Oct. 25, 1966 O. C. PARROTT 3,280,539

SPINDLE AND ROLL CORE ASSEMBLY FOR AIR FILTER APPARATUS

Filed May 13, 1965

Fig. 1

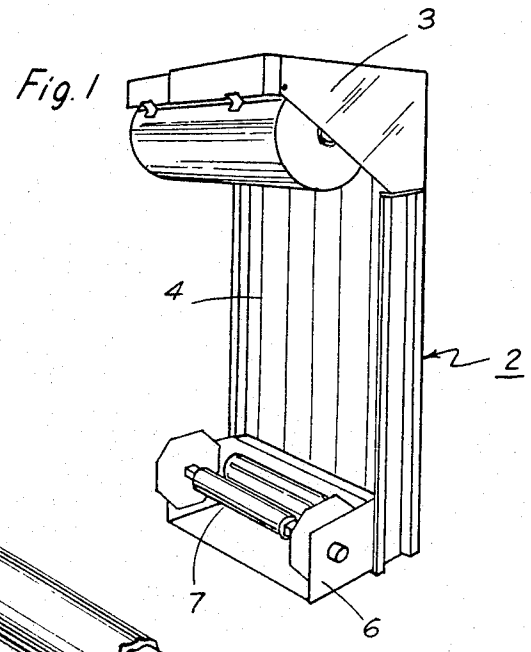


Fig. 2

Fig. 3

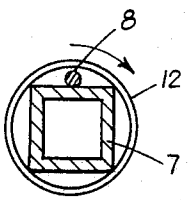


Fig. 4

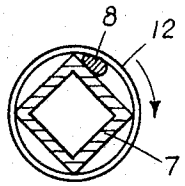


Fig. 5

INVENTOR.
Orville C. Parrott
BY
Ralph B. Brick

United States Patent Office

3,280,539

Patented Oct. 25, 1966

3,280,539

SPINDLE AND ROLL CORE ASSEMBLY FOR AIR FILTER APPARATUS

Orville C. Parrott, Fern Creek, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky., a corporation of Delaware

Filed May 13, 1965, Ser. No. 455,375
2 Claims. (Cl. 55—354)

The present invention relates to automatic air filters and more particularly to automatic air filters of the type employing an elongated air cleaning web adapted to be progressively advanced longitudinally across an air stream passage to clean dirty air as it passes through such passage.

The present invention finds particular applicability in those structures known in the art wherein a supply of filter medium is furnished on a roll mounted in a supply zone at one end of a filter, is withdrawn from the roll and moved through an air cleaning zone for air cleaning purposes and is finally directed into a discharge or rewind zone at the opposite end of the filter where it is manipulated into a roll package for disposal. It is to be understood that the present invention is not to be considered as limited to a specific filter medium or structure, but that it can be utilized in any one of a number of known filter structures wherein any one of a number of known types of filter medium in roll form is progressively advanced across an air stream passage to clean air as it passes through the passage.

In the prior art, various type spindle arrangements have been utilized in the rewind zone of aforedescribed filter arrangements to support the cores on which rolls of filter medium materials are manipulated into compact packages for disposal. These spindle arrangements, some of which have been designed to grip a roll core when rotated, for the most part have been cumbersome and complex in construction and maintenance and have been limited in use. The present invention provides a spindle arrangement which can be utilized in the rewind zone permitting fast, firm gripping of the inner wall of a roll core in a straightforward and efficient manner. In addition, the arrangement of the present invention is economical in construction and maintenance and can be readily converted to use in the supply zone if and when occasion arises.

Various other features of the present invention will become obvious to one skilled in the art upon reading the disclosure set forth herein.

More particularly, the present invention provides: in an air cleaning device of a type employing an elongated air cleaning web adapted to be progressively advanced longitudinally across an air stream passage from a supply zone to a rewind zone; an improved rewind assembly for supporting and rewinding contaminant loaded media on a roll core comprising: a substantially rigid longitudinally extending multi-sided spindle; and a flexible cord disposed between the roll core and the spindle to extend along one side of the spindle to wedgingly engage with the inner wall of the roll core when the spindle is rotated for rewind to lock the roll core on the spindle. In addition, the present invention provides a novel end plate arrangement for the spindle wherein at least one end is removably splined in spring-loaded fashion so that the spindle can be readily loaded for rewind purposes.

It is to be understood that various changes can be made in the arrangement, form and construction of the apparatus disclosed herein without departing from the scope or spirit of the present invention.

Referring to the drawing which discloses one advantageous embodiment of the present invention:

FIGURE 1 is an elevational perspective view of a vertically disposed filter arrangement including the inventive filter spindle apparatus;

FIGURE 2 is an enlarged perspective view, partially broken away, disclosing the novel roll core gripping arrangement for the spindle;

FIGURE 3 is an enlarged cross-sectional side view of one end of the spindle of FIGURE 2 disclosing the novel manner in which the spindle can be compressed for insertion into the filter unit;

FIGURE 4 is a schematic cross-sectional view disclosing the roll core as it is mounted on the spindle; and

FIGURE 5 is a view similar to FIGURE 4 disclosing the spindle as it is rotated with the cord thereon wedgingly gripping the roll core mounted on the spindle.

Referring to FIGURE 1 of the drawing, a roll-type filter housing **2** is disclosed in vertical position. Housing **2** includes top filter medium supply section **3**, central air treating section **4**, and bottom filter medium rewind section **6**. It is to be understood that a supply roll of filter medium can be mounted in wound form in supply section **3**. This supply roll, which can be comprised of a web of any one of a number of known suitable filter medium materials, is advanced incrementally from time to time into and through the central air treating section **4** which frames the air stream passage through which the air to be treated must flow. As the web is progressively advanced through central section **4**, the web filters the contaminants from the air stream. The web is then correspondingly progressively advanced to the rewind section **6** where it is wound on a spindle **7** into a discharge roll which can be ultimately thrown away or reconditioned. Suitable drive motor and web metering controls, known in the art and not shown, can be utilized to advance the medium progressively in the manner aforedescribed.

As can be seen in FIGURE 2 of the drawing, spindle **7** is of a substantially rigid, longitudinally-extending multi-sided form and can be made from any one of a number of suitably selected, lightweight fabricating metals. Advantageously it is hollow and is of rectangular cross section. Fastened in slack manner at the opposite extremities of one side of spindle **7** intermediate the edges of such side is cord **8**. Cord **8** can be formed from any one of a number of known flexible, compressible materials and advantageously an economical and readily available cotton rope-like material can be utilized. The cord is fastened to the side of the spindle **7** by suitable cord fasteners **9** which can be in the form of electric terminals, screws **11** being utilized to hold fasteners **9** in position. It is to be noted that cord **8** is proportioned in length relative to the length of the spindle and fastened thereto with sufficient slack so that the major portion of the cord can extend along the edge of the side to which it is fastened when the spindle is rotated. It also is to be noted that cord **8** has a selected diameter which advantageously is slightly less than the maximum perpendicular distance between the side of spindle **7** and the inner wall of roll core **12** mounted on the spindle when the edges of such spindle side abut against the inner wall of roll core **12**. Accordingly, as can be seen in FIGURES 4 and 5 of the drawing, when spindle **7** is rotated, cord **8** moves to one edge of the spindle side on which it is mounted to wedgingly engage between such spindle side and roll core **12** firmly gripping the roll core in fixed relationship to the spindle so that the filter medium material can be readily wound onto the core as the spindle is rotated.

It is to be noted that spindle **7** is provided with end plate members **14** and **16** and that end plate member **16** is removably splined to spindle **7** in spring-loaded fashion. To accomplish this (FIGURE 3), a stop plate mem-

ber **17** is fixed inside hollow spindle **7** to provide a stop for one end of helical spring **18**. The other end of helical spring **18** engages against one end of coupling member **19** which is slidably mounted within spindle **7**, the coupling being provided with a slot and pin arrangement **21** which determines the limit of movement of the coupling within spindle **7**. The other end of coupling **19**, which also is hollow, receives end plate shaft **22** on which plate **16** is mounted by some suitable means such as welding, the shaft **22** and coupling **19** being held together by pin **23**. It will be obvious to one skilled in the art that a suitable drive means including a suitably recessed coupling can engage the other end of shaft **22** to drive spindle **7**. To mount spindle **7** it only is necessary to compress end plate **16** against spring **18**, inserting the spindle in the bearing supports (not shown) provided in rewind zone **6** of filter structure **2**.

The invention claimed is:

1. In an air cleaning device of a type employing an elongated air cleaning web adapted to be progressively advanced longitudinally across an air stream passage from a supply zone to a rewind zone; an improved rewind assembly for supporting and rewinding contaminant loaded media on a roll core comprising: a roll core; a substantially rigid longitudinally-extending hollow spindle of polygonal cross section to provide a plurality of flat longitudinally extending sides, said spindle being arranged to extend through said roll core with said edges of said spindle serving as the only contact lines between said spindle and said core; a flexible, compressible cord fastened in slack manner at its opposite extremities to one of said flat sides of said spindle intermediate the edges thereof so that the major portion of said cord extends along an edge of said flat side when said spindle is rotated, said cord having a selected diameter slightly less than the maximum perpendicular distance between the side of the spindle and the inner wall of the roll core to be mounted on said spindle when the edges of such spindle side abut against the inner wall of said roll core.

2. The apparatus of claim **1**, said spindle having oppositely spaced end plate members, at least one of which is compressibly splined to said spindle in spring-loaded fashion.

References Cited by the Examiner

UNITED STATES PATENTS

676,335	6/1901	Moffatt	242—46.3
1,105,951	8/1914	Bagnall	242—55.2
1,261,356	4/1918	Brown	242—46.3
1,391,326	9/1921	Killiam	242—55.2
2,166,320	7/1939	Posatsky	242—55.2 X
2,507,042	5/1950	Osborn	55—354 X
2,579,440	12/1951	Palmer	55—290 X
2,582,010	1/1952	Crosby	242—72
2,875,680	3/1959	Forshee	55—354 X
2,881,859	4/1959	Nutting	55—354 X
2,901,626	8/1959	Becker	55—290 X
2,956,757	10/1960	Limbach	242—46.3
3,007,651	11/1961	Palmore	55—354 X
3,007,652	11/1961	Heckman	242—72
3,013,630	12/1961	Palmore	55—354
3,020,976	2/1962	Hyatt	55—351 X
3,022,959	2/1962	Blake	242—72
3,098,731	7/1963	Greene et al.	55—351 X

FOREIGN PATENTS

65,415	2/1947	Denmark.
516,937	1/1931	Germany.
850,488	10/1960	Great Britain.

HARRY B. THORNTON, *Primary Examiner.*

D. E. TALBERT, JR., *Assistant Examiner.*