April 21, 1931. S. S. BETTMAN 1,801,620

VACUUM BOARD ERASER

Filed June 11, 1928

Fig. 1

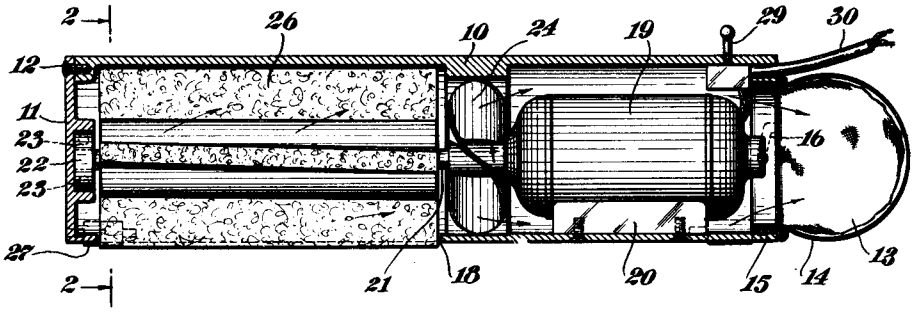


Fig. 2

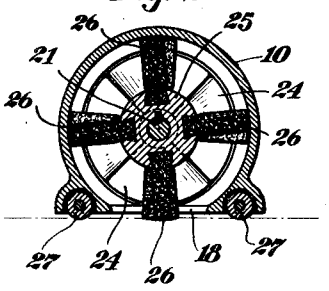


Fig. 3

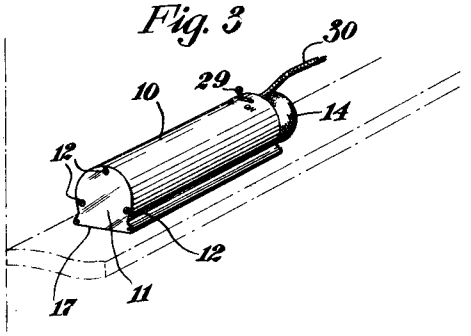
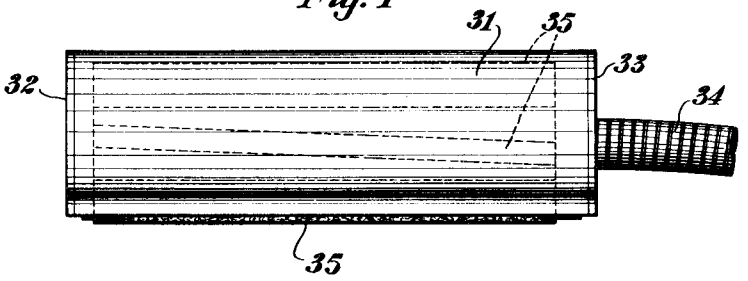


Fig. 4



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UNITED STATES PATENT OFFICE

SANFORD S. BETTMAN, OF NEW YORK, N. Y.

VACUUM BOARD ERASER

Application filed June 11, 1928. Serial No. 284,459.

My present invention relates generally to cleaning devices, and has particular reference to blackboard erasers.

It is well known that the ordinary type of blackboard eraser consists of nothing more than a set of felts arranged along a suitable wiping surface, the operation of the eraser doing nothing more than to break up the concentrated markings of chalk on a blackboard and to dissipate these markings in the form of very fine chalk dust. A certain amount of this dust adheres to the felts, another part thereof remains in finely spread condition upon the blackboard itself, but a very large amount of chalk dust is released from both of these surfaces, pollutes the air of the room in which the blackboard is, and settles in an annoying manner on the clothes of the occupants of the room, on desks, and elsewhere. It also enters the lungs of the occupants.

Board erasers of this ordinary type are obviously of an extremely inefficient character and decidedly unsanitary; and particularly in class rooms occupied by a number of children, where such erasers are generally employed, the use thereof is highly unsatisfactory and undesirable.

It is a general object of my invention to provide a blackboard eraser whose employment is not accompanied by the disadvantages illustratively set forth above.

More particularly, it is an object of my invention to provide an eraser wherein the well known properties of a vacuum have been harnessed for the purpose of rendering the employment and operation of the device highly efficient and sanitary and devoid of the objectionable features referred to.

I am fully aware that vacuum devices for cleaning purposes are well known. It is a particular object of my present invention, however, to provide a device which is so constructed as to be usable in the well known ordinary manner in which blackboard erasers are generally employed; to provide a device which is so constructed and arranged as to be manually graspable in the customary expeditious manner; and to provide a device which is not only sufficiently light in weight and compact in nature but also absolutely safe for employment by children.

It is another object of my invention to provide a blackboard eraser employing the usual felts for purposes of loosening the chalk markings on the board, and constructed in such a manner that the loosened chalk is not left to adhere on the felts nor on the blackboard, nor dissipated into the air of the room; the construction being such that the loosened chalk dust is quickly and efficiently directed into a suitable receptacle which may be emptied and cleaned at convenient intervals in a sanitary manner.

Briefly, my invention contemplates the provision of a manually graspable elongated casing substantially similar in size and shape to the usual well known board eraser, the provision of an apertured and flattened wiping surface, the arrangement of a set of felts with portions exposed on said surface, and the provision of means for creating a vacuum in said casing for purposes of drawing the loosened dust into and through the casing to the suitable receptacle.

It is a particular feature of my invention to provide the device of such a character and in such a manner that the employment thereof is practically identical in nature with the manner of employing the customary board eraser, the present device being adapted to rest on the usual ledge provided in association with the blackboard, and being sufficiently light and compact to be grasped in the usual manner and moved over the blackboard.

It is another feature of my invention to provide a set of movable felts in combination with means for causing the same to move transversely with respect to the wiping surface. The effectiveness of the latter is thus multiplied many times.

Another feature of my invention lies in arranging the felts in such a manner that the movement thereof will not only help to loosen the chalk and transform it into chalk dust, but will also aid in directing the loosened chalk dust in the desired manner into and through the casing.

A further feature lies in constructing a

suitable dust receptacle in a convenient and unobstructing manner, a preferred construction positioning the receptacle at one end of the elongated casing and lying substantially within the bounds of the latter.

Another feature of my invention lies in constructing the device in an extremely simple and efficient manner, more particularly, by arranging a shaft longitudinally within the casing. The shaft is adapted to support a set of felt strips radially thereof and is also preferably employed for purposes of supporting and rotating a suitable fan. In one type of construction, a small motor is arranged within one end of the casing with its axis aligned with that of the shaft, thereby providing the desired compactness and simplicity.

In another form of my invention, both the motor and fan are remotely positioned and a suitable tube extends to the device for transmitting the vacuum thereto.

For the attainment of the foregoing objects and such other objects as may hereinafter appear or be pointed out, I have illustrated two forms of my invention in the accompanying drawings, in which—

Figure 1 is a longitudinal cross-section of one form of construction embodying the features of my invention;

Figure 2 is a cross-sectional view taken substantially along the line 2—2 of Figure 1;

Figure 3 is a perspective view of the entire device of Figures 1 and 2 shown as it would appear on a ledge of a blackboard; and

Figure 4 is a side elevational view of a modified type of device.

I provide an elongated casing 10 which is substantially cylindrical in cross-section as shown most clearly in Figure 2, this casing being of suitably light metal and being shaped and sized to be manually graspable in the same manner as ordinary board erasers are grasped.

The forward end of the casing 10 is closed as by means of the closure plate 11, the latter being suitably attached to the body of the casing 10 as by screws or bolts 12.

The opposite end of the casing 10 is open, either wholly or in part, to provide an outlet opening for the chalk dust. In the construction illustrated in Figures 1–3, I have provided a suitable dust receptacle or dust-bag in association with this outlet opening.

More particularly, it will be noted that I have provided a dust-bag 13 shaped to conform to the major portion of a sphere, this bag being retained within a suitable guard 14 of relatively rigid material. The guard 14 is preferably of wire mesh or similar perforated material and is provided at its forward end with a flange 15 adapted to enter the outlet opening in the casing 10, thereby sealing the latter. A bayonet slot engagement 16 may be provided for permitting expeditious attachment and removal of the receiving unit consisting of the bag 13 and the guard 14.

The under-surface 17 of the casing 10 is flattened to define a base for the device when the latter is set down as shown in Figure 3, and to provide also a suitable wiping surface adapted to be swept back and forth across the blackboard.

The forward portion of the surface 17 is apertured, and I have shown a relatively large opening 18 substantially rectangular in shape. In the construction of Figures 1–3, the rear portion of the casing, i. e., that portion lying to the rear of the aperture 18, is constructed to accommodate suitable vacuum-creating apparatus.

In the form illustrated, I have provided a motor 19 of suitable size and construction, the latter being positioned in the rear end of the casing 10 immediately in front of the outlet opening. The motor may be suitably supported as by a saddle 20, and the axis of the motor is preferably arranged to coincide approximately with the axis of the casing 10 as a whole.

A shaft 21 is aligned with the shaft of the motor and extends longitudinally through the casing, being journaled at its forward end 22 in the closure plate 11. A set of ball-bearings 23 may be provided for facilitating the rotation of this shaft.

On the shaft 21 and immediately in front of the motor 19 I provide a set of vanes to constitute a fan 24. The vanes are constructed and arranged to create a draft of air into the casing through the aperture or opening 18, through the fan itself, around the motor 19, and out through the outlet opening into the dust-bag 13.

A set of felts are associated with the casing with portions thereof arranged along the wiping surface. It is a feature of my invention to provide these felts in a movable manner.

Referring particularly to Figures 1 and 2, it will be noted that a drum 25 is keyed to the shaft 21 along that portion of the shaft which lies between the closure plate 11 and the fan 24. The drum 25 is provided with a set of longitudinal grooves, and a set of felt strips 26 are secured in position in these grooves. In the construction illustrated, the grooves are undercut so that one longitudinal edge of each felt strip 26 may be positioned in a groove to provide a sort of dovetail joint.

The felt strips 26 are substantially rectangular in shape and extend radially from the drum 25. They are so sized that the outer longitudinal edges thereof will lie substantially along the wiping surface of the device. It is obvious that the rotation of the shaft 21 will cause the felt strips to move transversely across the aperture 18.

In accordance with one feature of my in-

vention, the grooves which accommodate the felt strips 26 are not absolutely parallel to the shaft 21 but are arranged at a slight acute angle with respect thereto. As a result, the movement of the felts across the aperture 18 will not only loosen the chalk which they encounter on the blackboard but will at the same time have a tendency to sweep such chalk dust rearwardly toward the vanes of the fan 24.

To facilitate the sliding movement of the device over the blackboard surface and to enhance the general support of the device either in the position of rest or during the use thereof, I prefer to provide a set of rollers 27 at opposite sides of the wiping surface. Two of these rollers are clearly illustrated in Figures 1 and 2, but any suitable or desired number thereof may be provided. Such rollers are preferably made of soft rubber or the like.

Any suitable electric switch may be associated with the device, and I have illustrated a small switch 29 pivotal from an "on" to an "off" position and arranged on the upper rear end of the casing 10. Suitable wires 30 establish the necessary electrical connection between the switch 29, the motor 19, and an external source of energy such as the ordinary electric light socket or outlet.

The device is shown in normal resting position in Figure 3. When it is employed, it is grasped in the usual manner and the switch 29 is thrown to the "on" position. The device is then swept back and forth across the blackboard surface in the usual and well-known manner. The operation of the motor 19 rotates the fan 24 and creates a suction in the direction of the motor and hence in the direction of the outlet opening leading to the dust-bag. The rotation of the motor also causes the shaft 21 to revolve and in this way moves the felts in rapid succession transversely across the wiping surface of the device.

In Figure 4 I have illustrated a modified type of construction wherein the motor and fan have been removed from within the casing, thereby serving to lighten the latter. In this construction, a casing 31 is provided similar in construction to the casing 10. A closure plate 32 is arranged at one end, and a closure plate 33 is arranged at the opposite end. Leading to and through the plate 33 is a flexible hose 34 which is in communication at some remote point with a vacuum-creating device.

Arranged within the casing in substantially the same manner as illustrated in Figures 1 and 2 are a set of felts 35, the latter being sized and shaped so as to have the outer portions thereof lie along the wiping surface of the device. The rotation of the felts in this construction is effected merely by sweeping the entire device across the blackboard surface.

It will be obvious that changes in the details herein described and illustrated for the purpose of explaining the nature of my invention may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claim. It is therefore intended that these details be interpreted as illustrative and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

A vacuum blackboard eraser comprising an elongated manually graspable substantially cylindrical casing, said casing having one side flattened to provide a wiping surface, said surface having an opening therein; one of the ends of the casing being closed and the opposite end being open to provide a dust outlet, a dust-receiver over said outlet, means within the casing adjacent to said outlet for creating a suction from said wiping surface in the direction of said dust-receiver, and a set of movable felts arranged to sweep across said wiping surface; said felts comprising a series of radially arranged strips, and means for rotating said strips about an axis parallel to the casing axis, said strips being arranged at an angle with respect to the axis of rotation for directing the swept-up dust in the direction of said dust receiver.

In witness whereof I have signed and sealed this specification this 4 day of June, 1928.

SANFORD S. BETTMAN.