United States Patent [19]

MacFarland

[11] **3,797,064**

[45] **Mar. 19, 1974**

[54] **FILTER BAG CLEANING MEANS**

[75] Inventor: **Charles H. MacFarland,** Rocky River, Ohio

[73] Assignee: **The Scott & Fetzer Company,** Cleveland, Ohio

[22] Filed: **Oct. 20, 1972**

[21] Appl. No.: **299,217**

[52] **U.S. Cl.** **15/351,** 15/352, 55/296, 55/379, 55/473

[51] **Int. Cl.** **A47l 5/34**

[58] **Field of Search** 15/350, 351, 352; 55/296, 55/304, 305, 341, 379, 473

[56] **References Cited**

UNITED STATES PATENTS

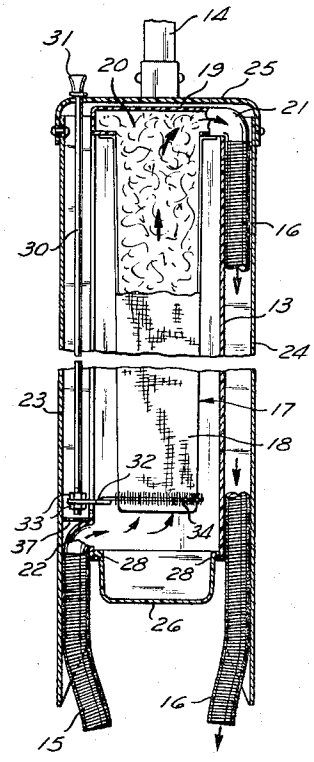
2,594,456	4/1952	Kroenlein	15/352 X
2,020,120	11/1935	Leathers	55/341
2,806,242	9/1957	Sparklin	15/351
2,823,762	2/1958	Bunnell	55/341 X
3,639,940	2/1972	Carlson et al	15/352
2,405,129	8/1946	Bible	15/352 X
1,763,397	6/1930	Hutchinson	15/352 X
1,069,754	8/1913	Baillie	55/296
971,895	10/1910	Joedicke	55/296

Primary Examiner—Harvey C. Hornsby
Assistant Examiner—C. K. Moore
Attorney, Agent, or Firm—McNenny, Farrington, Pearne & Gordon

[57] **ABSTRACT**

A hardbox upright vacuum cleaner having a filter bag cleaning brush within the box which is operable by a handle projecting from the box. The filter bag is enclosed within the box and is filled with a stiffening material, such as short fibers. Dirt-laden air is drawn against the outside surface of the bag so that the dirt is collected on the bag surface. The collected dirt is scraped from the bag surface by the bag cleaning brush. A removable dirt collecting box is provided beneath the bag for disposal of the dirt.

3 Claims, 6 Drawing Figures



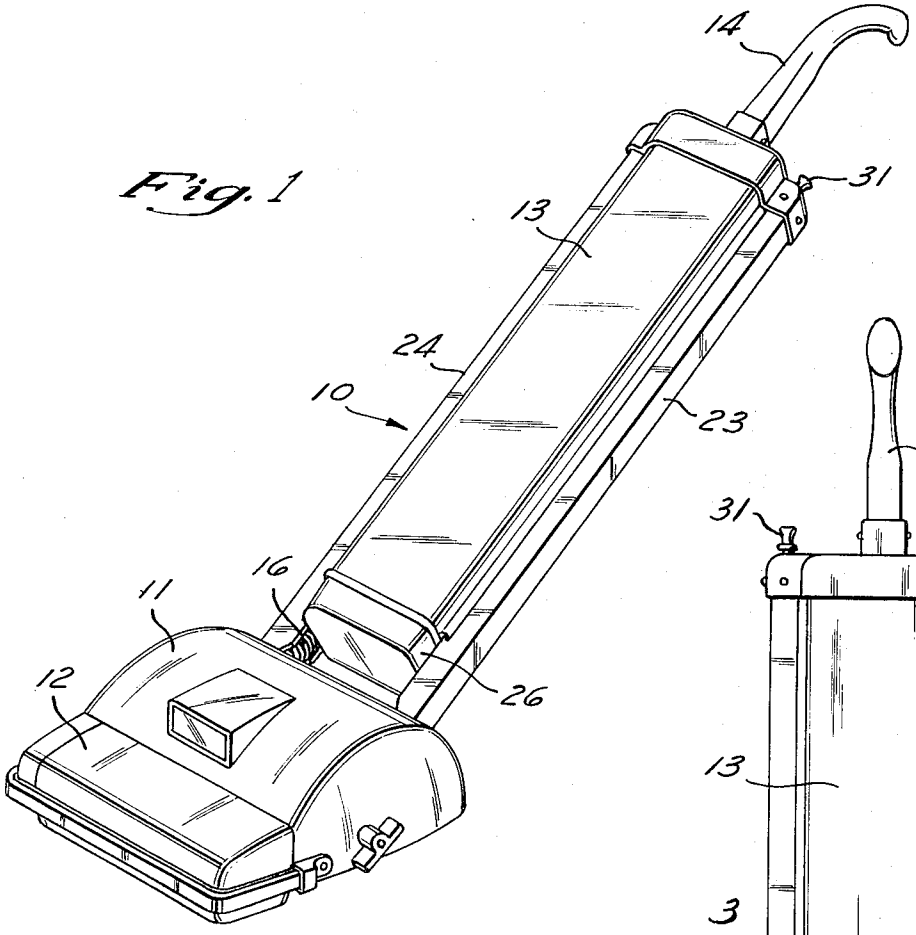


Fig. 1

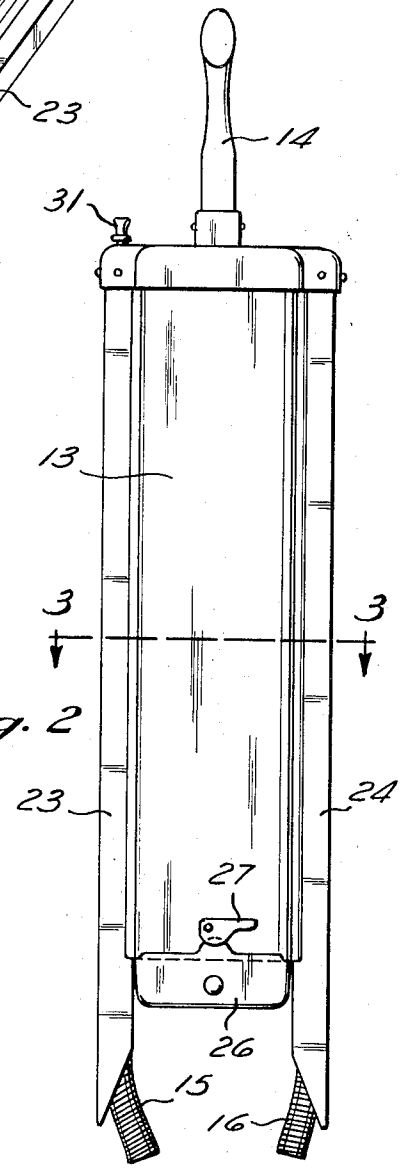


Fig. 2

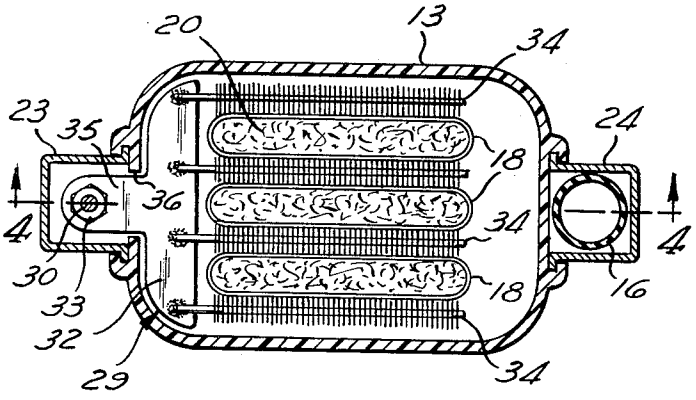


Fig. 3

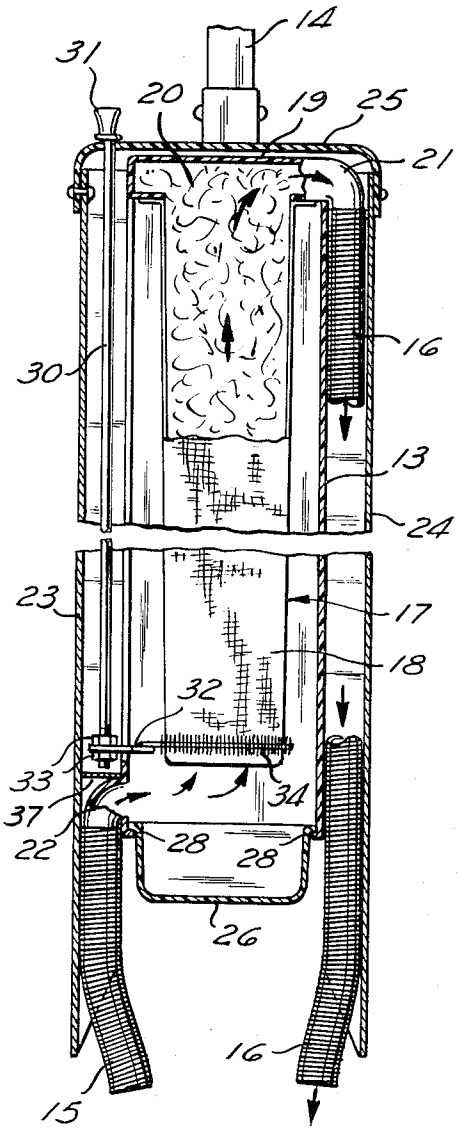
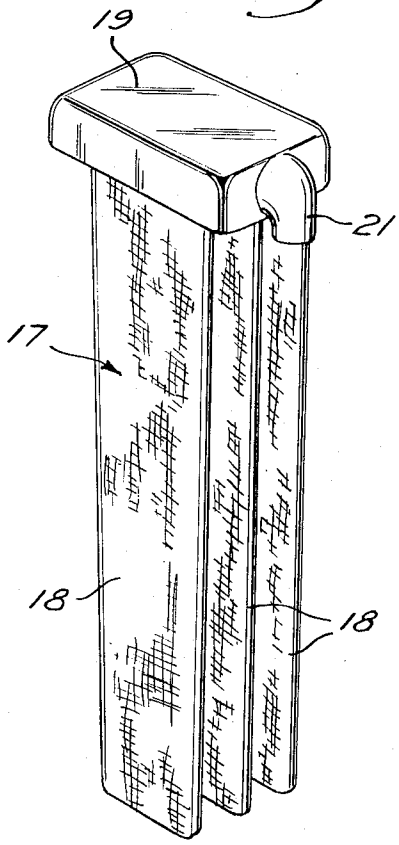


Fig. 4

Fig. 5



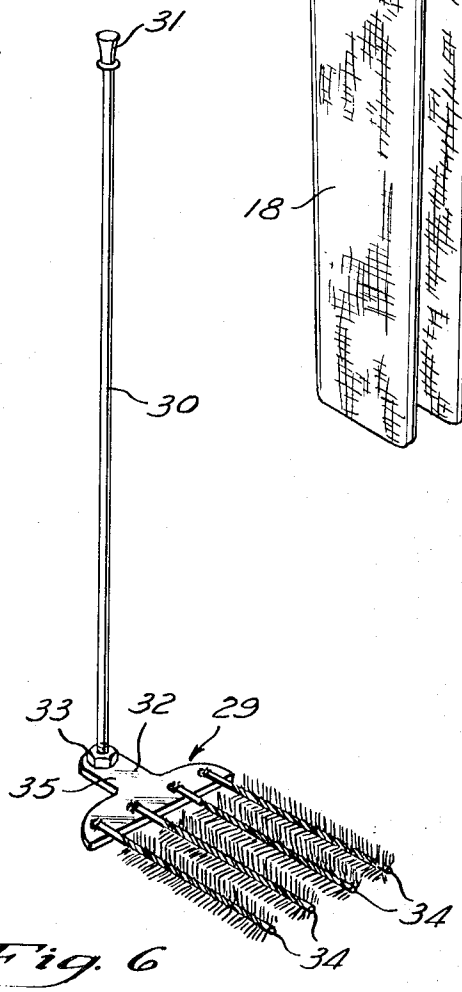


Fig. 6

FILTER BAG CLEANING MEANS

BACKGROUND OF THE INVENTION

There have been various proposals for cleaning the dirt and lint from the filtering material in vacuum cleaners. In those vacuum cleaners which do not include disposable dirt bags, it has been proposed to remove the dirt and lint from the filtering material by employing devices which either vibrate or beat the material. Examples of filter vibrators are shown in U.S. Pat. Nos. 2,488,300; 2,522,498; 2,522,709; 2,534,578; 2,558,429; 2,585,508; and 3,484,889. Examples of filter beaters are shown in U.S. Pat. Nos. 2,564,734 and 2,586,876. These beater and vibrator devices are employed with filter constructions which may be easily vibrated or beaten.

There are filter constructions, however, which are not easily cleaned by the foregoing devices. For example, there is disclosed in U.S. Pat. No. 3,160,908 a sweeping machine having a dust separator which includes a plurality of depending filtering pockets through which the air is forced for separating the dust on the outer surfaces of the pockets. The pockets may contain a separator to maintain the sides of the pockets in spaced relation. The outside surface of the filter pockets is cleaned during use, since the pockets move in a pendulum fashion as the machine changes direction and speed. In addition, a mechanism is provided to bounce the pockets up and down to loosen accumulated dirt.

Although the arrangement shown in U.S. Pat. No 3,160,908 may effectively clean the filter pockets, such an arrangement is unsuitable for cleaning filter pockets provided in a hand-operated hardbox upright vacuum cleaner, since the pockets in such a cleaner are not vertically suspended for pendulum motion during normal cleaning operations and since it is impractical to make the box large enough to accommodate such motion in a hand-operated cleaner.

SUMMARY OF THE INVENTION

This invention provides a cleaning mechanism for pocket-type filters in a hardbox upright vacuum cleaner which effectively cleans the filter without relying upon motion of the pockets or upon mechanical agitation or beating of the filter material. According to this invention, a hardbox upright vacuum cleaner is provided with a filter which includes a plurality of longitudinally extending filter pockets within the hardbox portion of the cleaner having their upper ends joined to a manifold. Each pocket is spaced from each other pocket and is filled with a stiffening material, such as coarse fibers or the like. A cleaning brush assembly having a plurality of spaced brushes is mounted within the box so that the brushes engage the exposed planar surfaces of the filter pockets. The brush assembly is provided with a handle which projects from the box so that by grasping the projecting end of the handle, the brushes may be caused to traverse the planar faces of the filter pockets. A removable dirt box or collector is provided below the filter pockets to catch the dirt which is brushed from the filter pockets. The brushes maintain the filter pockets in a separated condition when the box is in any position during cleaning operations.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a hardbox upright vacuum cleaner incorporating the subject matter of this invention;

FIG. 2 is a rear elevational view of the hardbox portion of the vacuum cleaner illustrated in FIG. 1;

FIG. 3 is a cross sectional view, the plane of the section being indicated by the line 3—3 in FIG. 2;

FIG. 4 is a cross sectional view, the plane of the section being indicated by the line 4—4 in FIG. 3;

FIG. 5 is a perspective view of the filter assembly according to this invention; and

FIG. 6 is a perspective view of the cleaning brush assembly according to this invention.

DETAILED DESCRIPTION OF THE DRAWINGS

In FIG. 1 of the drawings, there is illustrated a hardbox upright vacuum cleaner **10.** The hardbox upright vacuum cleaner **10** includes a motor and fan housing **11,** a brush nozzle portion **12** which may be removably attached to the housing **11,** in a manner more fully set forth in copending application Ser. No. 299,345, filed Oct. 20, 1972, a filter housing **13** which is pivotally connected to the motor housing **11,** and an operating handle **14.**

As is customary in hardbox upright-type vacuum cleaners, a first hose **15** extends from the brush nozzle portion **12** to the filter housing **13.** A second hose **16** extends from the housing **13** to a motor fan unit (not shown) within the housing **11.** Thus, air is drawn by the motor fan unit from the portion **12** through the first hose **15,** the housing **13,** the second hose **16,** and then through a suitable clean air exhaust (not shown).

As may be seen most clearly in FIG. **4,** a filter unit **17** is mounted within the housing **13.** The filter unit **17** includes a plurality of pockets **18** which open into a header or manifold **19.** The pockets **18** may be sealed to the manifold **19** by a suitable adhesive and/or rivets (not shown). The pockets **18** are filled with a stiffening material **20** which may comprise a multiplicity of rubberized hair or bristles.

The manifold **19** is fixed to the upper end of the housing **13** and has a downwardly extending elbow extension **21** which is attached to one end of the hose **16.** The other hose **15** communicates with an elbow extension **22** which is provided at the lower end of the housing **13.**

First and second axially extending ducts **23** and **24,** respectively, are sealed to the sides of the housing **13,** as may be seen most clearly in FIG. **3.** The duct **23** carries the hose **15** at its lower end to prevent kinking of the hose during operation of the cleaner. The duct **24** carries the hose **16.** The housing **13** and the upper ends of the ducts **23** and **24** are sealingly capped by a cover **25** upon which the handle **14** is mounted. The lower ends of the ducts **23** and **24** are removably fixed to hinge members (not shown) which are provided on the housing **11.**

The bottom end of the housing **13** is closed by a dirt box **26.** The dirt box **26** may be removed for cleaning by releasing a latch **27** and by sliding the box **26** rearwardly with respect to the housing **13** along guide runners **28** formed in the lower end of the housing **13** (FIG. **4**).

As may be seen most clearly in FIG. **4,** the motor fan unit draws air through the hose **16.** This air is filtered,

since it is drawn through the filter pockets **18.** Thus, dirt-laden air is drawn from the brush nozzle **12** through the hose **15** and the dirt is deposited on the external surface of the filter pockets **18.** Of course, some dirt will fall into the dirt box **26.** Eventually, however, the outside surface of the filter pockets **18** will become coated with dirt and lint.

To remove the dirt from the outside surface of the filter pockets **18,** there is provided a filter cleaning brush assembly **29.** The brush assembly **29** includes a rod **30** having a handle **31** at its upper end and a mounting plate **32** at its lower end. The plate **32** is fixed to the rod by a pair of nuts **33.** A plurality of brushes **34** project from the plate **32** and are spaced apart so that their bristles bear against the planer surfaces of the pockets **18,** as may be seen in FIG. **3.** The plate **32** has a narrowed neck portion **35,** which projects through a longitudinal slot **36** in the housing **13.** The rod **30** extends within the duct **23** and projects through the cap **25.** In order to maintain suction through the casing **13,** a suitable seal (not shown) is provided between the rod **30** and the cap **25.** A seal **37** is provided in the duct **23** beneath the rod **30.**

When the surfaces of the pockets **18** become covered with dirt and lint (thereby reducing the efficiency of the vacuum cleaner), the rod **30** is withdrawn from the duct **23** to thereby cause the brushes **34** to scrape and brush the dirt and lint from the filter pockets. Several strokes may be required, depending upon the condition of the pockets **18.** After this operation, the dirt box **26** may be removed and emptied.

It should be noted that the brushes **34** not only clean the pockets **18,** but also maintain these pockets in a rigidly separated condition so that they are spaced from each other and from the sidewalls of the housing **13.**

The invention is not restricted to the slavish imitation of each and every detail set forth above. Obviously, devices may be provided which change, eliminate, or add certain specific details without departing from the scope of the invention. What is claimed is:

1. A vacuum cleaner having a motor housing, a suction nozzle connected to said housing, an elongated filter box for filtering dirt-laden air picked up by said nozzle, first conduit means connecting said nozzle to one end of the interior of said filter box for conducting said dirt-laden air to a first portion of said interior, second conduit means connecting said motor housing to the other end of the interior of said filter box for conducting filtered air from a second portion of said interior to a fan means within said motor housing, filter means within said box and separating said first and second portions, said filter means comprising a plurality of elongated filter bags fixed at said other end of said filter box and having freely hanging distal ends extending toward said one end, said filter bags having stiffened planar faces and being arranged in spaced face-to-face apposition, brush means engaging each planar face of said filter bags adjacent said distal ends and providing the sole spacing means for those ends, and means to move said brush means along said planar faces toward the other end of said filter box to remove dirt from the surface of said filter bags.

2. A vacuum cleaner according to claim **1,** wherein said means to move said brush means comprises a handle projecting through a wall of said filter box.

3. A vacuum cleaner according to claim **2,** including a dirt box removably attached to said one end of said filter box for collecting dirt removed from said filter means.

* * * * *