

A Dust Collect Device For An Eraser

Technical Field

The present invention is related to a dust collecting device for an eraser or the like dust producing or generating devices and to an eraser provided therewith, especially to an improved dust collect eraser that can rapidly collect the dust when
5 users are erasing boards. Because of this, the environment around the board can stay clean.

Background of the Invention

The present invention is related to a dust collect eraser, especially an
10 improved dust collect eraser that can rapidly collect the dust when users are erasing boards, so that the environment can stay clean.

Usually a blackboard or a whiteboard is set in the teaching place for teachers to write words, content of courses or to explain teaching materials. Some teachers write on the whiteboards with sign pens or whiteboard pens, but the material
15 contained is strong poison organic solvent, which is easy to evaporate and does harm to health; others use chalk, and after writing words on the board for a period of time, they have to erase them with erasers. The dust of chalk is pressed under the eraser and when the eraser moves, the dust drops and spreads all over. This makes the environment filled with chalk dust, and the dust does harm to teaching
20 staffs and students, especially teachers and children. Teachers write on the board with chalk, and when they erase the board, dust comes out and files everywhere and it does harm to health. The manufacturer of the eraser should make some improvement in this situation.

Accordingly, it is an object of the present invention to avoid an excessive
25 dust generation upon erasing the blackboard.

This object is solved according to the invention by a dust collecting device according to claim 1 and by an eraser according to claim 6. Preferred embodiments are subject of the dependent claims.

According to the invention, there is provided a dust collecting device for an
5 eraser or the like dust producing device, which comprises a first box, an inside box
being fixed inside the first box, wherein an outer space is defined between the first
box and the inside box, wherein the first box has an air outlet connected with the
outer space and a pass, and wherein the inside box has a through or opening
connecting the outer and inner spaces in which an inhaler component is arranged, a
10 door leaf, which sheathes the pass of the inside box and contacts the inside box to
become substantially airtight, wherein a dust bag, which can be ventilated but
through which the dust cannot pass can be arranged in the inner space of the inside
box, wherein a dust guide pipework, one end of which is pivotably provided with a
connection and the other end of which is connectable with an eraser or the like dust
15 producing device, wherein the connection can pierce through the door leaf and a
bonding component is provided on one or more portions of the connection so that it
can attach tightly with the dust bag.

Accordingly, the inventor developed an improved design of dust collecting
device for an eraser to fit in with environmental protection and health by means of
20 his accumulated long-term experience on dealing with dust collect and peripheral
assemblies and on manufacturing and designing related products in that field.

According to a preferred embodiment of the invention, the inhaler
component being installed on the trough of the inside box comprises an air suction
ring and an exhaust ring communicating with the inner and outer spaces,
25 respectively.

Preferably the door leaf is pivotably joined with the first box, so that it can be open and closed.

Further preferably, the dust bag comprises a perforation on one side of it and a bonding component arranged substantially around it.

5 Most preferably, there is provided a detector for detecting a vacuum inside the inner box.

Preferably, there is provided a dust collecting device for an eraser being related to a box, which has an inside box to separate the room of the box into an inner and an outer space. An inhaler component and a ventilate dust bag are
10 collocated. The dust bag connects a dust guide pipe work and forms a connective structure, so that users can operate the inhaler component at any time to absorb the dust into the dust bag. Thus, the dust is collected instead of floating and spreading in the air, so the environment can stay clean.

The second aspect of the present invention of a dust collect device for an
15 eraser is related to the inner space of the inside box, in which has a ventilate dust bag. The dust bag connects a dust guide pipe work to form a connective structure, so that the dust bag can be easily taken apart from the embodiment.

In order to describe in detail the objects, characteristics and functions of the present invention, an example of embodiment and figures, relevant to the present
20 invention are given as follows:

Description of the Drawings

Fig. 1 is the diagrammatic sketch of the entirely structure of the first embodiment of the dust collect device;

25 Fig. 2 is the diagrammatic sketch of the box and the inside box of the first

embodiment of the dust collect device;

Fig. 3 is a cutaway illustration of the combination of the box and the inside box of a further embodiment of the dust collect device;

Fig. 4 is a diagrammatic sketch of a further preferred embodiment of the dust collect device showing how the dust bag connects the dust guide pipe work;

Fig. 5 is a diagrammatic sketch of a further embodiment of the dust collect device showing how the dust bag connects the dust guide pipework;

Fig. 6 is a diagrammatic sketch of a further embodiment of the present invention showing the placement of the eraser in the dust-cleaning trough.

10 Detailed Description of the Invention

In the following, an embodiment of the invention to embody the dust collect device (as shown in Fig. 1) is described. It consists of or comprises a box 20, an inhaler component 20, a door leaf 40, a dust bag 50, and a dust guide pipework 60. In which:

15 The box 20(as shown in fig. 1) is fabricated preferably by solidly joining bar sheets. An opening 201 is provided on its front side and at its bottom side is provided an air outlet 202. The upper part of the box 20 is preferably hollow, and on its top is a set of hinges 203, and furthermore a cover 204 is provided on its top. The hinge 203 is solidly joined with the side of the cover 204 is provided an airtight
20 piece 205, which compresses the box 20 to substantially become an airtight structure. An inside box 21 is or can be fixed in the box 20 and is also fabricated preferably by solid jointing bar sheets. Between the box 20 and the inside box 21 are provided or defined an outer space 22 and an inner space 23. The inside box 21 has a front frame 211 solidly joining the inside edge of the opening 201, and it
25 also has a pass 212 set at the inner side of the front frame 211. The pass 212

connects with the opening 201 of the box 20. On the top of the inside box 21 has a round hollow trough or opening 213 to connect the outer space 22 and the inner space 23. Further, a circular groove 25, which is formed and keeps an appropriate interval between the inside box 21 and the box 20, connects the outer space 22. A
5 bottom-set 26, which is also formed and keeps an appropriate interval between the inside box 21 and the box 20, is provided at the bottom of the inside box 21 and connects the circular groove 25 with the air outlet 202. A soundproof mat is preferably attached to the inside surface of the box 20 and the front cover 204.

The inhaler component 30 (as shown in Fig. 1) is or can be installed on the
10 round hollow trough or opening 213 of the inside box 21. It has two round pedestal 31 and 32 contact and press the top and bottom side of the round hollow trough 213 respectively, so that the joints can be made airtight. An air suction ring 33 connecting with the inner space 23 is set on the round pedestal 32, which is at the bottom of the inhaler component 30. Besides, an air exhaust ring 34
15 connecting the outer space 22 is set on the round pedestal 31, which is on the top of the inhaler component 30.

The door leaf 40 (as shown in Fig. 1 and 4) is substantially square and sheathes the opening 201 of the box 20. Inside the edge of the door leaf 40 can be provided an airtight mat 41, which contacts the pass 212 of the inside box 21. On
20 the side of the door leaf 40 is a set of hinge 42, and the hinge 42 correspondingly solid joints the opening 201 of the box 20. The door leaf 40 can be deflected or pivoted to be open or closed, and a round hole 43 is provided in the middle of the door leaf 40.

The dust bag 50 (as shown in Fig. 1 and 4) comprises a filter coat 51, which
25 has tiny meshes on it, and an appropriate space 52. It can be put in the inner space

23 of the inside box 21, and a perforation 54 is on one side 53 of it. The perforation 54 preferably has a bonding component 55, and this component 55 can be e.g. the magic binder we usually buy in the store. The perforation 54 has a soft inner ring 56 in it.

5 The dust guide pipework 60 is preferably a serpentine pipe, which is soft and has an appropriate diameter (as shown in Fig. 1 and 3). One end of the dust guide pipework 60 can pivot and is joined with a connection 61. The straight pipe 62 of the connection 61 pierces through the round hole 43 of the door leaf 40. The middle part of the straight pipe 62 has a flange 62 contacting the inside surface of
10 the inner ring 56 of the round hole 43. On the side of the flange 63, which is corresponding to the bonding component 55, has a bonding component 64. The bonding component 55 and 64 can bond and joint to each other firmly. The other end of the dust guide pipework 60 connects a switchover head 65, with which the connecting pipe 66 can be joined by insertion.

15 One side of the eraser 70 (as shown in Fig. 1, 3 and 5) can be connected with a core case 71, which connects with the connecting pipe 66. At the bottom of the core case 71 are provided connecting holes 72. Besides, it also sticks with a cleaning layer 73, which has multiple grooves 74. The groove 74 is connected with the connecting holes 72. At the bottom of the other dust-cleaning trough 75
20 has a dust scraper 76 to contact with the eraser 70, and to scrape the dust of chalk. The dust-cleaning trough 75 is set up on a frame 76 and can be pulled out or pushed and hid in.

 The sensitive element 80 (as shown in Fig. 1 and 2) solidly joints with the inside box 21 and is set on the top of the inside box 21 and substantially around the
25 round hollow trough 213. The sensitive element 80 has a detector bar 81 which

pierces through the inside box 21 and protrudes into the inner space 23. The detector bar 81 can test or detect the (level of) vacuum. A display lamp 82 is fixed on the front part of the box 20. The display lamp 82 is connected with the sensitive element 80 by a conducting wire. An inductance switch 83 and a manual switch 84 are connected with the power supply and the inhaler component 30, respectively. An infrared switch 85 is set in the core case 71 of the eraser 70. A turn-on switch 86 and the turn-off switch 87 are set in the core case 71. The turn-on switch 86 and the turn-off switch 87 are connected with the infrared switch 85. Users use the turn-on switch 86 and the turn-off switch 87 to control the infrared switch 85 to turn on or turn off the inductance switch 83, so that the inhaler component 30 is electrified to get moving or disconnected to stop. According to the above-mentioned (as shown in Fig. 1 and 3), the filter coat of the dust bag 50 has tiny meshes on it. It is ventilated, i.e. air can pass it, but the dust cannot go through it. The inner space 52 and the outer space 23 are connected and are ventilated. The inner space, the dust bag, the dust guide pipework and the core case 71 of the eraser 70 are connected, and the groove 74 of the eraser 70 connects with the connecting hole 72. When users use the eraser to clean the words or charts on the board, they hold the core case 71 of the eraser 70 and press the turn-on switch 86 with their fingers. The infrared switch 85 is started and it turns on the inductance switch 83 to start the inhaler component 30. The inhaler component 30 pumps the air of the inner space 23, and the dust bag 50 ventilates for it. In the meantime, the inhaler component 30 also pumps the dust bag 50. Because the dust guide pipe-work, the core case 71 of the eraser 70, the groove 25 74 and the connecting hole 72 are connected, the air among them is also pumped by the inhaler component 30. Dust comes out when the cleaning layer 73 of the eraser 70 cleans

the words or charts written by chalk. The dust is pressed between the cleaning layer 73 and the blackboard. The eraser 70 can pump the dust between the cleaning layer 73 and the blackboard to the groove 74. By the connecting structure, the dust is led by the dust guide pipework 60 to the inner space 52 of the dust bay
5 50.

As shown in Fig. 1 and 4, the dust is or can be pumped into the space of the dust bay 50. Because the filter coat 51 is ventilating, but the dust cannot go through it, the dust is gathered in the inner space of the dust bay 50. The inhaler component 30 directly pumps the dust when the eraser 70 cleans the words or charts.
10 Because of this, the dust comes out from the eraser 70 does not spread and fly. The Environment around the board can stay clean.

As shown in the Fig. 3, when the dust is accumulated in the inner space of the dust bag 50, the filter coat 51 is covered with dust, so that the meshes are clogged partly or the meshes are becoming smaller and smaller. In order to keep
15 the amount the inhaler component 30 pumps, the inhaler component 30 adjust its output power by the internal control system. Only if the inhaler component 30 can pump appropriate air in the dust bag 50, and the inner space 23 keeps its set vacuum, the inhaler component 30 can keep its stable pumping amount.

As shown in Fig. 3 and 4, when the dust bag 50 accumulate the dust to a
20 large amount and the filter coat 51 are clogged to a set level, the air goes out from the dust bag 50 will be less than the set level as the inhaler component 30 pumps. In this case, the function of its pumping dust is getting lower. The inhaler component 30 pumps the air in the inner space 23, so that the vacuum is raised. At this time, the detector bar 81 of the sensitive element 80 pieces into the inner space
25 23. When the vacuum value that it gets or detects is higher than a set

(predetermined or predeterminable) value, the sensitive element 80 will give the display lamp 82 a signal through a conducting wire. The display lamp 82 glistens, so that users will know that the dust in the dust bag 50 is accumulated to a limit. Accordingly, it may remind users to clean the dust or to change a new dust bag.

5 When users want to change or clean the dust in the dust bag 50, they can open the door leaf from the opening 201 of the box 20. The pass 212 becomes hollow, and the inner space 23 of the inside box 21 is open. The dust bag 50 is connected with the bonding components 55, 64 of the connection 61 e.g. by magic binder. The bonding components 55 and 64 can be easily taken apart. Users can
10 take out the dust bag 50 easily to clean the dust inside. When users are going to change or put back the dust bag 50, they only have to match the perforation 54 of the dust bag 50 and the straight pipe of the connecting 61. Then, female joints or inserts the inner ring 56 to or into the straight pipe 61. The inner ring 56 is soft, so that the straight pipe when it female joints with the straight pipe 62, it becomes
15 airtight. When users bind the bonding component 55 and 64, the bag will be completely put back to the embodiment. It is easy for adults and children to operate.

 When the inhaler component 30 pumps the air in the inner space 23, the air goes in through air suction ring 33 and out through the exhaust ring 34 to be
20 discharged to the outer space 22 of the box 20. The air goes through the circular groove 25, the bottom-set 26 and at last goes out through the air outlet 202. Soundproof pads 27 are set on the inner surfaces of the cover 204. The inhaler component 30 makes some noise when it pumps air. The soundproof pads 27 can isolate the noise. Besides, the circular groove 25 and the bottom-set 26 between
25 the box 20 and the inside box 21 form an extended pass to effectively isolate the

sound. So, it will not make noise when it is operated.

When users clean the words or charts on the blackboard, they press the turn-on switch 86 with their fingers. The infrared switch 85 is started and it turns on the inductance switch 83 to start the inhaler component 30. When it cleans the board, it starts to pump the dust. This make the environment around the board
5 clean and it is good in particular for children's health. After the eraser 70 cleaning the board for a period of time (as shown in Fig. 5), the surface of the cleaning layer 73 is covered with dust. Users can put the eraser 70 into the dust-cleaning trough. The bottom of the cleaning layer 73 can touch with the dust scraper 76, and they
10 move relatively to scrape the dust. Magic binder can bind the eraser 70 and the cleaning layer 73, so that users can replace the cleaning layer 73 very easily.

To conclude, the present invention provides a dust collecting device for an eraser. It is related to a box, which has an inside box to separate the room of the box to an inner and an outer space. An inhaler component is set in the inside box,
15 and it connects the inner with the outer space. A dust bag, which is ventilated, is placed in the inner space, and it connects a dust guide pipework with the eraser to form a connective structure, so that users can operate the inhaler component at any time to absorb the dust into the dust bag. Thus, the dust is collected instead of floating and spreading in the air, so the environment can stay clean.

20 The present invention has really the practical applicability and the creativeness, and base never been published to the public, that conforms to the regulations specified in the Patent Law.

The embodiment mentioned above is only a preferred embodiment of the present invention, and cannot restrict the range of embodiment of the present
25 invention to it. Any modification or change made based on the present invention

shall be considered to be within coverage of the present invention as defined in the claims.

What is claimed is:

1. A dust collecting device for an eraser (70) or the like dust producing device,
which comprises: a first box (20),
an inside box (21) being fixed inside the first box (20), wherein an outer space
5 (22) is defined between the first box (20) and the inside box (21), wherein the
first box (20) has an air outlet (202) connected with the outer space (22) and a
pass (212), and wherein the inside box (21) has a trough (213) connecting the
outer and inner spaces (22, 23) in which an inhaler component (30) is arranged,
a door leaf (40), which sheathes the pass (212) of the inside box (21) and
10 contacts the inside box (21) to become substantially airtight, wherein a dust bag
(50), which can be ventilated but through which the dust cannot pass can be
arranged in the inner space (23) of the inside box (21), wherein a dust guide
pipework (60), one end of which is pivotably provided with a connection (61)
and the other end of which is connectable with an eraser (70) or the like dust
15 producing device, wherein the connection (61) can pierce through the door leaf
(40) and a bonding component (63) is provided on one or more portions of the
connection (61) so that it can attach tightly with the dust bag (50).
2. A dust collecting device according to claim 1, wherein the inhaler component
(30) being installed on the trough (213) of the inside box (21) comprises an air
20 suction ring (33) and an exhaust ring (34) communicating with the inner and
outer spaces (23, 22), respectively.
3. A dust collecting device according to one or more of the preceding claims,
wherein the door leaf (40) is pivotably joined with the first box (20), so that it
can be open and closed.
- 25 4. A dust collecting device according to one or more of the preceding claims,



wherein the dust bag (50) comprises a perforation (54) on one side of it and a bonding component (55) arranged substantially around it.

5. A dust collecting device according to one or more of the preceding claims, wherein there is provided a detector (80) for detecting a vacuum inside the inner
5 box (21).
6. An eraser for erasing blackboards provided with a dust collecting device according to one of the preceding claims.

