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F. B. HETHERWICK ETAL

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DUST-FREE CABINET

Filed April 18, 1961

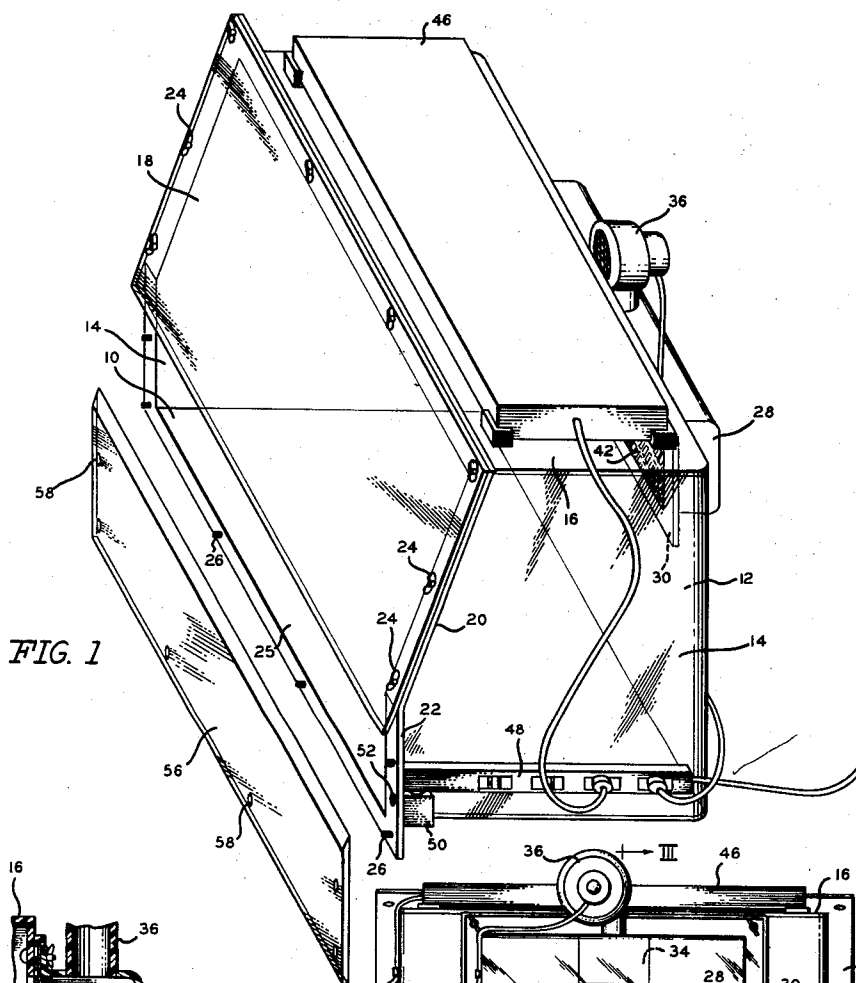


FIG. 1

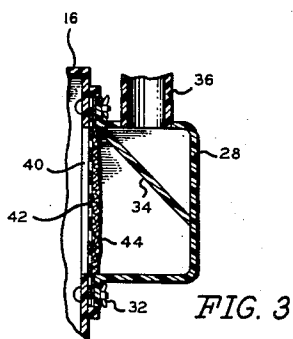


FIG. 3

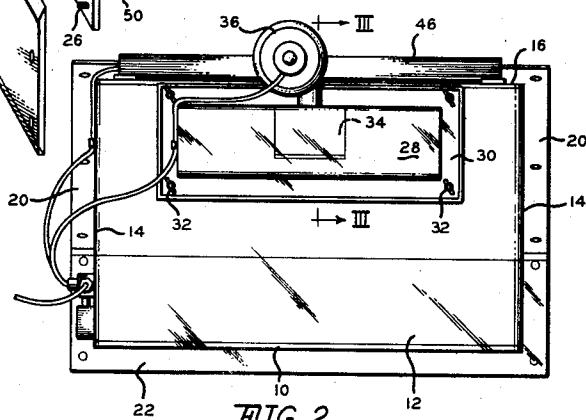


FIG. 2

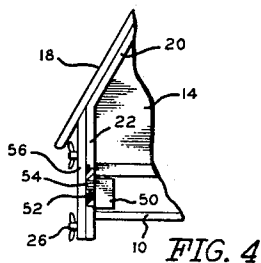


FIG. 4

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DUST-FREE CABINET

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1 Claim. (Cl. 34—82)

This invention pertains to a dust-free cabinet, and particularly relates to a work cabinet having a ready access wherein the operator may perform work therein while the body, except the hands, remains on the outside of the cabinet.

In the assembly of high precision articles such as small ball bearings, electronic equipment, and other sensitive apparatus which may be adversely affected by small dust particles, it is common to employ cabinets which protect the assembly or manufacture area from foreign matter in the surrounding air. It is the purpose of the invention to provide a cabinet of this type wherein the operator may perform an assembly or manufacture within the cabinet, and wherein the entrance of dust particles is prohibited.

A further object of the invention is to provide a dust-free work cabinet wherein visibility and light entrance into the cabinet are excellent and wherein the cabinet is free of shadowed or darkened areas.

A further object of the invention is to provide a dust-free cabinet employing means for creating a superatmospheric pressure therein wherein the entire cabinet structure is self-contained, and is a complete unit in itself.

A further object of the invention is to provide a dust-free cabinet of concise dimensions and configuration wherein safety interlock means are employed to prevent the entrance of foreign matter into the cabinet upon the de-energizing of blower means for creating a superatmospheric pressure therein.

These and other objects of the invention arising from the relationships and details of the components of an embodiment thereof will appear from the following description and accompanying drawings wherein:

FIG. 1 is a perspective view of a dust-free cabinet in accord with the invention, showing the night cover in exploded relation thereto,

FIG. 2 is a back elevational view of the cabinet in accord with the invention,

FIG. 3 is a sectional, elevational detail view of the plenum employed with the cabinet as taken along section III—III of FIG. 2 and,

FIG. 4 is an elevational detail enlarged view, partly in section, of the night cover and interlock switch employed therewith.

The basic configuration of the dust-free cabinet in accord with the invention will be apparent from FIG. 1 wherein the cabinet includes a bottom panel 10, a back panel 12, opposed end wall panels 14, and a top panel 16. Each of these panels, except 16, is preferably constructed of clear acrylic plastic sheets and the panels are cemented together by suitable bonding means. In that the panels are formed of clear plastic, it will be readily appreciated that outside light may readily enter the interior of the cabinet through the walls thereof. The top panel 16 is preferably constructed of a translucent plastic panel capable of diffusing light for reasons which will be later apparent.

The front of the cabinet is defined by an obliquely extending front wall panel 18, also formed of clear plastic. The angle of the front wall panel 18 is such that an operator sitting in front of the cabinet, which would have the bottom plate 10 resting upon a table or like supporting surface, has a line of vision into the interior of the cabinet which will be substantially perpendicular

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to the plane of the panel 18. A flange member 20 is cemented to the side walls 14 and top wall 16 and extends at right angles thereto to define a peripheral flange. This flange extends perpendicularly downwardly at 22, and along the bottom edge of the panel 10, and extends therebelow. Thus, it will be appreciated that a flange member 20—22 is defined about the entire front of the cabinet and the portion extending below panel 10 overlaps the edge of the table on which the cabinet is supported. Bolt members 24 are mounted in the flange portion 20 and extend through the holes defined in the front panel 18 whereby wing nuts may hold the front panel 18 in position. Preferably, a gasket material is interposed between the front wall 18 and the flange 20. This construction permits the front wall 18 to be removed from the cabinet should large equipment be placed in the cabinet which cannot be inserted through the access opening 25 defined between the lower edge of the panel 18 and the bottom panel 10. A plurality of bolts 26 are mounted in the flange portion 22 for attachment of the night cover as will be later described.

A plenum member 28 is mounted on the back of the cabinet upon wall 12 and this member may also be constructed of clear plastic sheets. Plenum 28 is of rectangular configuration and is provided with a peripheral flange 30 having holes therein which cooperate with bolts 32 mounted in the rear wall 12. Thus, it will be appreciated that the plenum 28 may be attached to the wall 12 in the illustrated manner. A downwardly inclined deflecting member 34 is formed within the plenum member directly below the outlet of an electric blower 36 mounted thereon. The width of the deflector 34 is slightly less than one-third of that of the plenum and serves to distribute the air blown into the plenum evenly throughout the plenum.

The rear wall 12 is provided with an opening 40, FIG. 3, which is of rectangular configuration and substantially corresponds in size to the plenum vertical area. A screen member 42 is interposed between the plenum 28 and opening 40 and a filter medium 44 is located immediately adjacent the screen 42 within the plenum. Filter 44 is of very fine characteristics and may be formed of spun glass or the like and is preferably capable of removing dust particles down to .5 micron in size. It will therefore be appreciated that the air being blown into plenum 28 by blower 36 will flow from the plenum 28 through the filter 44 into the interior of the cabinet through the opening 40.

During use of the cabinet the operator will sit facing the front panel 18 and insert the hands through the access opening 25 to perform the work within the cabinet. The apparatus necessary for the assembling or manufacturing process involved will rest upon the bottom panel 10, and the fact that blower 36 creates a superatmospheric pressure within the cabinet will cause a constant air flow out of the access opening 25 preventing small dust particles from entering the cabinet.

To insure complete safeguard against the entrance of foreign matter into the cabinet an interlock switch 50 is mounted upon the flange portion 22 adjacent one of the end panels 14 and a hole 52 defined in the flange portion receives the switch feeler member 54 whereby the feeler may extend beyond the front face of the portion 22 during use of the cabinet. The switch 50 is connected to a bus bar 48 attached to the adjacent end wall 14 and the power leads for the light and blower are taken from this bus bar. When it is desired to close the work cabinet, the night cover plate 56 is inserted over the access opening 25 and affixed in place by the use of wing nuts threaded upon the bolts 26 which extend through the holes 58 defined in the night cover. Upon the cover 56 being firmly tightened into position the cover will depress

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switch feeler 54 causing the switch 52 to open and de-energize the blower 36 and light 46. Suitable gasketing may be employed between the night cover and flange portion 22 to insure an air tight seal. Upon loosening of the night cover wing nuts the switch 50 will be closed and the blower will be energized to once again create the cabinet interior superatmospheric pressure.

Due to the fact that all of the panels defining the cabinet are either transparent or translucent, the light within the room containing the cabinet, in addition to that from light 46, illuminates the cabinet and hence, superior visibility within the cabinet as compared with conventional structures is obtained. Also, the fact that the filter plenum is directly associated with the cabinet minimizes the opportunity of contamination between the filtering means and the cabinet, particularly in that the filter is located directly adjacent to the cabinet interior.

It will be appreciated that various embodiments of the invention may be apparent to those skilled in the art without departing from the spirit and scope thereof, and it is intended that the invention be defined only by the scope of the following claim.

We claim:

A dust-free work cabinet comprising, in combination, a work chamber defined by a bottom panel, light-transmitting top, rear and end panels and a transparent front

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panel having a lower edge vertically spaced above said bottom panel, an access opening defined in said chamber between said front panel lower edge and said bottom panel in opposed relation to said rear panel, an opening defined in said rear panel centrally related to the width of said access opening and vertically disposed thereabove, a plenum attached to the exterior of said rear wall communicating with the entire area defined by said opening, an air inlet defined in said plenum and centrally related to the width of said plenum, a filter interposed between said plenum and said opening, a blower connected to said air inlet mounted upon said plenum, and light means disposed exteriorly of said cabinet and substantially coextensive with said top panel adapted to illuminate said cabinet.

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