United States Patent [19]

Pitre, Sr.

[11] **3,731,340**

[45] **May 8, 1973**

[54] **MOTOR VEHICLE BRAKE DRUM CLEANING APPARATUS**

[76] Inventor: **Horace R. Pitre, Sr.**, 144 Atkinson, Baton Rouge, La. 70806

[22] Filed: **Aug. 9, 1971**

[21] Appl. No.: **170,069**

[52] **U.S. Cl.** **15/345**, 15/303, 15/405

[51] **Int. Cl.** **A47l 5/14**

[58] **Field of Search**.....15/303, 310, 311, 15/322, 345, 346, 405–408, 415

[56] **References Cited**

UNITED STATES PATENTS

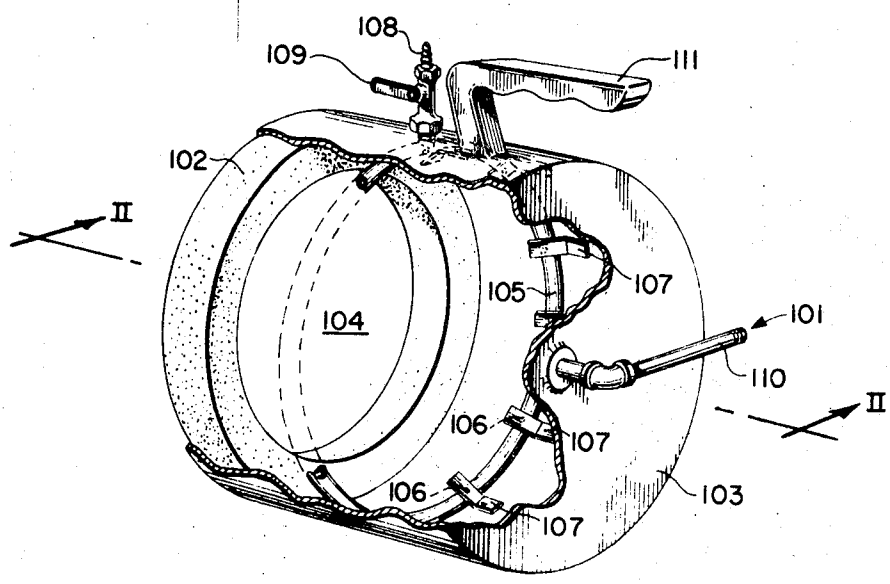
3,538,926	11/1970	Nesbitt	15/304 X
3,222,707	12/1965	Allenbaugh	15/345
3,161,900	12/1964	Hornschuch et al.	15/345
1,620,390	3/1927	Peters	15/346
3,510,905	5/1970	Bannert	15/345

Primary Examiner—William I. Price
Assistant Examiner—C. K. Moore
Attorney—William David Kiesel

[57] **ABSTRACT**

An apparatus for cleaning motor vehicle brake drum assemblies and other objects which apparatus has no moving parts and utilizes fixed air streams to being cleaned while at the same time preventing the dust and other particles from contaminating the cleaning work area.

3 Claims, 4 Drawing Figures



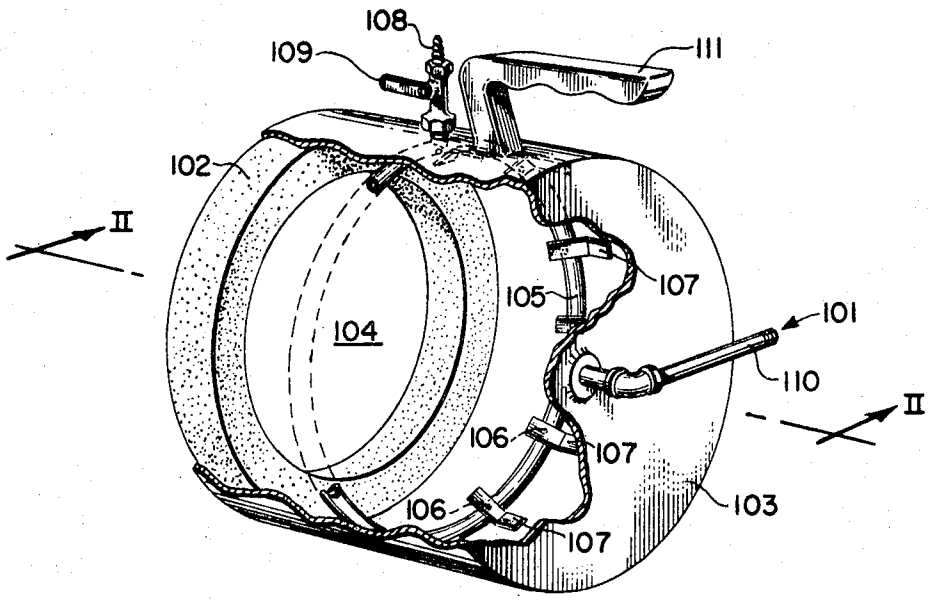


FIGURE I.

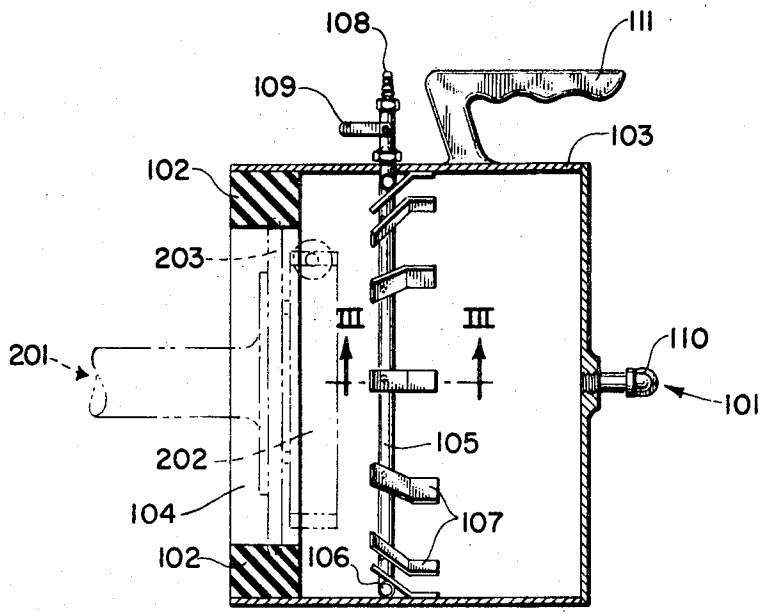


FIGURE II.

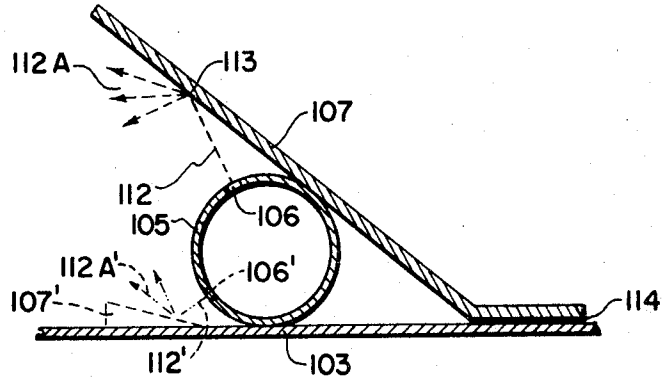


FIGURE III.

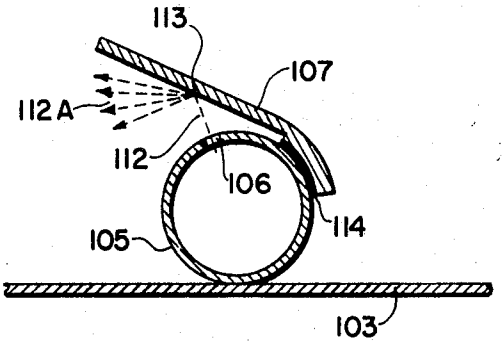


FIGURE IV.

MOTOR VEHICLE BRAKE DRUM CLEANING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for cleaning various objects, particularly motor vehicle brake drum assemblies.

To prevent rapid wear and help insure safe, dependable service it has been and still is necessary to remove dust and other particles from brake drum assemblies, particularly from about the brake drum lining. The current practice is to remove the wheel and outer cover thus exposing the brake drum assembly. The a stream of air from an air hose under a pressure of about 50 to 150 psig pressure is used to knock the dust and other particles free from the assembly. While this procedure is very effective in removing the dust and other particles it is highly undesirable because it spreads the dust and particles throughout the work area. This causes very unhealthy as well as unpleasant work conditions not only for the person operating the air stream, but also to any other person in the work area. A further disadvantage of this procedure is that the scattering of the dust and particles restricts the other type of work that can be done around the cleaning area. Work which requires very clean surfaces or dust free environment can only be done once the dust has settled. This could take as long as 24 hours. Such restrictions severly hender service in a multi-purpose business such as an automobile repair shop.

In an effort to eliminate these problems several apparatus have been designed not only to clean brake drum assemblies, but also to contain the dust and other particles to a very small area during the cleaning operation. For example, see U.S. Pat. Nos. 3,222,707 and 3,510,905. However, while these designs do alleviate some of the difficulty previously experienced during the cleaning operations they have not been readily accepted by the automobile repair industry as a whole. The complexity and expense in construction of some of the prior art apparatus has made their use prohibitive. Maintenance is another disadvantage for many of the prior art designs, particularly those that involve many moving parts. Other prior art designs have also experienced difficulty in attaching securely to the brake drum assembly while at the same time leaving all parts of the assembly exposed for contact with the air stream. Also another problem associated with many prior art designs is the ability of the vacuum system connected to these apparatus to remove the dust and other particles from the brake drum cleaner during operation.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide an apparatus that not only is capable of removing the dust and other particles from the brake drum assembly, but also is able to contain this dust and particles to a very limited area.

A still further object of this invention is to provide a brake drum cleaning apparatus which is not only easy to attach to a brake drum, but also is attachable so that all parts of the brake drum to be cleaned are exposed to the air stream within the apparatus.

Another object of this invention is to provide an apparatus which cleans brake drum assemblies with fixed streams of air or other gas.

Still another object of this invention is to provide a brake drum cleaning apparatus which has little or no maintenance because there are no moving parts to wear.

Further objects and advantages of this invention will become clear from the following summary and description of the invention.

Motor vehicle brake drum assemblies are cleaned free of dust and other particles by an apparatus which comprises a rigid hollow body which has an opening in one end large enough to fit about a brake drum assembly, a means to seal the open end of the hollow body about the brake drum assembly so that dust and other particles can not escape through the open end, an air duct attached in fixed position about the inside surface of the hollow body having one end at least partially sealed and the other end adapted to connect to a source of air or other gas, openings positioned in the air duct and directed toward the assembly so that when the air stream is passed through the air duct and out through the openings all aprts of the assembly will be struck by the air stream, and a means, such as a vacuum system, to remove the dust and other particles from the hollow body.

In a preferred embodiment cylindrical tubing will be attached about two to about twelve inches, most preferably between about four and eight inches, from the open end and to the inside surface of a cylindrical body. Tubing of any size may be used depending upon the air stream pressure, among other things, but tubing of about one-fourth inch to three-fourths inch inside diameter provides a sufficiently high pressure air stream for openings of less than one-fourth inch in the tubing. To assure that the air stream contacts all parts of the brake drum assembly the openings should be spaced no further than 5 inches apart and preferably about 3 or less inches apart. The spacing between the openings can be varied by adjusting either the air stream pressure or the size of the openings or the shape of the openings. In a more preferred embodiment broad obstructions are attached either to the hollow body or tubing and positioned so as to spread the air stream. This embodiment allows for fewer openings and better cross-circulation of the air streams resulting in more efficient removal of the dust and other particles. These obstructions or air dispersal means may be thin, broad strips of material placed in the air stream path. The shape may be varied and can be used to create specific cross-circulation air stream paths. In one embodiment the air dispersal means are all similarly shaped, the shape being like a flat fan blade.

While many different types of dust and particle removal means can be used, such as openings in the bottom of the hollow body with or without suction means, one embodiment of particular use with the design of this invention is to place an opening in the hollow body centered and about opposite the large open end located about the brake drum assembly. To this opening is attached a vacuum system. The advantages of this system is that it has been found that the air stream pressure is great enough so the dust and other particles removed from the brake drum assembly travel past the air duct to the rear of the hollow body where they can be readily removed. Also positioning the vacuum system behind the air stream duct has

several other advantages. First, the suction system of the vacuum system does not interfere with the cross-circulation air streams set up, and less suction is needed since the vacuum system does not compete with the air streams in determining the trajectory of the dust and other particles.

Another preferred embodiment of this invention is in the use of a compressible material as the sealing means. While prior art sealing means such as stretchable fabrics can be utilized and compressible material has been found not only to give a better dust seal, be more easily attached to the brake drum assembly, but also to better position the cleaning apparatus to the brake drum assembly in order to clean all aprts of the assembly. Materials such as foam rubber which is not only compressible but is also very elastic and will not stretch upon compressing many times could be used.

Further embodiments and modifications of this invention will become clear upon a reading of the preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. I is a three dimensional cutaway illustrating a preferred embodiment of the invention.

FIG. II is a cross-sectional view drawn along line 2—2 in FIG. I which illustrates the apparatus of this invention in working relationship with a brake drum assembly.

FIG. III is a cross-sectional view taken along lines 3—3 in FIG. II which illustrates one embodiment of the air dispersal means in conjunction with the air duct openings.

FIG. IV is a cross-sectional view similar to FIG. III but which illustrates another embodiment for connecting the air dispersal means to the air duct.

PREFERRED EMBODIMENTS OF THE INVENTION

In a preferred embodiment as seen in FIG. II the brake drum cleaning apparatus **101** fits about an exposed brake drum assembly **201** forming a dust seal at the open end **104** by sealing means **102**. Air or other gas is then introduced into air duct **105** attached to body **103** through means **108**, the rate being controlled by valve **109** and the extent which air duct **105** is crimped at the other end. Air duct **105** is provided with openings **106** spaced apart so that all parts of brake drum assembly **201** are struck by the air streams exiting from openings **106** and being dispersed by air dispersant means **107**. The velocity of the air stream forces the dust and other particles from the brake drum assembly and to the back portion of hollow body **103** where it can be removed through opening **110** which is connected to a vacuum system (not shown).

Turning to FIG. I more preferred embodiments of the brake drum cleaning apparatus are shown. The hollow body **103** of brake drum cleaning apparatus **101** may be most any shape but is preferably right circular cylinder shaped, at least from open end **104** to a point beyond where air duct **105** and air dispersant means **107** are attached. The diameter of body **103** should be large enough to fit about the brake drum assembly to be cleaned. It is also preferred that body **103** be rigid, and could be constructed of plastic, fiberglass, metal or any other such suitable material. However, it may also be desirable to construct that portion of body **103** back of the point where the air duct or air dispersant means is attached from a more flexible material, such as a heavy cloth, to facilitate construction or lower costs.

One end of hollow body **103** is open to form open end **104** which fits about the brake drum assembly. Sealing means **102** is attached to hollow body **103** about open end **104** and extends into the space of open end **104**. In the preferred embodiment sealing means comprises a compressible material, such as foam rubber, that is of a thickness large enough so as to make sealing contact with the vacuum plate **203** of brake drum assembly **201**. As best seen in FIG. II the compressible material contacts the vacuum plate **203** at a position that exposes brake lining **202** to air streams set up within body **104**. This seal is easy to establish and prevents any dust or other particles from escaping through open end **104**.

While the invention has been described in its preferred embodiments using a compressible material other methods of sealing body **104** to assembly **201** may also be used if desired. For example, an elastic material, or material with an elastic band, could be attached to rigid body **104** around the open end and then attached around the brake drum assembly, preferably around the vacuum plate to form the dust seal. The operation of the air dispersal means is more clearly seen in FIG. III. Here the air in duct **105** is forced through openings **106** and follows direction **112** until it strikes air dispersal means **107** at position **113**. Upon striking air dispersal means **107** attached to body **103**; e.g. by weld **114**, the air is dispersed and deflected along directions **112A** toward the brake drum assembly **201** (not shown). The position of opening **105** in relationship to air dispersal means **107** must be such that the air is dispersed and deflected toward the brake drum assembly. This can be accomplished by placing opening **106** at most any position around the circumference of duct **105**. Once the position of opening **106** has been selected, then air dispersal means **107** can be positioned so that the air streams will be dispersed and deflected toward the brake drum assembly. Because of simplicity of design and ease in construction, as well as, reducing the air pressure required inside duct **105** it is preferable that opening **106** be positioned so that air stream direction **112** is in the direction of open end **104**. As also seen in FIG. III in an alternate embodiment the air could escape through opening **106'** and travel in direction **112'** until it strikes air dispersal means **107'** located and attached to body **103** in front of duct **105**.

FIG. IV illustrates a similar air dispersal means **107** in relationship to opening **106** except that air dispersal means **107** is attached to duct **105**, e.g. by weld **114**.

The air duct **105** comprises hollow tubing for passage of the air or other gas. The tubing is attached to the inside surface of the hollow body **103** in a position from two to twelve inches, or more, from open end **104** in a circular fashion as clearly seen in FIG. I. The position of the tubing depending upon its inside diameter, velocity of air stream, how far the brake drum assembly extends into the hollow body, size and number of the openings in the tubing, among other things. In one example a 3/8 inch tubing attached abut four inches from open end **104** having 3/16 inch openings spaced about

two inches apart with flat fan shaped air dispersal means **107** worked quite well under moderate air pressure of about **100** psig.

One end of the tubing extends through hollow body **104** and is adapted to connect to an air or other gas source. If desired valve **109** can be used to regulate the air pressure within the tubing. The other end of the tubing is either sealed or partially crimped in order to allow back pressure to buildup within the tubing. A standard air hose system found at most motor vehicle repair shops will be a more than an adequate air source.

The tubing is provided with openings **106** to allow the air in the tubing to escape in the form of an air stream. These openings are preferably directed toward open end **104**, and more particularly to that area where the brake drum assembly parts to be cleaned are located. In order to assure that all parts are cleaned of dust and other particles the openings should be spaced so that air contacts directly all parts to be cleaned. The spacing will depend upon the opening size and shape, as well as, the velocity of the air stream among other things. The spacing may also depend on whether air dispersant means **107** are used. One example of a satisfactory arrangement would include three-sixteenths inch circular openings directed toward the open end and spaced about two inches apart. Examples of other opening shapes would include square, rectangular, oval, split, as well as, most any other shape. The size of the opening could be as small as one thirty-second inch to as large as one-half inch. While other sizes could be used this range would be the most practical.

In order to assure complete removal of all dust and other particles from the assembly it has been found that a good cross-circulation of air currents is desirable. This assures that air will strike all parts of the assembly. When using fixed air streams as in this invention it is preferred to disperse these air streams with a fixed device such as means **107**. The shape and size of air dispersal means **107** will depend upon the velocity of the air stream, the size of the openings, among many other variables. It has been found that one design which will establish the desired cross-circulation of air currents is a flat fan shaped means as seen in FIG. I. It is, however, again emphasized that many other shapes would also be satisfactory, such as by way of example, circular, triangular, or curved shaped.

During operation of the cleaning apparatus **101** dust and other particles are removed from the brake drum assembly. The velocity of the air stream is such that the dust and other particles are knocked past air duct **105** and to the rear of cleaning apparatus **101**. There they are removed from hollow body **104** through opening **110** which is preferably connected to a vacuum system.

While these particles could also be removed from body **104** by similar means at other positions within body **104** it is preferred that opening **110** be positioned behind air duct **105**. In this position it has been found that the dust and other particles are easily removed while requiring less suction power in the vacuum system than if opening **110** where positioned before air duct **105**. This results in the ability to use a smaller vacuum system and for better dust and particle removal from body **104**. Also by positioning opening **110** behind air duct **105** there will be minimum interference by the suction to the cross-circulation air streams. This results in need for less powerful vacuum systems and hence lower cost in operation of the cleaning device.

As is clear from the above description it is within the scope of this invention that portion of body **104** between the attachment of the air duct or air dispersal means and opening **110** need not be rigid, although it is so shown in FIG. I.

In order to facilitate mounting of the cleaning assembly **101** on the brake drum assembly **201** a handle or grip **111** may be provided.

Other embodiments and features of this invention are clear from the above description and are within the scope of this invention. For example, other objects than a brake drum assembly could be cleaned from dust and other particles by use of this cleaning apparatus.

Having described and illustrated my invention what I claim as new, novel, useful and unobvious, and desire United States Letters Patents is:

1. An Apparatus for cleaning dust and other foreign particles from surfaces which comprises:
   a. a hollow body with one end open, said open end surrounding surface;
   b. a sealing means attached to said open end and fitting about said surface so as to form a dust seal;
   c. an air duct attached to said hollow body and extending inside said body, said duct having one end at least partially closed and another end adapted to connect with an air stream source, said duct having air exit openings between said ends;
   d. an air dispersal means located inside said body and attached within said body, said air dispersal means positioned and shaped about said air exit openings to disperse and deflect any air emitted through said air exit openings toward said open end; and
   e. a means for removing said dust and other foreign particles from said body during operation of said apparatus.

2. An apparatus according to claim 1 wherein said air dispersal means is attached to said air duct.

3. An apparatus according to claim 1 wherein said air dispersal means is attached to said body.

* * * * *