May 31, 1932. H. E. HOWARD 1,860,778

AIR FILTER

Filed April 27, 1929

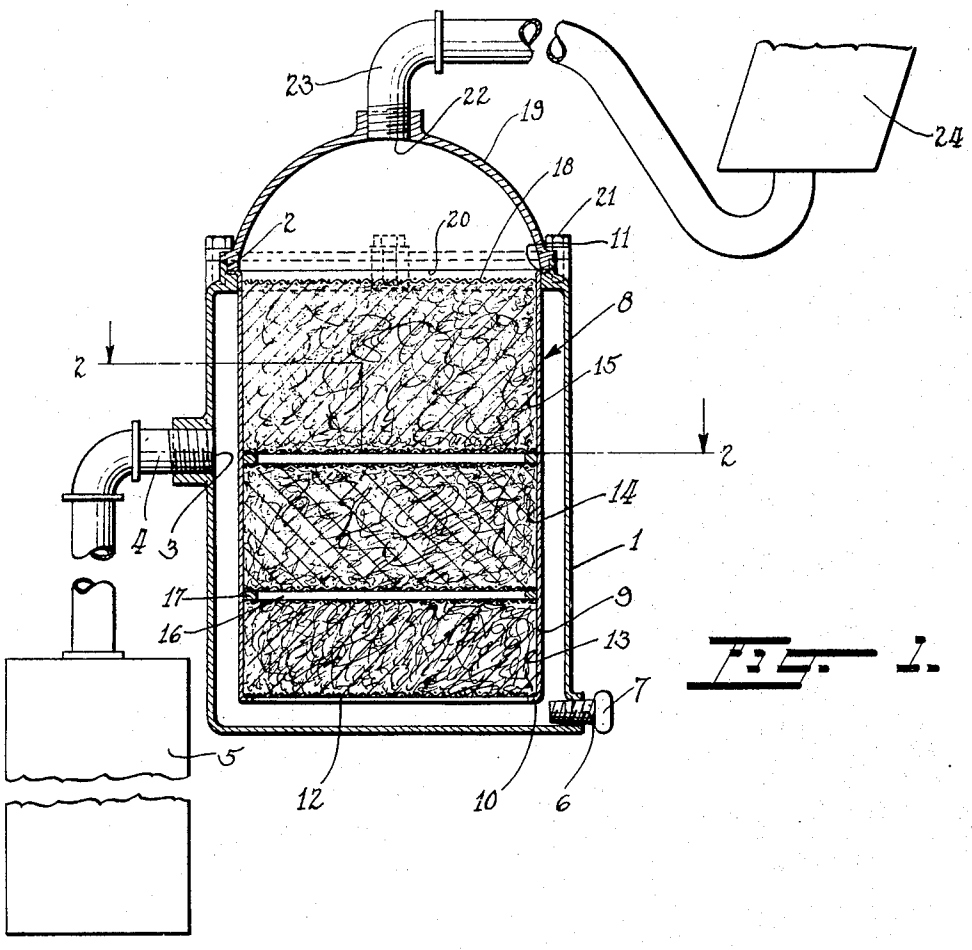


Fig. 1.

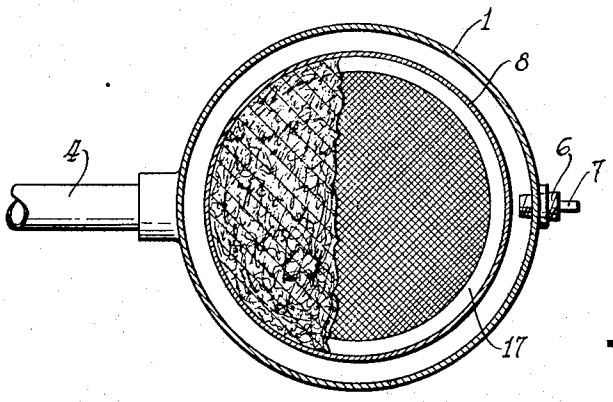


Fig. 2.

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UNITED STATES PATENT OFFICE

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AIR FILTER

Application filed April 27, 1929. Serial No. 358,670.

My invention relates to improvements in air filters, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a positive means for separating any substance, such as oil, from air which is compressed to be used in any suitable manner such as for paint guns or the like.

A further object of my invention is to provide a device of the type described which employs a unit containing a suitable material for positively removing oil or any other substance from the air.

A further object of my invention is to provide a device of the type described which has novel means for preventing capillary attraction of the oil collected in the unit.

A further object of my invention is to provide a device of the type described which has means for receiving and draining off excess oil or the like which has been received by the unit.

A further object of my invention is to provide a device of the type described which is simple in construction and thoroughly efficient for the purpose intended.

A further object of my invention is to provide a device of the type described which cools the air from approximately 110° Fahrenheit to approximately 40° Fahrenheit thus making it possible to use a short connection between the compressor and the spraying gun when spraying lacquer.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which

Figure 1 is a vertical sectional view of my device, and

Figure 2 is a section along the line 2—2 of Figure 1.

In carrying out my invention I provide a housing 1 having an opened end provided with an annular recess 2. An inlet opening 3 is provided for the housing 1 and is disposed in the side thereof. An air supply pipe 4 is disposed in communication with the inlet opening 3 and may be operatively connected to a compressor indicated diagrammatically at 5. A drain opening 6 is provided for the housing 1 and is arranged to receive a drain plug 7.

A filtering unit 8 is composed of a casing 9 having an inwardly extending flange 10 at the inner end thereof. An outwardly extending flange 11 is integral with the casing 9 at the outer end thereof and is receivable in the annular recess 2 of the housing 1. The casing 9 is provided with a screen 12 which rests upon the flange 10 and is secured thereto. Compartments 13, 14, and 15 are formed in the casing 9 by spaced apart partitions 16. Between the compartments 13 and 14, and between the compartments 14 and 15, double screen partitions 16 are provided and are separated by washers or separating members 17 which fit firmly in engagement with the inner wall of the casing 9. An upper screen 18 is disposed in the casing 9 and secured in place.

The compartments 13, 14, and 15 vary in size as may be observed by viewing Figure 1. Compartment 13 is the smallest, compartment 14 is somewhat larger, and compartment 15 is about twice as large in thickness as compartment 13. These compartments are filled with asbestos fiber of a certain desired grade. It is obvious that any other suitable material which will produce the efficient result may be employed.

The housing 1 is provided with a cover 19 which is arranged to be disposed upon the open end of the housing and which is provided with an annular flange 20 which extends into the recess 2 and engages with the outwardly extending flange 11 of the casing 9. The cover 19 is rigidly secured in place by means of screws 21 or the like and in this manner the casing 9 is firmly secured in the housing. An outlet opening 22 is provided for the cover 19 and receives an air pipe 23 which is adapted to be secured to a paint gun 24 or the like.

The air passing from the compressor 5

through the supply pipe 4 will enter the housing 1 at the inlet opening 3 and surround the casing 9. The only outlet for the housing is through the casing 9 and the outlet opening 22. Therefore, the air under pressure will pass through the compartments 13, 14, and 15, through the outlet 22 and the air pipe 23, to the gun. As the air passes through the compartment 13, and of course through the asbestos fiber contained in the compartment, any substance such as oil will be retained by the fiber thus cleansing the air before it reaches the outlet opening 22. The fiber contained in the compartment 13 is sufficient to thoroughly cleanse the air, however, the additional compartments are provided so as to lengthen the life of the filtering unit. When the fiber in the compartment 13 has been completely saturated with oil and other substances taken from the air, it will then, of course, fail to thoroughly cleanse the air. However, the compartment 14 will, in conjunction with the compartment 15 and the fiber disposed therein, thoroughly clean the air even though the fiber in the compartment 13 is completely saturated. The purpose of spacing the compartments away from each other is to prevent capillary attraction of the fluid, such as oil, that is taken from the air. Therefore, instead of the oil, absorbed by the fiber in the compartment 13, passing upwardly into the compartments 14 and 15, it will be retained in the compartment 13 and allowed to drop into the bottom of the housing 1 where it may be removed through the drain opening 6 by removing the drain plug 7.

With this construction, namely: the spaced-apart compartments filled with fibrous material, the unit 8 may be efficiently used for quite some time. When the fiber in the various compartments has been saturated with the substance taken from the air, the unit 8 may be removed by removing the cover 19 and a new unit disposed in the housing.

With this construction the air is thoroughly cleansed and is thus free from substances, such as oil, which interfere with the efficient result desired in painting or lacquering. Furthermore, the air is cooled as it passes through the unit thus obviating the need of long extensions between the air filter and the paint gun.

The use of the asbestos is the essential feature in this invention. Owing to the fact that asbestos, especially that which is known as XXX medium carded fibre asbestos pure and unadulterated with cotton, wool or any other similar material, is the only material which will separate oil vapor from hot air. The provision of the spaced-apart compartments is a secondary feature of this invention but nevertheless an essential construction for bringing about the efficient and prolonged result desired.

I claim:

The combination with a housing comprising a body portion and a cover portion, of a filtering cartridge disposed in said housing, said cartridge comprising a tubular casing, a plurality of filtering units disposed in said casing, each of said units comprising a pair of spaced-apart screen elements having filtering substance disposed therebetween, and annular spacing members disposed between said units and adapted for holding the same in spaced-apart positions, one end of said casing being provided with an inwardly extending annular flange adapted for supporting the units within the casing and the other end of said casing being provided with an outwardly extending annular flange receivable between the body portion and the cover portion of said housing and adapted for supporting the casing in fixed position within the housing.

Signed at Bridgman, in the county of Berrien and State of Michigan, this 19th day of April, 1929.

HAROLD E. HOWARD.