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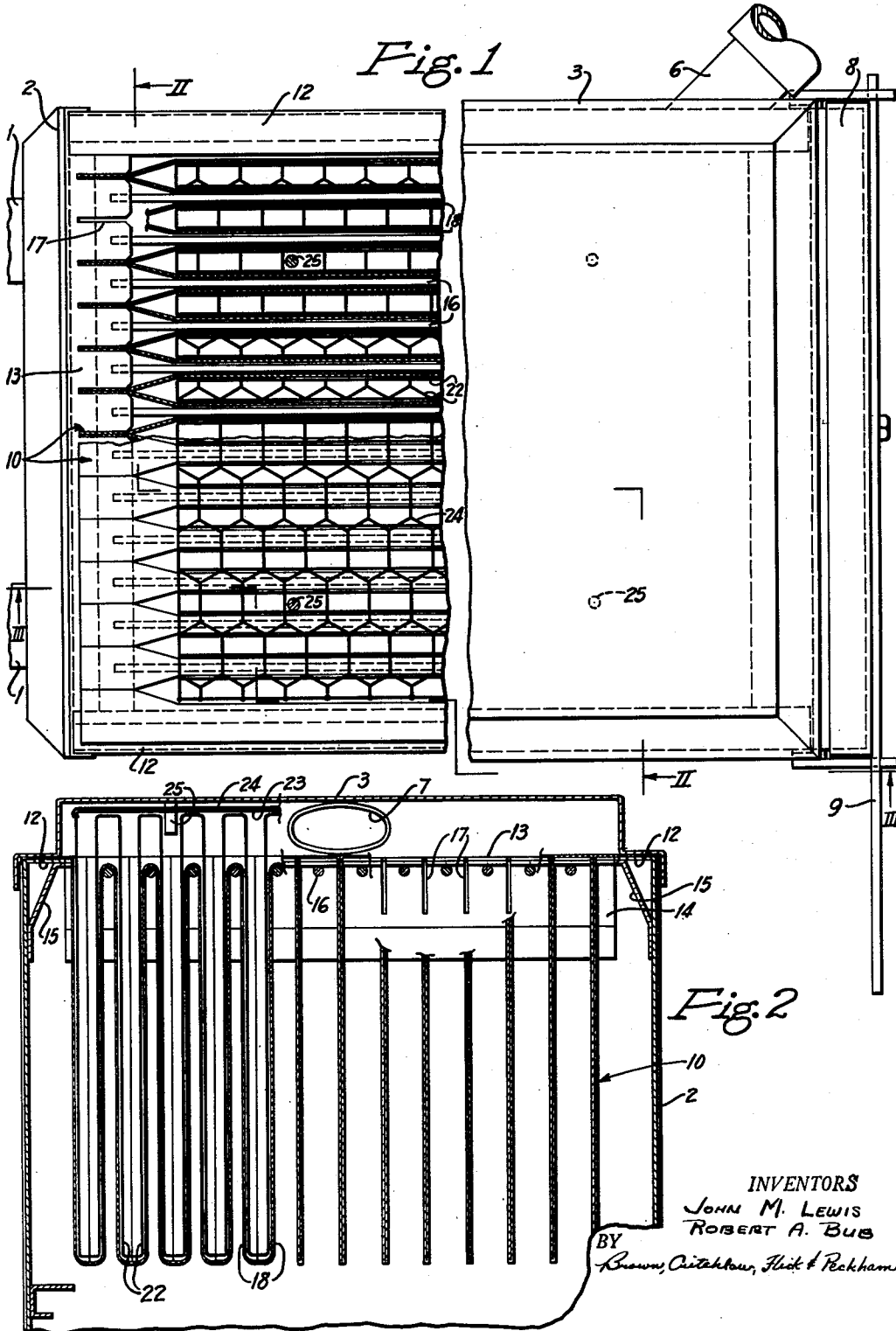
J. M. LEWIS ET AL

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DUST FILTERING APPARATUS

Filed Dec. 29, 1951

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

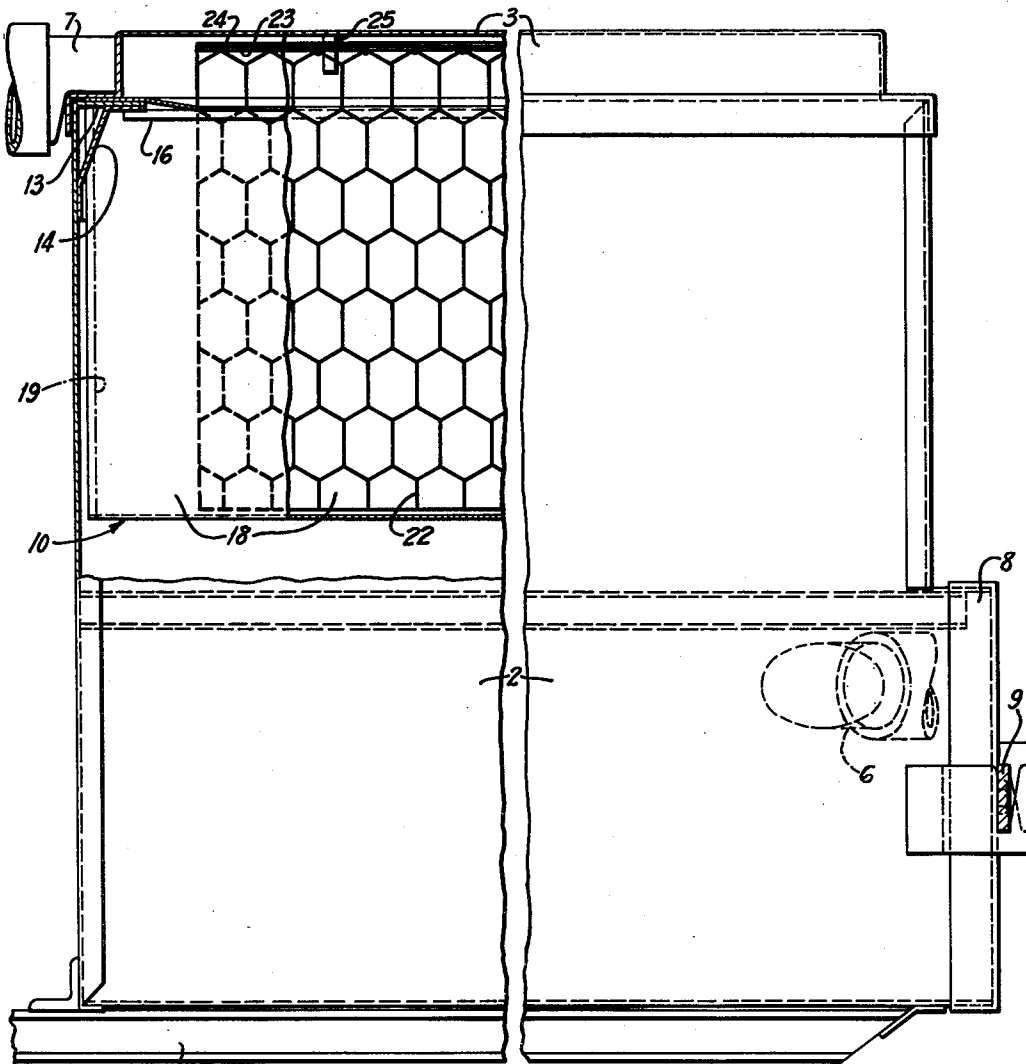


Fig. 3

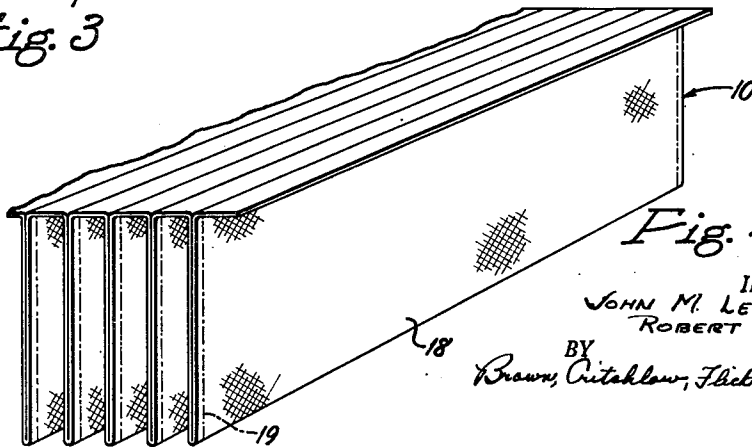


Fig. 4

INVENTORS
JOHN M. LEWIS &
ROBERT A. BUS

BY
Brown, Antkowiak, Fitch & Reckham

UNITED STATES PATENT OFFICE

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DUST FILTERING APPARATUS

John M. Lewis, Cheswick, and Robert A. Bub,
Wilkinsburg, Pa., assignors to Mine Safety Ap-
pliances Company, Pittsburgh, Pa., a corpora-
tion of Pennsylvania

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8 Claims. (Cl. 183—51)

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This invention relates to dust filtering apparatus, and more particularly to the filtering material or bag therein.

It is among the objects of this invention to provide filtering apparatus in which the bag has a very large surface area for the size of the housing containing it, in which the bag is easy to form, and in which the bag is mounted in the housing in a simple and inexpensive manner.

In accordance with this invention, the filter housing is formed from a box, the open top of which is closed by a removable cover. The filter bag is formed from a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel depending pockets spaced apart at their upper ends by connecting areas of the sheet. These connecting areas are supported by suitable means in the box. Preferably, such means are parallel rods extending lengthwise in the upper part of the box between the filter pockets. The opposite sides of each pocket at each end are sealed together and form vertical multiple thickness portions. Horizontal supporting members are secured to the opposite ends of the box and project inward therefrom along the rods for a short distance. These members are provided with vertical slots between the rods for receiving the upper ends of the multiple thickness end portions of the pockets. The ends of the connecting areas of the filter bag between the pockets rest on top of the supporting members. The box and cover are each provided with an opening, one of which is an inlet for unfiltered gas and the other of which is an outlet for the gas that has been filtered in passing through the bag. When the outlet is in the cover, which is preferred, means are provided for holding the pockets open. For this purpose it is preferred to use laterally spaced foraminous members inserted in pairs in each of the pockets. They may be formed by providing a reticulated wire strip with a plurality of reverse bends.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a fragmentary plan view of our dust filtering apparatus, partly broken away to show parts in section; Fig. 2 is a fragmentary vertical section taken on the line II—II of Fig. 1; Fig. 3 is a fragmentary side view, partly broken away to show parts in section; and Fig. 4 is a fragmentary perspective view of the filter bag.

Referring to the drawings, the filtering apparatus disclosed herein may be mounted on a frame formed from a pair of spaced horizontal

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beams 1. As the apparatus preferably is portable, these beams may be carried by wheels (not shown) by which the apparatus can be transported to the desired locations. Mounted on the rear half of the frame is a filter housing which is formed from an open top box 2 provided with a removable cover 3 that is held in place by screws or any other suitable means (not shown). Near the rear end of one side of the box there is an air inlet coupling 6 that preferably extends diagonally away from the housing. At the opposite end of the housing the cover is provided with a central air outlet coupling 7 which is connected to a suction blower that is not shown, but which can be seen in copending patent application, Serial No. 201,154, filed December 16, 1950. The back end of the housing has a clean-out opening that normally is sealed shut by a door 8 held in place by a bar 9 pivoted to the center of the door. The purpose of this clean-out opening is described in detail in my copending application. The present invention is concerned only with the upper part of the housing above the clean-out door, in which a filter bag 10 is mounted.

The opposite sides of the filter box 2 are provided at the top with inwardly extending horizontal flanges 12. Similar flanges 13 are formed at the opposite ends of the box. Each of the end flanges is supported by an inclined bracket 14 secured to its lower surface and to the adjacent end wall of the box, while the side flanges are reinforced by similar brackets 15. The end brackets 14 have welded to the lower surfaces of their upper portions the opposite ends of parallel rods 16 that extend lengthwise of the box. These rods, which are spaced apart uniformly, support the filter bag 10. Midway between the rods each end flange 13 and its reinforcing bracket are provided with vertical slots 17 (Fig. 2) that extend from the free edge of the flange outward nearly to the adjoining end wall of the box for a purpose that now will be described.

The filter bag is made from a single sheet of filtering material, such as any suitable filter cloth or paper. Assuming that the filter sheet, which originally is very long in relation to its width, is horizontal, it is provided at spaced intervals with pairs of parallel transverse folds. As shown in Figs. 2 and 4, the sheet between the folds of each pair extends downward to form a pocket having two side walls 18 joined by a fold at their bottom. The opposite ends of each pair of these side walls are sealed together, preferably by stitching them together along vertical lines 19

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a short distance from their ends. The upper end of this stitching may be carried outward to the adjacent edge of the sheet. It will be seen that the ends of each pocket are double thickness where they are stitched together. There are as many pockets as there are slots 17 in each end flange of the filter box, and the double thickness ends of the pockets are inserted in the slots. The tops of the pockets are integrally connected by narrow areas of the sheet, the end portions of which lie on top of end flanges 13. As shown in Figs. 1 and 2, considerably wider areas of the sheet extend outward from the tops of the two outermost pockets and rest on the side flanges 12. The narrow connecting areas of the filter bag between its pockets rest on and are supported by rods 16, with the pockets hanging down between the rods as shown in Fig. 2.

Any space that otherwise might exist between the filter bag and the box is avoided by pressing the bag down onto the box flanges by means of the cover 3. A gasket may be placed between the margin of the bag and the cover if desired. Consequently, all of the air flowing through the filter housing must pass through the filter bag, which will filter the dust out of the air.

The suction at the outlet 7 of the filter housing will tend to collapse the pockets by drawing their opposite sides together. To avoid this, means are provided for keeping the sides of each pocket spread apart. Preferably, this is done by spaced foraminous members in each pocket. Chicken wire has been found to form a very suitable separator for this purpose, because it is inexpensive, it has large openings through it, and it is easy to form into the desired shape. Thus, a separator for the pockets may be formed from a long strip of chicken wire, the major portion of which is provided with a plurality of spaced parallel reverse bends extending across it to form laterally spaced, depending pairs of spaced wire members 22, as shown in Fig. 2. Each of these pairs of spaced members is inserted in a different one of the filter pockets to separate its side walls. The drawings show, for the sake of clearness, the vertical areas of the chicken wire spaced slightly from the filter pocket walls, but it will be understood that actually they are in engagement because it is the wire that holds the sides of each pocket apart. The opposite end portions 23 and 24 of the wire strip beyond its outermost pairs of members 22 preferably are folded across the top of the separator in overlapping relation and have their ends attached to each other. This double thickness horizontal area of the wire stiffens the separator and helps hold it in its desired shape. The inside of the cover 3 may be provided with several pins 25 that project down through some of the holes in the top of the separator to keep it from shifting horizontally in the filter housing.

In the apparatus disclosed herein a filter bag having a large filtering area can be made easily and hung in a relatively small housing by dropping its pockets between the rods and inserting their ends in slots 17. The wire separator then is inserted in all of the pockets to hold them open, and the housing cover is clamped in place. All of the dust-laden air drawn into inlet 6 must pass through the filter bag before leaving the housing through outlet 7.

According to the provisions of the patent statutes, we have explained the principle of our invention and have illustrated and described what we now consider to represent its best em-

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bodiment. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. Filtering apparatus comprising a box with an open top, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel depending pockets spaced at their upper ends by connecting areas, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom a short distance, said members being provided with vertical slots for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, means in the box between said supporting members and supporting said connecting areas between said ends of said areas, and a cover on the box, the box and cover each being provided with an opening, and one of said openings being an inlet for unfiltered gas and the other opening being an outlet for filtered gas.

2. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, and a cover on the box, the box and cover each being provided with an opening, and one of said openings being an inlet for unfiltered gas and the other opening being an outlet for filtered gas.

3. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, a cover on the box provided with an outlet for filtered gas, the box being provided below said rods with an inlet for unfiltered gas, and means holding the pockets open.

4. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said

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rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, a cover on the box provided with an outlet for filtered gas, the box being provided below said rods with an inlet for unfiltered gas, and a pair of laterally spaced foraminous members inserted in each of said pockets to hold it open.

5. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, a cover on the box being provided below said rods with an inlet for unfiltered gas, and a reticulated wire strip provided with a plurality of reverse bends to form laterally spaced depending pairs of spaced members inserted in said pockets to hold them open.

6. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, a cover on the box provided with an outlet for filtered gas, the box being provided below said rods with an inlet for unfiltered gas, and a reticulated wire strip provided with a plurality of reverse bends to form laterally spaced depending pairs of spaced members inserted in said pockets to hold them open, a portion of said strip extending across the top of said depending members and connecting the tops of the two outermost members.

7. Filtering apparatus comprising a box with

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an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, a cover on the box provided with an outlet for filtered gas, the box being provided below said rods with an inlet for unfiltered gas, a reticulated wire strip provided with a plurality of reverse bends to form laterally spaced depending pairs of spaced members inserted in said pockets to hold them open, a portion of said strip extending across the top of said depending members and connecting the tops of the two outermost members, and pins projecting down from said cover into some of the holes in said top portion of the reticulated strip to help keep it from moving laterally.

8. Filtering apparatus comprising a box with an open top, spaced parallel horizontal rods extending lengthwise of the upper part of the box, a sheet of filter material folded upon itself at laterally spaced intervals to provide a plurality of parallel pockets hanging down between said rods and spaced at their upper ends by connecting areas of the sheet supported by the rods, the opposite sides of each pocket at each end being sealed together and forming vertical multiple thickness portions, horizontal supporting members secured to the opposite ends of the box and projecting inward therefrom along the rods for a short distance, said members being provided with vertical slots between the rods for receiving the upper ends of said multiple thickness portions with the ends of said connecting areas resting on top of said members, horizontal flanges extending along the inside of opposite sides of the box at substantially the same level as the top of said members, said filter material having at the top of its two outermost pockets outwardly extending areas resting on said flanges, and a cover on the box pressing said filter material areas against said supporting members and flanges, the box and cover each being provided with an opening, and one of said openings being an inlet for unfiltered gas and the other opening being an outlet for filtered gas.

JOHN M. LEWIS.
ROBERT A. BUB.

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