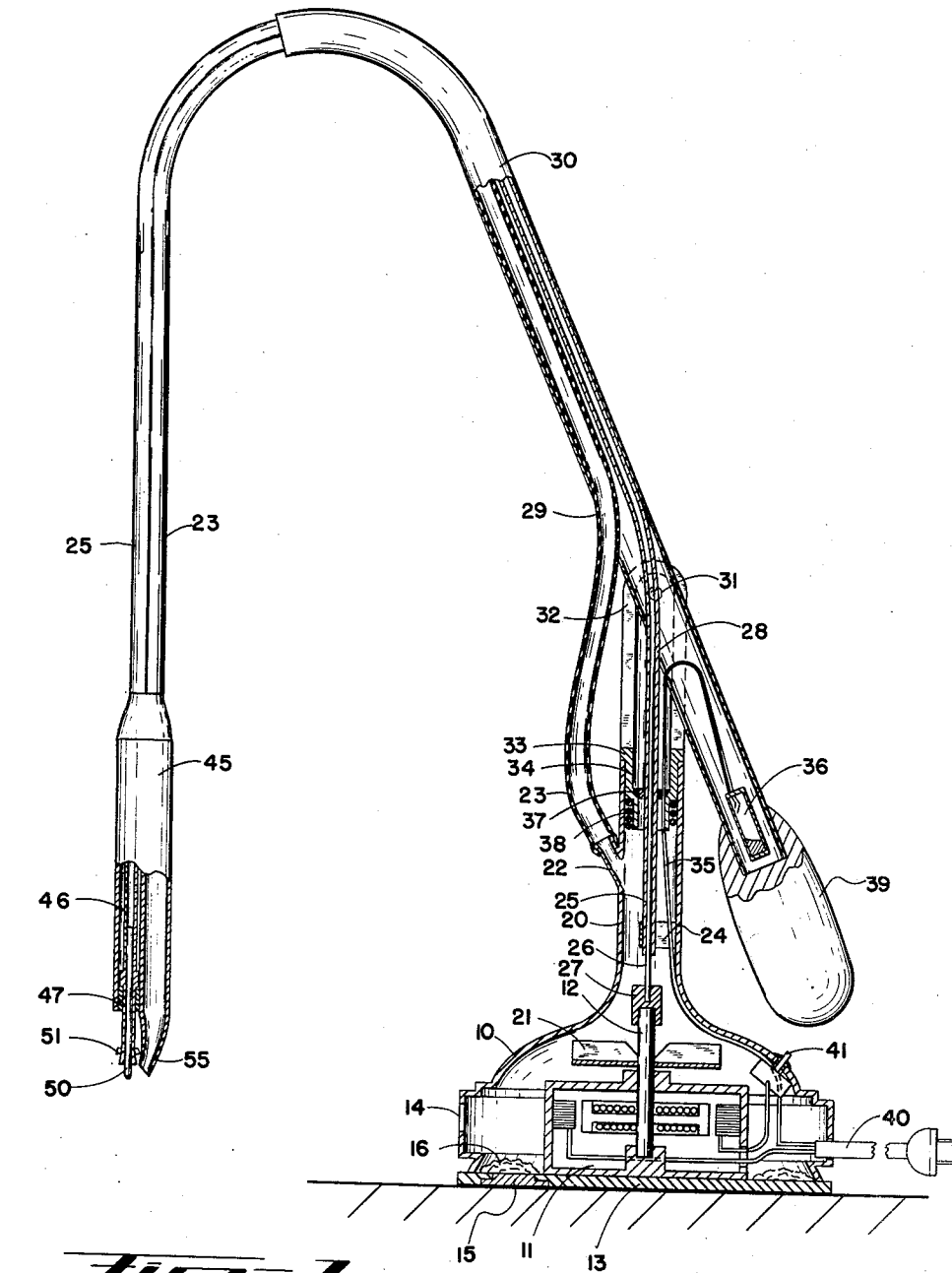


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ERASER WITH SUCTION DISPOSAL

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2,956,546

ERASER WITH SUCTION DISPOSAL

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This invention relates to improvements in a power-operated eraser and has particular reference to an erasing machine having suction means for removing the eraser debris.

Conventional power-operated erasers are not convenient to use by typists because they usually incorporate an electric motor in the handle which makes the handle objectionably bulky and heavy. The motor is capable of wearing away the paper and eraser at a rapid rate, producing a considerable volume of paper fibers and rubber crumbs for which no automatic means of removal is provided. Such erasers have been used to a considerable extent by draftsmen because disposal of eraser debris on the drafting board does not present a serious problem. Eraser crumbs and paper fiber are objectionable in a typewriter, however, and draftsmen's electric erasers have never been adopted extensively by typists.

It is, therefore, an object of the present invention to provide a power-operated eraser which will suit the needs of typists as well as draftsmen; to provide an eraser having a relatively small and light weight handle portion which can be manipulated with facility on paper in a typewriter; to provide an eraser having the relatively bulky and heavy power component separated from the manipulating handle; to provide an eraser having a suction cleaner for removing debris created by the eraser and to provide an improved erasing machine for general use by typists, draftsmen and others who must do considerable erasing.

In the present erasing machine, the motor is contained in a base housing having a pedestal supporting a swinging and swivelling arm containing a flexible shaft and a suction tube. The arm is counter-balanced or otherwise biased to cause it to extend upwardly above the base housing so that a handle portion on the end of the flexible shaft and suction tube will hang from the upper end of the arm in a convenient position for use while allowing a considerable range of movement of the handle portion, both vertically and horizontally, without moving the base.

These and other objects and advantages will become apparent as the description proceeds in connection with a preferred embodiment illustrated on the accompanying drawing. Various changes may be made in the construction and arrangement of parts, however, and certain features may be used without others, all such modifications within the scope of the appended claims being included in the invention. The single figure in the drawing is an elevation view with parts in vertical section to show the details of construction.

A base housing 10 contains a high speed electric motor 11 having a vertical shaft 12. If the motor is not sufficiently heavy to provide good stability for the base housing, the latter may include a heavy base plate 13. Housing 10 is equipped with one or more air relief holes 14 and base plate 13 is equipped with a removable plug 15 for disposal of the eraser debris 16 which is collected in the housing.

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The upper part of the housing is reduced in size to form a tubular suction pedestal 20. Pedestal 20 is aligned with the motor shaft 12 which is equipped with a suction fan impeller 21 mounted close to the upper wall of the housing immediately beneath the suction pedestal to produce suction therein. Thus, the lower end of suction pedestal 20 communicates axially with the center of the impeller 21 and the downwardly flaring shape of the top wall of the base housing allows for centrifugal discharge from the fan, causing eraser debris to impinge against the housing. Impingement of the solid material against the housing reduces its velocity to a point such that the material will separate from the air stream and fall to the bottom in a quiescent state while the air escapes through openings 14. The total area of openings 14 is many times the area of the inlet opening in the suction nozzle, presently to be described, whereby a high inlet velocity is developed in the suction nozzle and a low discharge velocity is developed in openings 14. Thus, the eraser debris is not blown out of openings 14 but is collected in the bottom of the housing and can be removed from time to time by taking out the plug 15.

Pedestal 20 is equipped with a connection 22 for a flexible suction tube 23 and is further equipped with a supporting bracket 24 for one end of flexible shaft housing 25 on flexible shaft 26. A connector 27 connects flexible shaft 26 with motor shaft 12.

Portions of suction tube 23 and flexible shaft 26 are contained in a tubular arm 30 which is pivotally mounted at 31 between the upstanding arms of a clevis support 32. Clevis support 32 has an annular shoulder 33 resting on the upper end of tubular pedestal 20 for swivel movement and a neck portion 34 extending within the pedestal. Extending through neck portion 34 are the flexible shaft 26 with its housing 25 and a pair of wires 35 leading to a mercury switch 36 in the tubular arm 30. The opening through neck 34 is otherwise closed by an air seal 37. In the present embodiment, suction tube 23 enters the hollow arm through an opening 29 and flexible shaft 26 enters the arm through an opening 28 but other equivalent arrangements of these parts will suggest themselves.

The numeral 38 designates a torsional spring to return the clevis 32 and arm 30 to a particular orientation after the arm has been rotated on the vertical axis of the pedestal, one end of spring 38 being attached to the neck 34 and the other end being anchored in pedestal 20. Sufficient slack is provided in suction tube 23 between the connection 22 and the opening 29 to permit the arm 30 to rotate 180° in opposite directions about the axis of pedestal 20. The swivel return spring may be omitted, however, if desired as this is a refinement which is not necessary to the successful operation of the device. In order to hold the long end of arm 30 upright and suspend the handle parts, the lower, short end of the arm is equipped with a counter-weight 39.

The motor 11 is energized by a conductor cord 40 through a circuit including a manual switch 41 and mercury switch 36 in series. After manual switch 41 has been turned on, mercury switch 36 will energize the motor whenever the arm 30 is pulled down to use the eraser. Switch 36 is adjusted in the arm at an inclination to deenergize the motor when the arm returns to the near vertical position shown.

Suction tube 23 and flexible shaft 26 terminate in a small light weight handle 45, the tube and shaft preferably being of a length to suspend the handle in pendant position above the table top, as shown, when the device is not in use. Flexible shaft 26 is connected to a hollow eraser shaft 46 rotatable in a bearing 47 in the end of the handle. This hollow shaft has a longitudinally split and thickened end portion forming a chuck for an eraser

50. A clamp ring 51 is slidable downwardly on the outside of shaft 46 into wedging position on the thickened portion thereof to clamp the eraser in the end of the shaft.

Suction tube 23 connects with a suction nozzle 55 which may be mounted in or formed as an integral part of the handle 45. The lip of the suction nozzle 55 may be made flexible so that it will flatten when brought to bear against the erasing surface and will not interfere with the manipulation of the eraser. Handle 45 with its component parts is considerably smaller and lighter than it is possible to make an electric motor having sufficient power to drive the eraser whereby the present device can be manipulated with much greater facility than a conventional electric eraser having its motor incorporated in the handle portion.

Suction nozzle 55 captures any loose debris so that it will not fall into the typewriter when the device is used by typists. The friction of the eraser tends to form electrostatic charges on the eraser crumbs and paper, causing the crumbs to adhere to the paper. In any event, the debris does not fall into the typewriter and the particles which are not immediately sucked into nozzle 55 may be scraped off the paper with a lip of the nozzle after the erasure is completed.

If desired, the eraser 50 may be removed and a small rotary brush chucked in the hollow shaft 46 for cleaning the type bars and other parts which are accessible to the brush. The material dislodged by the brush is removed by the suction nozzle.

By reason of the swivel joint between the pedestal 20 and clevis support 32, the arm 30 is rotatable on a vertical axis to any direction around a complete circle to serve a plurality of workers whose desks or drawing boards are grouped together. Arm 30 is high enough to swing over and across a typewriter. It will also be apparent that the base housing 10 instead of being portable may be equipped with a clamp or other suitable fastening device for rigid attachment to a desk, table or drawing board where the eraser may be needed.

Having now described our invention and in what manner the same may be used, what we claim as new and desire to protect by Letters Patent is:

1. An erasing machine for use on an office desk comprising a base housing containing an electric motor, a suction fan driven by said motor, a hollow arm mounted for universal movement on said housing, means to bias said arm to upright position, a flexible shaft connected with said motor carried within said arm, a suction tube communicating with said fan carried within said arm, a switch actuated by tilting movement of said arm to energize said motor, and a handle on said flexible shaft and suction tube having an eraser connected with said shaft and a suction nozzle connected with said tube.

2. An erasing machine comprising a base housing containing an electric motor, a suction fan impeller in said housing driven by said motor, a hollow pedestal on said housing communicating with the center of said impeller, a flexible shaft in said pedestal connected with said motor, a suction tube connected with said pedestal in communication with said suction fan impeller, a clevis mounted for rotation on the axis of the pedestal, an arm pivotally mounted on a horizontal axis on said clevis, portions of said flexible shaft and suction tube being

supported by said arm, and a handle on a free end of said flexible shaft and suction tube depending from said arm, said handle containing an eraser connected with said shaft and a suction nozzle connected with said tube.

3. An erasing machine comprising a base housing containing an electric motor, a suction fan impeller in said housing driven by said motor, a hollow pedestal on said housing communicating with the center of said impeller, a flexible shaft in said pedestal connected with said motor, a suction tube connected with said pedestal in communication with said suction fan impeller, a clevis mounted for rotation on the axis of said pedestal, a hollow arm pivotally mounted on a horizontal axis on said clevis, portions of said flexible shaft and suction tube being contained within said arm, a mercury switch in said arm actuated by a tilting movement of the arm to energize said motor, a counter-weight for holding said arm normally in an upright position, and a handle on a free end of said flexible shaft and suction tube depending from the elevated end of said arm, said handle containing an eraser connected with said shaft and a suction nozzle connected with said tube.

4. An office erasing machine comprising a base housing having a hollow pedestal extending upwardly therefrom, a motor in said housing, a suction fan on said motor in suction communication with said pedestal, a hollow arm mounted for vertical swinging movement about a horizontal axis on said pedestal, a flexible shaft driven by said motor extending through said arm and pedestal, a flexible suction tube in suction communication with said pedestal carried by said arm, said shaft and suction tube projecting beyond a swinging end of said arm, means for biasing said swinging end of said arm in an upward direction, and a handle having an eraser connected with said flexible shaft and a suction nozzle connected with said suction tube.

5. An erasing machine for use on an office desk comprising a base housing adapted to rest on the desk having a hollow pedestal extending upwardly therefrom, a motor in said base having a drive shaft aligned with said pedestal, a flexible shaft extending upwardly through said pedestal and connected at one end with said drive shaft, a suction fan on said motor having suction communication with said pedestal, a flexible suction tube connected at one end with said pedestal, a handle on the free ends of said flexible shaft and suction tube having an eraser connected with said shaft and a suction nozzle connected with said tube, a supporting arm pivotally mounted on said pedestal for horizontal and vertical swinging movements and having a free end supporting said flexible shaft and suction tube at a point spaced from said eraser and nozzle a distance approximately equal to the height of said free end of the arm above said base housing when the arm is directed upward, and means biasing said free end of said arm upwardly to elevate said eraser and nozzle in pendant position above the desk.

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UNITED STATES PATENT OFFICE
CERTIFICATION OF CORRECTION

Patent No. 2,956,546

October 18, 1960

Emily S. Teters et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1, 2, and 3, for "Emily S. Teters, of Portland, Oregon, Warren A. Aikins, of Longview, Washington, and William E. Strader, of Kelso, Washington," read -- Emily S. Teters, of Portland, Oregon, Warren A. Aikins, of Longview, Washington, and William E. Strader, of Kelso, Washington, said Aikins and said Strader assignors to said Teters, --; lines 12 and 13, for "Emily S. Teters, Warren A. Aikins, and William E. Strader, their heirs" read -- Emily S. Teters, her heirs --; in the heading to the printed specification, lines 3 to 6, for "Emily S. Teters, Portland, Oreg. (6425 SW. 124th Ave., Beaverton, Oreg.); Warren A. Aikins, 829 20th Ave., Longview, Wash.; and William E. Strader, 803½ S. 3rd, Kelso, Wash." read -- Emily S. Teters, Portland, Oreg. (6425 SW. 124th Ave., Beaverton, Oreg.); Warren A. Aikins, 829 20th Ave., Longview, Wash., and William E. Strader, 803½ S. 3rd., Kelso, Wash., said Aikins and Said Strader assignors to said Teters --.

Signed and sealed this 18th day of April 1961.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents