A hand held fibrous duster is disclosed. The hand held fibrous duster comprises of a base and a cleaning fabric. The base defines at least one curved cleaning surface configured to hold a cleaning fabric thereon. The cleaning fabric is mounted on the cleaning surface and covers at least a portion of the cleaning surface such that on sliding the duster against a surface, only a fraction of the cleaning fabric comes in contact with the surface, said fraction defines a cleaning edge that remains in contact with the surface.
Magnet Insert (ring shape to allow space for holding articles)
FIBROUS HANDY CLEANER FOR DEVICES

[0001] The present disclosure provides a hand held fibrous duster.

BACKGROUND

[0002] Cleaning of screen parts such as television screens, desktops, laptop screens and keyboards etc are conventionally performed by using cotton wipes, microfiber cloths and brushes provided with handheld structures or elongated handheld brushes with gripping portion. The microfiber cloths usually provide cleaning by picking up the static dust due to electrostatic force. The larger fiber dusters do not provide effective uniform pressure to clean small screens of mobile devices. The brushes are generally used by moving the brushes multiple times over the cleaning surface of the screen. This will result in wiping of the dust from the effective surface in contact with the brush and the wiped dust gets accumulated around the corners and the edges of the screen. Further force applied on the handheld structures such as the handle of the brush gets translated into pressure which is unevenly or non-uniformly distributed over the surface of the screen in contact with the brush. Moreover, applying larger force may result in cracks, scratches or damage to the screen.

[0003] Common dusters available for the purpose of cleaning surfaces are:

[0004] 1. Flat Dusters

[0005] A flat duster has a planar cleaning surface as illustrated in FIG. 1. The flat duster is costly, difficult to store, and is intended for long term use. The total force required to clean off the desired surface is more as whatever force is applied to collect the dust, gets distributed along the surface to be cleaned. When a flat duster moves it creates a swiped surface which is cleaned. As illustrated in FIG. 1 the surface formed by points 1, 2, 3 and 4 represent the flat duster's cleaning surface. The duster is moved to 1', 2', 3' and 4' creating cleaned surface 1, 2', 3', 4'. In case only line segment 1 and 2 would have been translated till 3' and 4' the same area between 1, 2, 3, 4' would have been swept. Hence flat bed dusters cleaning ability is only equal to its longest cleaning edge. Significantly, even minor undulations on the flat cleaning surface result in uneven cleaning.

[0006] 2. Brushes

[0007] A typical brush can be described as shown in the FIG. 2. A brush does not contain all the dust within itself and has a tendency of distributing the same in adjacent environment. Brushes also require more effort to clean a surface. If the brush bristles are rigid then there is always a possibility of scratching on sensitive surfaces by the pointed bristles' tips.

[0008] 3. Rollers

[0009] A cleaner described in Japanese patent document JP11225040 comprising of a cleaning fiber such as a super thin synthetic fiber or non woven cloth mixed with conductive fibers used on a roller surface to clean screen part surface of display devices. However, due to the rolling motion of the roller, the point of contact of the cleaner and the surface to be cleaned has zero relative velocity in the direction of the movement of cleaner and hence does not provide enough friction to pick up the dust from the surface to be cleaned. Moreover the rotating surface of the cleaner provides cleaning by picking up static dust due to electrostatic force and the cleaner is intended towards solving the problem of cleaning cathode ray electronic screens, which would gather substantial electrostatic charge on the surface. The handle and pivot at only at one end of the duster makes the distribution of pressure along the roller surface uneven.

[0010] A fiber duster is therefore desired which provides effective cleaning not only due to dust pick up capabilities of the fiber but which also provides an uniform distribution of pressure on the cleaning surface such that the dust gets effectively removed from the surface in contact without damaging the surface of the screen. Such fiber duster is desired which can ergonomically fit between the thumb and fingers of the human hand to clean small and medium screen sizes. Further it is also a concern to design such fiber dusters which are easy and economic to manufacture with minimum complexity in design.

SUMMARY

[0011] The present disclosure provides a hand held fibrous duster. Particularly, the hand held fibrous duster comprises of a base and a cleaning fabric. The base defines at least one curved cleaning surface configured to hold a cleaning fabric thereon. The said cleaning fabric is mounted on the cleaning surface and covers at least a portion of the cleaning surface, such that on sliding the duster against a surface, only a fraction of the cleaning fabric comes in contact with the surface, said fraction defining a cleaning edge that remains in contact with the surface.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0012] FIG. 1 illustrates a surface as cleaned by a prior art flat duster.

[0013] FIG. 2 illustrates a prior art brush.

[0014] FIG. 3 illustrates a duster held at two side ends of the base of the duster in accordance with an embodiment of the invention.

[0015] FIG. 4 illustrates a cleaning edge of the duster in accordance with an embodiment of the invention.

[0016] FIG. 5 illustrates a magnet placed at two side ends of the base of the duster in accordance with an embodiment of the invention.

[0017] FIG. 6 illustrates the dimensions of the base of the duster in accordance with an embodiment of the invention.

[0018] FIG. 7 illustrates the slots and pins in the base of the duster in accordance with an embodiment of the invention.

[0019] FIG. 8 illustrates an assembled cleaning fabric mounted on the base of the duster in accordance with an embodiment of the invention.

[0020] FIG. 9 illustrates the multiple layers of the cleaning fabric mounted on the base of the duster in accordance with an embodiment of the invention.

[0021] FIG. 10 illustrates the cleaning surface of the duster in accordance with an embodiment of the invention.

DETAILED DESCRIPTION

[0022] For the purpose of promoting an understanding of the principles of the invention, reference will now be made to embodiments and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the disclosed duster, and such further applications of the principles of the invention
therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

[0023] Reference throughout this specification to “one embodiment” “an embodiment” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrase “in one embodiment”, “in an embodiment” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

[0024] A hand held fibrous duster is disclosed. The hand held fibrous duster comprises of a base and a cleaning fabric. The base defines at least one curved cleaning surface configured to hold the cleaning fabric therein. The cleaning fabric is mounted on the cleaning surface and covers at least a portion of the cleaning surface such that on sliding the duster against a surface, only a fraction of the cleaning fabric comes in contact with the surface, said fraction defines a cleaning edge that remains in contact with the surface.

[0025] In accordance with an embodiment of the invention, the base of the hand held fibrous duster is a circular cylinder. In case of the circular cylinder, the entire outer surface can be considered as the cleaning surface. An exemplary circular cylindrical shaped duster is shown in Fig. 3. Such duster is held at two side ends of the duster as shown in Fig. 3 and comprises of a base SL1 on which cleaning fabric FC1 is mounted.

[0026] For the embodiment of Fig. 3, the cleaning edge is described in Fig. 4. The cleaning edge AB is formed by the line segment AB joining the points A and B of the duster touching the surface DEFG along the line with end points x1 and y1 on the surface DEFG. On sliding the duster against the surface DEFG, the cleaning edge AB reaches the line on the surface DEFG joined by the points x2 and y2, the surface (x1,y1,x2,y2) created by the translation of cleaning edge AB along the lines formed by (x1,x2) and (y1,y2) is the cleaned surface. The line that has gathered the dust is the cleaning edge AB. Here AB is the cleaning edge for a single cleaning operation. The cleaning edges can be selected differently during each cleaning operation. The force exerted by the user along the two side ends of the duster, as shown by the arrow marks F1 and F2, gets distributed along the line segment AB evenly. For equal force applied at the two side ends of the duster, as shown in Fig. 3, the resultant pressure is more when compared to the cleaning devices which have a surface contact as shown in Fig. 1. As the resultant force results in higher pressure along the line AB, it enables the duster to be held between two fingers and also generates enough friction to pick up dust particles by the cleaning fabric mounted on the cleaning surface of the duster.

[0027] In accordance with an embodiment of the invention, the cleaning fabric is a fibrous coating. As shown in FIGS. 3 and 4, the cleaning fabric FC is mounted over the base SL1. The fibrous coating can be a microfiber fabric or similar fabric made of fibers of materials such as polyester, polyamide, nylon, cotton etc. or a non woven fabric. Artificial fur of different kinds can also be used. The split conjugated fibers with linear mass density less than 25 deniers is preferably used. In accordance with an embodiment, cleaning fabric having density less than 1 denier may also be used.

[0028] In accordance with an embodiment of the invention, the base is made of wood or any type of plastic such as polypropylene, polystyrene, polyvinylchloride, rubber etc or any such material that can provide necessary rigidity and base to hold the cleaning fabric FC1.

[0029] In accordance with a further embodiment of the invention, the base comprises of a magnet for affixing the fibrous duster to a metallic structure such as a writing board. As shown in FIG. 5 the magnet M1 can be placed at either one or both side ends of the base. The magnet may be shaped as a ring as to provide space for holding articles such as pens, markers etc., or may have any other shape for aesthetic or functional purposes.

[0030] In accordance with an embodiment, FIG. 6 illustrates the dimensions of the base of the duster. The length of the base can be made between 4 to 20 cm such that it fits in the human hand for easy handling. As illustrated in FIG. 6 the radius of the curved cleaning surface is made less than 4 cm. The length is made such that it is comfortable enough for a person who wants to hold the duster, preferably as shown in FIG. 3. The thumb is placed at one end of the base at one side end of the duster and the other opposing finger is placed at other side end, now the duster can be applied on the surfaces for cleaning.

[0031] In accordance with an embodiment of the invention, the base may be formed of one or more components capable of engaging each other. In the example illustrated in FIG. 7, the base is formed of two similar parts SL1 and SL2.

[0032] In accordance with an embodiment of the invention the base includes a slot for receiving and retaining the cleaning fabric. As shown in FIG. 7 the cleaning fabric FC1 is mounted on a semi cylindrical base SL1 with an arrangement of pins shown as P1, P2, P3 for retaining the cleaning fabric and slots shown as S1, S2, S3 for engaging pins of the other component. Similar arrangement needs to be done for the other semi cylindrical base SL2.

[0033] In accordance with an embodiment of the invention, the two side ends of the cylindrical duster are fitted with a tight fitting cap, possibly made of cork, that can be used as a hand grip. As illustrated in FIG. 7, cap CAP1 can be a part of the semi cylindrical base SL1 or can be made to fit into it so as to cover the one side end of the circular cylinder. The same is true for the cap CAP2 at the opposite side which can be fit into semi cylindrical base SL2. When cleaning fabric FC1 is mounted on the semi cylindrical base SL1 and cleaning fabric FC2 is mounted on the semi cylindrical base SL2 such that CAP1 and CAP2 are on the opposite ends and pin P1 is opposite to slot S4, both the assemblies (FC1 and SL1) and (FC2 and SL2) are pushed against each so that the pin P1 is received by the slot S4, similarly pin P2 by slot S5, pin P3 by slot S6, pin P4 by slot S3, pin P5 by slot S2 and pin P6 by slot S1. This arrangement allows for an easy and economical assembly of the duster.

[0034] As illustrated in FIG. 8 caps CAP1 and CAP2 are assembled such they are at opposite side of each other on the two semi cylindrical base SL1 and SL2 respectively.

[0035] In accordance with an embodiment of the invention, the assembled cleaning fabric FC1 and FC2 at the respective semi cylindrical base SL1 and SL2 may be different kinds of cleaning fabric.

[0036] In accordance with an embodiment of the invention, the cleaning fabric is attached to the base of the duster by application of adhesives or by mechanical means. An example of mechanical means is illustrated in FIGS. 7 and 8.

[0037] In accordance with an embodiment of the invention, multiple layers of the cleaning fabric are mounted on the cleaning surface such that each layer can be peeled off or
easily removed. Once a layer of the cleaning fabric is used multiple times and has accumulated significant dust and completed its useful life, that layer is peeled off to reveal a fresh new layer of the cleaning fabric. An exemplary embodiment of the base with multiple layers of fabric mounted thereon is illustrated in FIG. 9.

0038 In accordance with an embodiment of the invention the base defines two or more cleaning surfaces. Different cleaning fabric can be mounted on each cleaning surface. This can be illustrated through FIG. 7 where semi cylindrical base SL1 can have one type of fabric FC1 and semi cylindrical SL2 can have different kind of fabric FC2 mounted on them respectively. In accordance with a preferred embodiment, the base is formed of two or more portions configured to engage each other wherein at least one portion has means for mounting the cleaning fabric.

0039 In accordance with an embodiment of the invention, the curved cleaning surface is formed by one or more planar surfaces. The curved cleaning surface of the duster is formed by one or more planar surfaces as or a series of cleaning surfaces wherein at least two cleaning edges are not coplanar to each other. An exemplary duster with planar surfaces not co planar to each other is illustrated in FIG. 10.

SPECIFIC EMBODIMENTS ARE DESCRIBED BELOW

0040 A hand held fibrous duster comprises of a base defining at least one curved cleaning surface and configured to hold a cleaning fabric thereon, the said cleaning fabric mounted on the said curved cleaning surface and covering at least a portion of the cleaning surface, such that on sliding the duster against a surface, only a fraction of the cleaning fabric comes in contact with the surface, said fraction defining a cleaning edge that remains in contact with the surface.

0041 Such hand held fibrous duster(s), wherein the base is a circular cylinder.

0042 Such hand held fibrous duster(s), wherein the curved cleaning surface is formed by one or more planar surfaces.

0043 Such hand held fibrous duster(s), wherein the cleaning fabric is a synthetic fur or a non woven cloth.

0044 Such hand held fibrous duster(s), wherein the cleaning fabric has a density not more than 25 deniers.

0045 Such hand held fibrous duster(s), wherein the base further comprises a magnet for affixing the duster to a metallic surface.

0046 Such hand held fibrous duster(s), wherein multiple layers of the cleaning fabric are mounted on the cleaning surface, each layer capable of being removed on completion of its useful life.

0047 Such hand held fibrous duster(s), wherein the length of the base is between 4 to 20 cm.

0048 Such hand held fibrous duster(s), wherein the base is made of polystyrene, polypropylene or wood.

0049 Such hand held fibrous duster(s), wherein the radius of the curved cleaning surface is less than 4 cm.

0050 Such hand held fibrous duster(s), wherein the base includes a slot for receiving and retaining the cleaning fabric.

0051 Such hand held fibrous duster(s), wherein the base defines two or more cleaning surfaces.

0052 Such hand held fibrous duster(s), wherein a different cleaning fabric is mounted on each cleaning surface.

0053 Such hand held fibrous duster(s), wherein the base is formed of two or more portions configured to engage each other wherein at least one portion has means for mounting the cleaning fabric.

INDUSTRIAL APPLICABILITY

0054 The hand held duster is a an economical and portable device which is used to clean surfaces such as television screens, desktop and laptop screens, mobile devices screens, keyboards etc. The hand held duster is also configured to be used as a duster for writing boards. The duster can fit ergonomically between the thumb and the fingers of the human hand and can provide easy cleaning as described above.

0055 Further on, the duster is configured to hold the cleaning fabric thereon in a convenient manner by means of pins in the slots provided in side the base. Additionally, the duster can also be provided with magnets to affix the duster on metallic boards for easy storage and the magnets can be provided with space to hold articles such as pens and markers.

1. A hand held fibrous duster comprising:
   a. a base defining at least one curved cleaning surface and configured to hold a cleaning fabric thereon;
   b. said cleaning fabric mounted on said curved cleaning surface and covering at least a portion of the cleaning surface;
   c. such that on sliding the duster against a surface, only a fraction of the cleaning fabric comes in contact with the surface, said fraction defining a cleaning edge that is a line segment, that remains in contact with the surface.

2. A hand held fibrous duster as claimed in claim 1, wherein the base is a circular cylinder.

3. A hand held fibrous duster as claimed in claim 1, wherein the curved cleaning surface is formed by one or more planar surfaces.

4. A hand held fibrous duster as claimed in claim 1, wherein the cleaning fabric is a synthetic fur or a non-woven cloth.

5. A hand held fibrous duster as claimed in claim 1, wherein the cleaning fabric has a density not more than 25 deniers.

6. A hand held fibrous duster as claimed in claim 1, wherein the base further comprises a magnet for affixing the duster to a metallic surface.

7. A hand held fibrous duster as claimed in claim 1, wherein multiple layers of the cleaning fabric are mounted on the cleaning surface, each layer capable of being removed on completion of its useful life.

8. A hand held fibrous duster as claimed in claim 1, wherein the length of the base is between 4 to 20 cm.

9. A hand held fibrous duster as claimed in claim 1, wherein the base is made of polystyrene, polypropylene or wood.

10. A hand held fibrous duster as claimed in claim 1, wherein the radius of the curved cleaning surface is less than 4 cm.

11. A hand held fibrous duster as claimed in claim 1, wherein the base includes a slot for receiving and retaining the cleaning fabric.

12. A hand held fibrous duster as claimed in claim 1 or 3, wherein the base defines two or more cleaning surfaces.
13. A hand held fibrous duster as claimed in claim 12, wherein a different cleaning fabric is mounted on each cleaning surface.

14. A hand held fibrous duster as claimed in claim 1, wherein the base is formed of two or more portions configured to engage each other, wherein at least one portion has means for mounting the cleaning fabric.

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