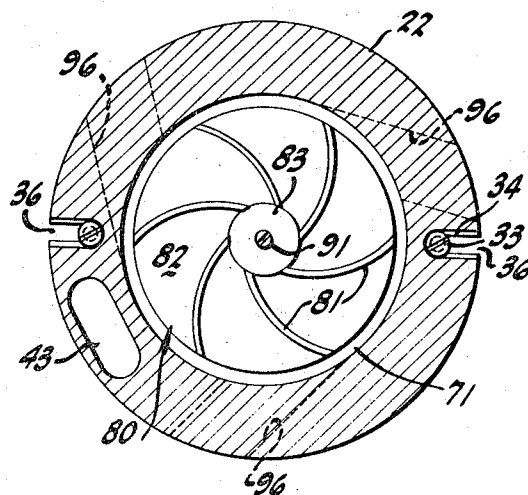


FIG-4

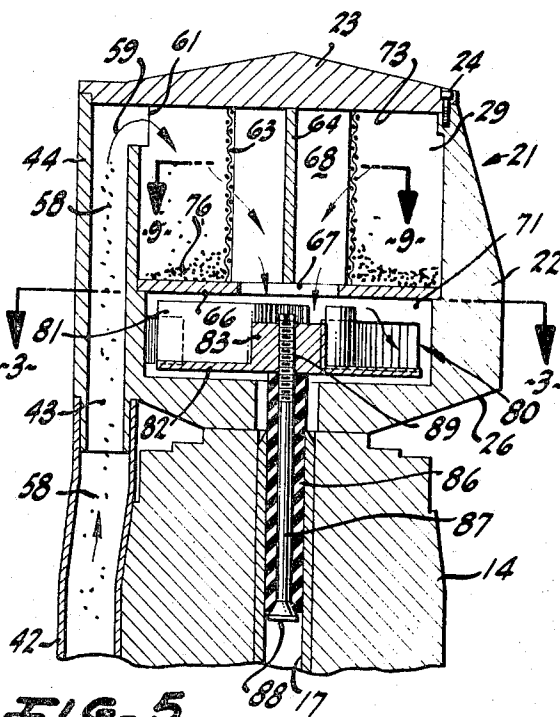


FIG-5

INVENTOR
RICHARD E. HENRICH

BY

Lothrop & West
ATTORNEYS

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VACUUM CLEANER ATTACHMENT FOR ELECTRIC ERASING MACHINE

Richard E. Henrich, 1542 Glen Way,
Yuba City, Calif. 95991

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2 Claims

ABSTRACT OF THE DISCLOSURE

Mounted on an electric erasing machine having an eraser tip driven by a spindle is a housing enclosing a fan. Connected to the fan housing is a vacuum head located adjacent the eraser tip. Rotation of the spindle is transmitted to the fan so that during the time the eraser is in operation the vacuum head sucks in the erasure material. The erasure particles withdrawn from the working area are screened out of the air flow and are stored in the housing for periodic removal, as necessary.

The invention relates to improvements in vacuum cleaner attachments for electric erasers.

In the latter years the convenience, speed and efficiency of electric erasing machines have led to the widespread use of such machines by engineers, architects, draftsmen and others.

One common problem attendant upon the use of electric erasing machines, however, has been the rapid accumulation of erasure particles in the vicinity of the erasure tip. This build up of material not only interferes with erasing but becomes especially vexatious when the material is impregnated with pencil or dried ink, tending to create smears or smudges.

Some individuals use a brush to wipe away from time to time the small piles of accumulated erasure debris; others blow them away now and then either by breath or by a small compressed air attachment. In all of these procedures the particles are not continuously and totally removed, but instead are merely relocated to alternate positions on the drawing board or on the floor.

It is therefore an object of the invention to provide a vacuum cleaner attachment for an electric erasing machine which continuously and entirely removes the erasure material.

It is another object of the invention to provide a vacuum cleaner attachment which can readily be affixed to the erasing machine either at the time of manufacture, or subsequent thereto.

It is a further object of the invention to provide a vacuum cleaner attachment which is compact in size and light in weight, thereby facilitating maneuverability of the device.

It is yet a further object of the invention to provide a vacuum cleaner attachment which is efficient yet relatively inexpensive, and which can be operated by the same mechanism that drives the eraser.

It is still another object of the invention to provide a generally improved vacuum cleaner attachment for an electric erasing machine.

Other objects, together with the foregoing, are attained in the embodiment described in the following description and illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view, to a reduced scale, of the attachment installed on a typical, commercially available electric erasing machine;

FIG. 2 is a top plan view;

FIG. 3 is a transverse sectional view of the fan housing, the plane of the section being indicated by the line 3—3 in FIG. 5;

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FIG. 4 is a fragmentary median sectional view taken on the line 4—4 in FIG. 2;

FIG. 5 is a fragmentary median sectional view taken on the line 5—5 in FIG. 2;

FIG. 6 is a transverse sectional view of the eraser and adjacent vacuum head structure, the plane of the section being indicated by the line 6—6 in FIG. 1;

FIG. 7 is a sectional view of the vacuum head taken on the line 7—7 in FIG. 6;

FIG. 8 is a bottom plan view of the vacuum head; and

FIG. 9 is a transverse sectional view, to an enlarged scale, of the screen filter structure, the plane of the section being indicated by the line 9—9 in FIG. 5.

While the vacuum attachment of the invention is susceptible of numerous physical embodiments, depending upon the environment and requirements of use, substantial numbers of the herein shown and described embodiment have been made, tested and used, and all have performed in an eminently satisfactory manner.

The vacuum attachment of the invention, generally designated by the reference numeral 12, is utilized with a conventional electric erasing machine 13 of the type, for example, which includes an electric motor housing 14 having mounted thereon a body 16 within which is journaled a spindle 17 carrying on its lower end the usual eraser 18 terminating in a conical tip 19.

The motor 14 is connected to an energy source by suitable conductors, not shown, and rotation of the motor 14 and the spindle 17 attached thereto is controlled by an appropriate switch, not shown.

Mounted on the upper end of the motor 14 (see FIGS. 1, 4 and 5) is a barrel-shaped housing 21 including approximately annular-in-section side walls 22, a top 23 removably attached by fasteners 24 and a bottom wall 26. A removable clean-out plug 27 frictionally secured in an opening 28 in the top cover 23 enables the contents of the interior chamber 29, or storage chamber, to be removed from time to time.

The housing 21 is secured to the erasing machine 13 in any suitable fashion, such as by a pair of elongated pins 31 threaded at their lower end for engagement with corresponding threaded flanges 32 carried by the motor housing 14. At their upper ends the pins 31 are formed with heads 33 engageable with a pair of lateral shoulders 34 formed on the sides of vertical recesses 36 on opposite sides of the housing 21. Spacer sleeves 37 encompass the pins, as appears most clearly in FIGS. 1 and 4, and serve accurately to position the housing 21 relative to the erasing machine 13.

In well-known fashion, the erasure material tends to accumulate in the vicinity of the eraser tip 19, and in order to remove the unwanted debris I provide a strong "vacuum" or "suction" adjacent the tip 19 during the entire period during which the eraser is rotating.

The "vacuum" is created by setting up within the attachment a condition of sub-atmospheric pressure such that atmospheric air in obeying the pressure gradient requirement flows toward the lower margin 40 of a member termed a vacuum head 41.

The vacuum head 41 is mounted on the lower end of a vertical conduit 42 connected at its upper end to a passageway 43 formed in a vertical projecting header 44 provided on one side of the housing 21. The conduit 42 can be of a yieldable material, if desired, and is given some degree of further resilience owing to the provision of a tension spring 45 secured at one end to a band 46 affixed to the eraser machine body and at the other end to an eye 47 carried on the vacuum head 41 (see FIG. 6).

Preferably, the vacuum head 41 is laterally elongated, as appears most clearly in FIGS. 1, 6 and 8, and around a large portion of the lower margin is provided with short

bristles 51. On the portion of the margin facing the eraser tip, however, the bristles are interrupted to afford an aperture 53 (see FIG. 8) through which the induced air flow is channeled, carrying with it the unwanted detrital material which forms around the eraser tip.

Occasionally, the erasure debris tends to adhere moderately strongly to the paper, and in such cases a slight flick of the hand-held instrument (i.e., the machine plus the attachment) will sweep the bristle portion over the accumulated material, thereby loosening it and allowing the air current to sweep it into the mouth 56 of the vacuum head, thence upwardly through the conduit 42 and the vertical passageway 43 on the side of the housing 21.

From the passageway 43, the erasure particles 58 flow laterally in the direction of the arrow 59 (see FIG. 5) through an opening 61 in the housing walls, thence into the annular chamber 29 within the housing 21.

A cylindrical screen type of filter 63 is interposed in the air stream, the screen being carried on a framework 64 which is cruciform in transverse section (see FIG. 9). The screen filter 63 and frame 64 are, in turn, supported on a horizontal disc 66 having a central opening 67 leading from the screen chamber 68 into a fan chamber 71 located below the disc 66.

As appears most clearly in FIG. 5, the screen 63 extends upwardly from the horizontal disc 66 (secured to the inner walls of the housing) and reaches the bottom surface 73 of the top cover 23. In other words, the screen is effective to intercept, or filter out, the erasure particles from the air stream, the debris accumulating in the storage chamber 29 in a pile 76 around the screen. Periodically, the clean out plug 27 is taken off and the stored debris is removed.

After passing inwardly through the screen, the clean air descends through the opening 67 in the disc 66 and thence into the fan chamber 71 where it is acted upon by a fan 80, or impeller, having blades 81 mounted on a circular plate 82 and flaring spirally outwardly from a central boss 83.

The fan 80 is rotated by the same motor-driven spindle 17 that operates the eraser. As appears most clearly in FIG. 5, the tubular spindle 17 is suitably journaled and rotates at a fairly high speed.

In the upper end of the tubular spindle 17 there is located a rubber or other resilient sleeve 86 through the center bore of which is inserted a pin 87 carrying at its lower end a tapered head 88 and threaded adjacent its upper end as at 89 for threaded engagement with the boss 83. The uppermost end of the pin carries a slot 91 for engagement with a screwdriver.

With the uppermost end of the sleeve 86 abutting the bottom surface of the circular plate 82, and with the pin 87 rotated by a screwdriver in a direction such as to draw upwardly the flared head 88 the sleeve 86 is radially enlarged. The rubber sleeve 86 is thereby urged into tight

frictional engagement with the encompassing walls of the spindle 17, and consequently rotates with the spindle.

In the operative condition just described, the rotating parts assume the position approximately as appears in FIGS. 4 and 5, with the impeller blades spaced centrally both in a radial and in an axial direction with respect to the fan chamber 71.

Thus, as the rapidly rotating spindle 17 rotates the sleeve 86, the attendant impeller blades 81 are driven at a substantial rate of speed and, in turn, the air is forcefully ejected from the fan chamber 71 tangentially outwardly through the passageways 96 and the exhaust ports 97 (see FIG. 1) into the atmosphere.

It can therefore be seen that I have provided a compact and efficient attachment for continuously removing the unwanted material formed by an electric erasing machine.

What is claimed is:

1. A vacuum cleaner attachment for an electric erasing machine having an elongated body and an axial rotatable spindle carrying an eraser tip located adjacent one end of said body, said attachment comprising:

- (a) a barrel-shaped housing mounted on the other end of said body, said housing including an inlet port and an outlet port;
- (b) a conduit mounted longitudinally on said body and extending from a location adjacent said eraser tip to said inlet port on said housing;
- (c) an impeller rotatably mounted within said housing, said impeller being connected to said spindle to create a sub-atmospheric condition within said housing effective to create an air flow from the vicinity of said eraser tip through said conduit and from said housing outwardly through said outlet port;
- (d) a filter located within said housing and interposed in said air flow to intercept erasure particles entrained in said air flow; and,
- (e) a clean out plug in said housing affording access to the interior of said housing for the removal of erasure particles located therein.

2. A vacuum cleaner attachment as in claim 1 wherein the opening of said conduit adjacent said eraser tip is at least partially encompassed by bristles capable of dislodging unwanted detrital material generated by said eraser tip.

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ROBERT W. MICHELL, Primary Examiner

U.S. Cl. X.R.

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