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C. A. CAMPBELL

2,134,601

AIR FILTER

Filed June 26, 1937

Fig. 1

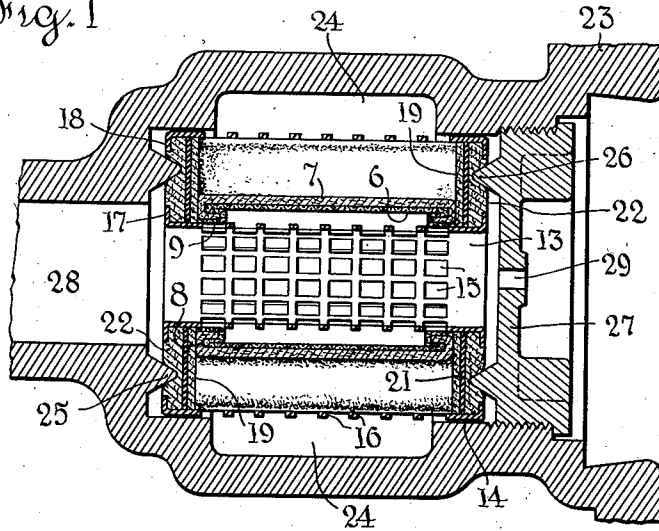


Fig. 2

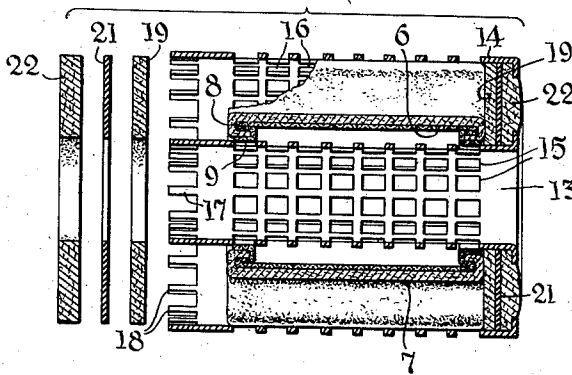


Fig. 3

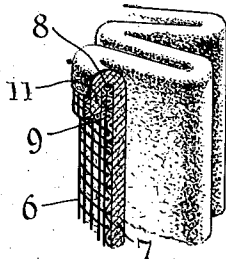
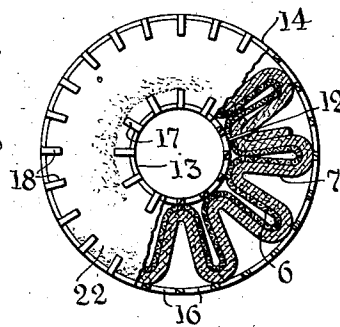


Fig. 4

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UNITED STATES PATENT OFFICE

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AIR FILTER

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3 Claims. (Cl. 183—71)

This invention relates to air filters, and particularly filters used to protect automatic valves of railway air brakes (such for example as triple valves, vent valves, application valves, etc.) from dust, scale and other abrasive substances which enter the brake pipe.

A familiar example is the annular cylindrical filter mounted in the pipe bracket of the AB freight brake now standard on American railways. This is interposed between the brake pipe on the one hand, and the piston chambers of the service and emergency portions of the AB valve on the other.

As is well known, brake pipe pressures are substantial, and although the filter is protected against undue pressure differentials by so-called by-pass check valves, it must be of rugged construction, and proof against leakage even under shock pressures which sometimes occur.

The present invention offers a successful solution of this problem and will be described as used in conjunction with the AB brake.

In the drawing,—

Fig. 1 is a section through the pipe bracket of the AB brake, the section being taken on the axis of the filter chamber characteristic of this bracket. The improved filter element is shown in place and in longitudinal axial section.

Fig. 2 is a longitudinal axial section of the filter cartridge, partially assembled.

Fig. 3 is an end elevation of the cartridge partly in section.

Fig. 4 is a fragmentary perspective of the main filtering element.

The main filtering element comprises a zigzag sustaining member of stiff heavy woven wire (preferably hard brass) indicated generally by the numeral 6, and an outer covering of filtering material, preferably wool felt, indicated generally by the numeral 7. The two are in the form of strips each longer than it is wide, the woven wire strip being slightly wider than the felt strip to afford stock for clamping the edge of the felt.

The clamped edge is best shown in Fig. 4. The woven wire is folded inward on itself at 8, and then outward at 9 to clamp the infolded edge 11 of the felt. The woven wire and felt are thus clamped together along both long edges. They are then folded into the zigzag or star form, indicated in Figs. 3 and 4, with the felt on the outer side. The felt extends beyond the woven wire at one end and this extending end is stapled into the reentrant angle as indicated at 12, forming a close joint.

No novelty is here claimed for the filter ele-

ment above described, nor is the invention limited to the specific method of forming such element.

Such an element, or its approximate equivalent, is inserted between a central tube 13 and an outer tube 14, each preferably formed of seamless brass tubing. These tubes are each perforated, as indicated at 15 and 16, respectively, throughout their circumferences and for distances commensurate with the axial length of the zigzag filter element. Each end of each tube 13 and 14 is formed with projecting fingers 17 and 18.

To seal the ends of the filter element an annular washer 19 of felt is placed against each end and closely fills the interval between the inner and outer tubes 13 and 14. Over these are placed successively a brass washer or plate 21 and a second felt washer 22, both of which are substantially coextensive with felt washer 19 and the end of the zigzag filter element. Then the fingers 17 are bent outward and the fingers 18 inward to retain the edges of the outer felt washers 22 and to exert sufficient pressure through these edges on washer 21 to produce tight engagement between washers 19 and the zigzag filter.

In Fig. 1 a portion of the pipe bracket is indicated at 23. The annular space 24 within the surrounding casing is in direct communication with the brake pipe.

The felt washer 22 at one end of the filter cartridge, seats tightly against the annular rib or ridge 25, and that at the other end tightly engages a similar rib 26 on the adjustable and removable plug 27 threaded into the bracket. The passage 28 leads to the piston chamber of the service portion while the small port 29 offers communication to the piston chamber of the emergency portion.

Thus a filter element of large effective surface is interposed between the brake pipe and the mechanism of the brake valve and precludes the entrance of abrasive dust into the valve parts. The rigid metal washer or plate 21 has a very important function. It distributes the annular, line sealing pressure of narrow ribs 25 and 26 and the pressure of fingers 17 and 18 over the entire end areas of the zigzag filter element, thereby ensuring a close seal between the entire end areas of that element and the coextensive felt washer 19. Metal washer 21 also forces felt washer 22 into good sealing engagement with ribs 25 and 26.

In this way leakage past the ends of the filter element and the cartridge is effectively prevented.

What is claimed is,—

1. An annular filter cartridge intended to be mounted in a filter casing and to seal tightly at

its ends with annular ribs on the casing, comprising in combination, a longitudinally rigid filter element of generally annular form; compressible gaskets overlying the ends of said element
 5 and substantially coextensive therewith; load pressure distributing plates overlying said gaskets and also approximately coextensive with the ends of said filtering element; gaskets overlying said plates and capable of sealing with said ribs,
 10 the ribs being relatively narrow as compared with said pressure distributing plates; and means for holding the above-named parts in assembled relation.

2. An annular filter cartridge intended to be
 15 located in a filter casing and to seal tightly at its ends against annular ribs on the casing, comprising in combination, a longitudinally pleated filter element made up of a filtering fabric and a foraminous metal stiffening core; inner gaskets
 20 overlying the ends of said element and coextensive with said pleats to effect a seal over the entire ends of the pleats; annular pressure distributing plates overlying and coextensive with said gaskets; outer gaskets overlying said plates and
 25 adapted to be engaged by said ribs, the ribs being relatively narrow as compared with said plates; and means comprising a foraminous shell arranged to hold the above named parts in assem-

bled relation, the parts being so arranged that in service the outer gaskets seal the plates to the ribs, and the plates and inner gaskets seal over the entire end area of the filter element whereby a close seal is secured and the core is protected from local deforming stresses.

3. The combination in a filter including a casing having a chamber provided with annular sealing ribs and a fluid inlet and a fluid outlet, of a longitudinally rigid filter element of generally annular form with longitudinally extending, open-end pleats located in said chamber; annular inner gaskets of compressible material overlying and completely sealing the open ends of said pleats; rigid, annular, pressure distributing plates overlying said gaskets and substantially coextensive therewith; and annular outer gaskets overlying said plates, said sealing ribs on the casing being relatively narrow as compared with said plates and having tight sealing engagement with said outer gaskets so that said pressure distributing plates maintain said inner gaskets in close sealing contact with the ends of the filter element and all fluid flowing between said inlet and outlet is compelled to pass through the filter element.

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