

April 29, 1930.

A. L. WERTZ

1,756,410

FLUSHING AND CLEANING DEVICE

Filed March 19, 1927

3 Sheets-Sheet 2

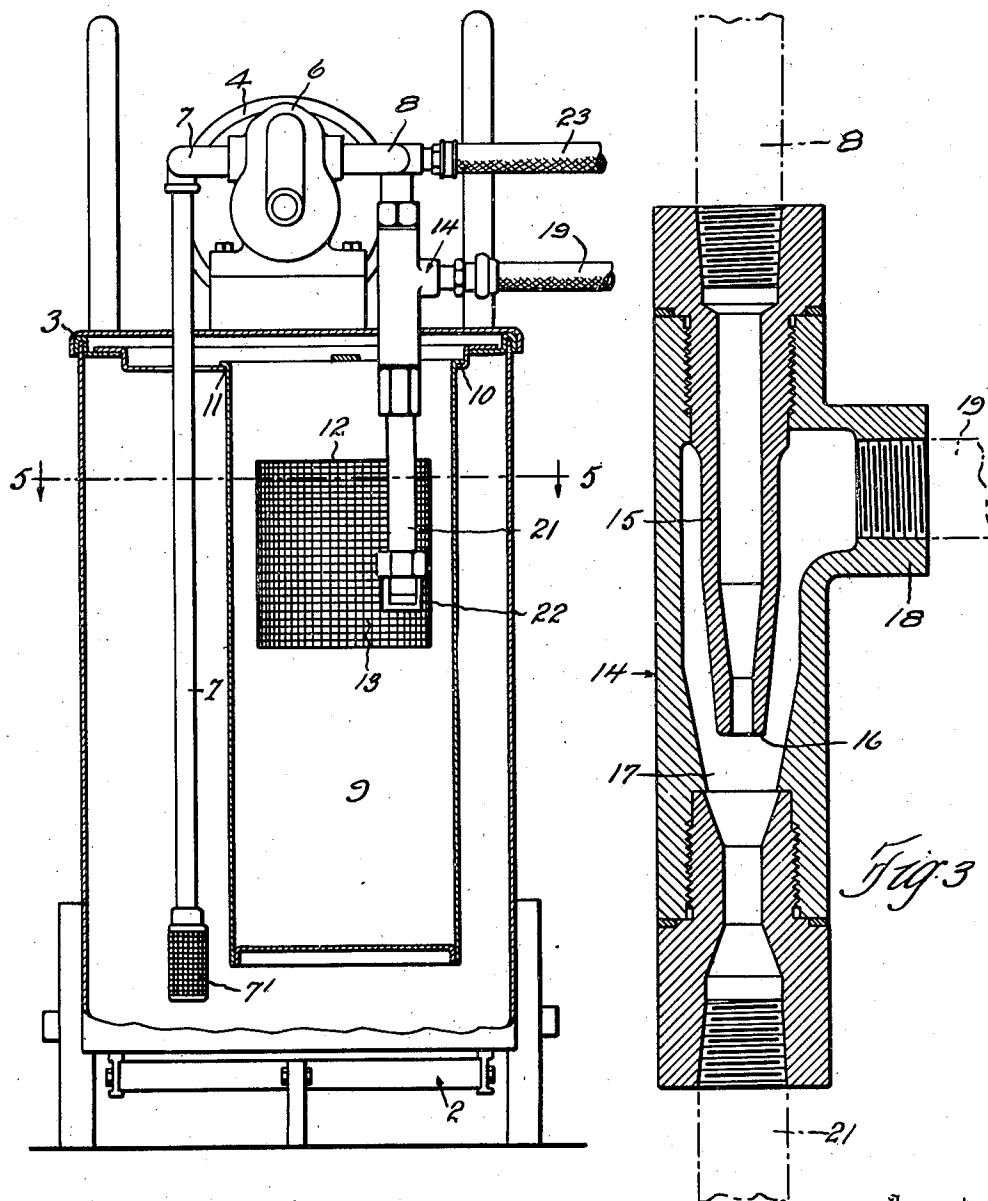


Fig. 2

Fig. 3

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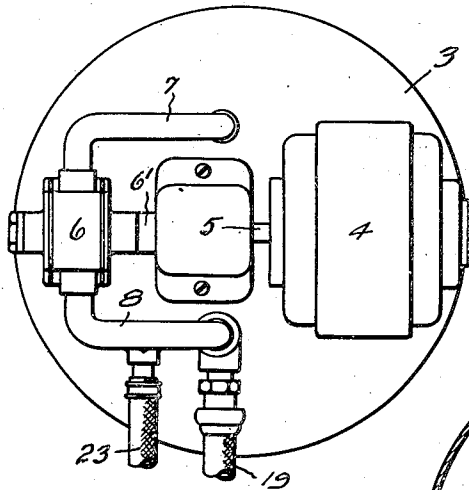


Fig. 4

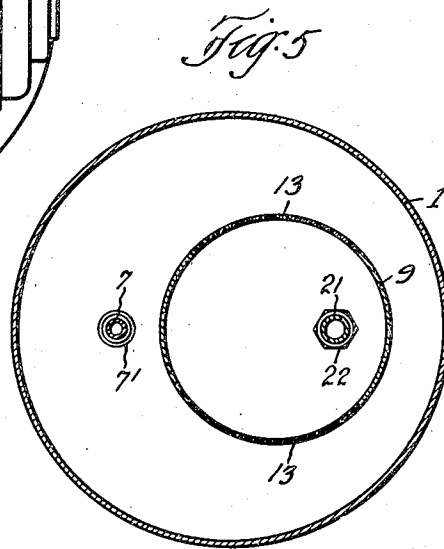


Fig. 5

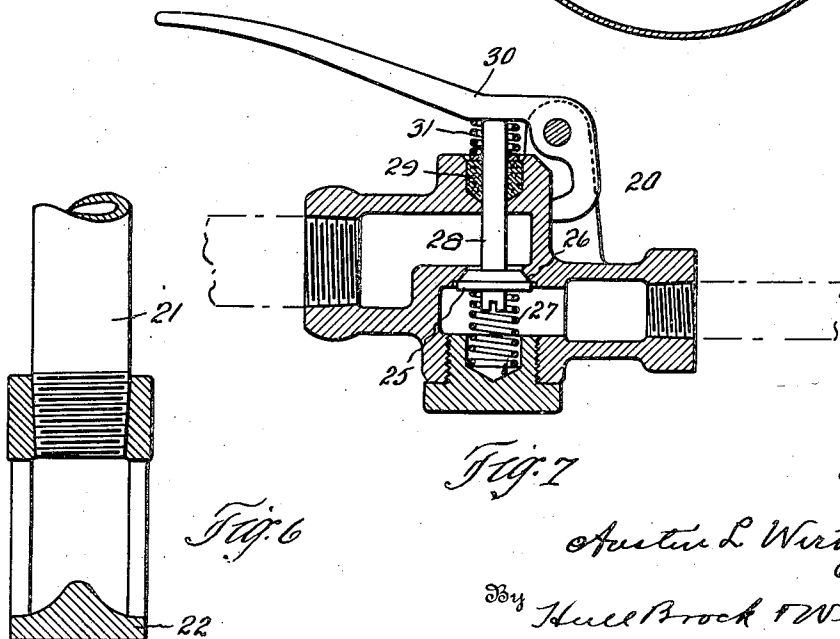


Fig. 6

Fig. 7

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UNITED STATES PATENT OFFICE

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FLUSHING AND CLEANING DEVICE

Application filed March 19, 1927. Serial No. 176,825.

This invention relates to a flushing and cleaning device especially adapted for use in cleaning and flushing out the transmissions and differentials of automobiles.

The main object of the invention is to provide a flushing and cleaning device for the purpose set forth in which the oil or lubricant is removed from the transmission or differential by means of an injector action and in a manner to be more fully described hereinafter.

A further object of the invention is to provide a device of the character described in which a flushing oil, such as kerosene, is delivered to the transmission for the purpose of loosening and removing all of the lubricant which might adhere to the gears or housing and which is provided with a suction line for removing the dirty and diluted lubricant.

A further object of the invention is to provide a flushing device in which the dirty lubricant removed from the transmission or differential is returned to the flushing device and which is provided with means for filtering and separating the solid particles contained in the dirty lubricant.

A further object of the invention is to provide a device of the character described in which the discharge pipe leading from the pump is provided with a vertically disposed portion in which is arranged the injector, the delivery end of which is directed downwardly whereby the suction obtained in the return line is materially increased.

A still further object of the invention is to provide a flushing device of the character described which is efficient in operation, compact and rigid in construction and well adapted for quantity production at comparatively low cost.

Further and more limited objects of the invention will appear as the description proceeds and by reference to the accompanying drawings in which Fig. 1 is a view in front elevation of the preferred embodiment of my invention; Fig. 2 is a vertical sectional view showing the interior of my device; Fig. 3 is a vertical sectional view of the injector; Fig. 4 is a top plan view of the tank and its associated parts; Fig. 5 is a horizontal sectional

view on the line 5—5 of Fig. 2; Fig. 6 is an enlarged detail vertical sectional view of the deflecting member secured to the bottom end of the discharge pipe; and Fig. 7 is an enlarged detail vertical sectional view of the control valve for the suction return line.

Referring now to the drawings, the numeral 1 designates a tank, which may be a standard size drum, and which is mounted in a truck 2 in any suitable manner and secured thereon by a strap 2' so that the same may be moved about from place to place. Secured over the tank 1 in any suitable manner is a cover 3 on which is mounted an electric motor 4 having a shaft 5 projecting therefrom. Also mounted on the cover 3 is a pump 6 the intake side of which is connected with the interior of the tank 1 by means of a pipe 7 leading to a point adjacent the bottom thereof. A filter 7' surrounds the lower end of the intake pipe 7. Leading from the discharge side of the pump 6 is a discharge pipe or conduit 8 having a horizontally disposed portion and a downwardly directed portion as shown most clearly in Figs. 1 and 2.

The cover 3 is provided with an annular opening in which is supported a container 9 having an annular flange 10 thereon which rests on an annular shoulder 11 formed on the cover 3. The container 9 is provided with one or more overflow openings 12 in the circumferential wall thereof and extending over the openings 12 is a screen or filter 13; the purpose of which will hereinafter appear. Connected with the downwardly directed portion of the pipe 8 is a T-connection designated generally 14. Threadedly secured within the T-connection 14 is an injector nozzle having a restricted downwardly directed outlet 16. The lower end of the T-connection 14 adjacent the restricted outlet 16 is somewhat conical in shape as shown at 17 so as to produce an injector action. Leading from the T-connection 14 at a point slightly above the lower end of the nozzle 15 is a connection 18 to which is connected a flexible conduit 19 having a valve controlled nozzle 20 at the discharge end thereof. Threadedly connected to the lower end of the T-connection 14 is a pipe 21 to the lower end of which is secured

injector, a second connection leading from said discharge conduit between said pump and injector, and means carried by the lower end of said discharge conduit for preventing undue agitation within said container.

3. A device of the class described comprising a tank, a cover for said tank, a pump carried by said cover, an intake pipe for said pump leading into said tank to a point adjacent the bottom thereof, a container arranged within said tank and supported by said cover and having one or more openings therein connecting with said tank, a discharge conduit leading from said pump and delivering into said container, said discharge conduit having a vertically disposed portion, an injector arranged within said vertically disposed portion and discharging downwardly, a connection leading from said vertically disposed portion and in open communication with said injector, a second connection leading from said discharge conduit between said pump and injector.

4. A device of the class described comprising a portable tank, a cover for said tank, a container arranged within said tank and supported from said cover, a pump carried by said cover, an intake pipe for said pump leading into said tank, a discharge pipe leading from said pump and discharging into said container and having a vertically disposed T-connection therein, an injector arranged within said T-connection and discharging downwardly, a pipe leading from said T-connection and having a nozzle at its opposite end adapted for insertion into an automobile transmission, a second pipe leading from said discharge pipe between said pump and T-connection, said container having one or more openings in its side walls for effecting communication between said container and tank when the liquid in said container reaches a predetermined level, and means for preventing undue agitation within said container.

5. A flushing device of the class described comprising a portable tank, a cover for said tank, a container arranged within said tank and supported from said cover, a pump carried by said cover, an intake pipe for said pump leading into said tank, an outlet pipe for said pump having a vertically disposed portion delivering into said container, an injector arranged within said vertically disposed portion having its discharge end directed downwardly, a connection leading from said vertically disposed portion and in open communication with said injector, a second connection leading from said discharge pipe between said pump and injector, one or more overflow openings in said container and a filtering medium covering said opening or openings.

6. In a flushing device of the class described, the combination of a tank, a pump

having an intake pipe leading into said tank, a discharge pipe for said pump also leading into said tank, a container supported within said tank and having communication with the interior thereof and into which said discharge pipe delivers, an injector in said discharge pipe, a conduit leading from said discharge pipe at a point adjacent said injector and a second conduit leading from said discharge pipe between said pump and injector.

7. In a flushing device of the class described the combination of a tank, a pump mounted on said tank and having an intake pipe connected with the interior of said tank and a discharge pipe leading therefrom and connected with the interior of said tank, an injector arranged within said discharge pipe and having its discharge end directed downwardly, a conduit leading from said discharge pipe at a point adjacent said injector, a second conduit leading from said discharge pipe between said injector and pump, a motor carried by said tank, the shaft of the motor being disposed in axial alignment with the shaft of the pump and a direct drive between the shaft of the motor and the shaft of the pump.

8. A flushing device of the class described comprising a tank, a cover for said tank, a pump carried by said device, an intake pipe for said pump connected with the interior of said tank, a container arranged within said tank and having communication with the interior thereof, a discharge conduit leading from said pump and delivering into said container, said discharge conduit having an injector therein, a connection leading from said discharge conduit at a point adjacent said injector and a second conduit leading from said discharge pipe at a point between said pump and injector.

9. A flushing device of the class described comprising a portable tank, a cover for said tank, a container arranged within said tank and having communication with the interior thereof, a pump carried by said tank, an intake pipe for said pump connected with the interior of said tank, a discharge pipe leading from said pump and delivering into said container and having a vertically disposed T-connection therein, an injector arranged within said T-connection and discharging downwardly, a pipe leading from said T-connection at a point adjacent said injector, a second pipe leading from said discharge pipe at a point between said pump and T-connection and means for operating said pump.

10. A flushing device of the class described comprising a portable tank, a cover for said tank, a container supported within said tank and having communication with the interior thereof, a pump having an intake pipe, connected with the interior of said tank, an outlet pipe for said pump having a vertically

disposed portion and delivering into said container, an injector arranged within said vertically disposed portion and having its discharge end directed downwardly, a connection leading from said vertically disposed portion at a point adjacent said injector, a second connection leading from said discharge pipe between said pump and injector, and means for operating said pump.

11. A flushing device of the character set forth comprising a tank having a supply chamber for flushing oil and a delivery chamber into which dirty oil is delivered, a pump having an inlet pipe connecting with said supply chamber and a discharge pipe delivering into said delivery chamber, an injector arranged within said discharge pipe, a connection leading from said discharge pipe at a point between said pump and injector, a second connection leading from said discharge pipe at a point adjacent said injector and means for operating said pump, said supply chamber and delivery chamber being in open communication one with the other.

12. A flushing device as set forth in claim 11 having means for directing the flow of the liquid delivered through said discharge pipe.

13. A flushing device as set forth in claim 11 having means for filtering the oil which passed from said delivery chamber into said supply chamber.

14. A flushing device of the class described comprising a portable tank, a cover for said tank, a container arranged within said tank and supported from said cover, a pump, a motor for driving said pump and a direct drive between said motor and pump, an intake pipe for said pump connected with the interior of said tank, a discharge pipe for said pump delivering into said container and having a vertically disposed portion, an injector arranged within said vertically disposed portion, a conduit leading from said discharge pipe at a point adjacent said injector, and having a nozzle at its outer end adapted for insertion into an automobile transmission, a second conduit leading from said discharge pipe at a point between said injector and pump and provided with a nozzle at its outer end, said container having one or more openings therein for connecting the same with the interior of said tank and means for preventing undue agitation of the contents of said container.

15. In a flushing device of the class described the combination of a tank, a pump carried by said tank and having an intake pipe connected with the interior of said tank and a discharge pipe leading therefrom and connected with the interior of said tank, an injector arranged within said discharge pipe and having its discharge end directed downwardly, a conduit leading from said discharge pipe at a point adjacent said injector,

a second conduit leading from said discharge pipe between said injector and pump, a motor carried by said tank, the shaft of the motor being disposed in axial alignment with the shaft of the pump and a direct drive between the shaft of the motor and the shaft of the pump.

16. A flushing device comprising a tank for a cleaning fluid, a partial cover for said tank having an opening therein, a strainer receptacle supported by said partial cover and extending downwardly therefrom through said opening and into said tank, a top cover positioned above said partial cover, motor operated pump means mounted on said top cover, a conduit connected to said means for withdrawing cleaning fluid from a point adjacent the bottom of said tank and discharging it into said receptacle, and an ejector in said conduit for withdrawing a fluid from without said tank and discharging it into said receptacle.

17. A flushing device of the class described, comprising a portable tank serving as a container for a cleaning fluid, a receptacle removably supported in said tank, said receptacle having strainer openings above the bottom therefor, a pump, motor means for driving said pump, an inlet conduit for said pump having an inlet opening adjacent the bottom of said tank, means operated by said motor means and pump to supply cleaning fluid from said tank to a part to be cleaned and to withdraw the cleaning fluid and collected impurities from said part, and means to conduct said impure cleaning fluid into said receptacle, whereby the impurities may settle to the bottom of said receptacle and the relatively pure cleaning fluid flow therefrom into said tank through said strainer openings.

In testimony whereof, I hereunto affix my signature.

AUSTIN L. WERTZ.

UNITED STATES PATENT OFFICE

WILLIAM B. WESCOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO RUBBER LATEX RESEARCH CORPORATION, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

DRY MOLDING

No Drawing.

Application filed December 10, 1927. Serial No. 239,215.

This invention relates to improvements in dry molding; and it comprises a method of obtaining rubber compositions in granular, vermiform, cordiform, shredded or other divided condition adapted for assemblage in a mold and of molding to the shape desired with subsequent curing wherein granular fillers, short cords or fibrous masses are treated with a small amount of properly diluted commercial latex containing some proteid protective colloid, such as hemoglobin, to obviate coagulation and also to obviate subsequent stickiness after drying, there being advantageously also an addition of zinc oxid, the treated material is dried to form an agglomerated mass and the mass is then comminuted or shredded to put it in divided form suitable for the stated dry molding operation; and it also comprises certain products of said method; all as more fully hereinafter set forth and as claimed.

In the rubber art it is a desideratum to produce a fine particled form of rubber-containing materials, such as a dry granular or loose fibrous rubber-containing material, which may be kept and stored and be conveniently assembled in weighed or measured amounts and directly molded into shape under heat and pressure in the usual way of vulcanizing. For various reasons, no very practical method of obtaining this result has been provided in the art. For one thing, such a material would expose large areas of rubber to air and it is thought by those familiar with the rubber art that rubber so exposed on storage may undergo undue oxidation. By the present invention however I am able to provide such a loose small grained or small particled material and I have found the presumed liability to deterioration on exposure to air to have no validity. The present invention is particularly applicable to making hard compacted articles from loose granular or fibrous materials, the final article, in the case of asbestos, consisting of asbestos fiber with a small amount of well-distributed rubber bonding the fibers together; this rubber being either soft cured or hard cured. In this invention, I use latex as a source of much, most, or all of the bond-

ing rubber. Similarly, hard and compact articles can be made from bulk loose cord containing material; or from a granulated or pulveriform composition of rubber and granular material. The present invention is particularly useful where the proportion of rubber is low.

Because of costs and for other reasons, it is sometimes desirable to make articles of asbestos, with or without other mineral matters, carrying as little as 6 to 8 per cent of rubber. This amount, if properly distributed, is sufficient for bond. It is impractical by present day processes however to incorporate more than about 35 to 40 per cent of asbestos into a rubber composition without using a rubber softener. It is, however, possible by the use of certain expedients to get these low proportions of rubber into an asbestos composition by the aid of diluted latex. Commercial latex is at once coagulated by commercial asbestos, which prevents intimate incorporation of the two in the way here desired. The asbestos may be freed of this coagulative property by extracting with acid and washing; but even so, the mechanical manipulation incident to working together large amounts of asbestos and small amounts of latex may, again, produce coagulation. This can be avoided by the use of a protective colloid.

A further difficulty, however, develops in the molding of this composition, since a mixture of asbestos and latex containing only 6 to 8 per cent rubber is apt to dry to a rock-like hardness and to shrink and warp. In some cases, the pressure required to obliterate voids and make a compact properly contoured final article from the materials resulting from drying, is of an order of magnitude much greater than is usual in rubber processes. Often, there is a compression factor of 3:1 to 1.5:1. But I have found these hard masses may be readily broken down to granular or powder form and be then molded into shape with no more pressure than is usual in the rubber art. The dry mass breaks down readily with suitable apparatus. In breaking down, I find it better to use a shredding device, effecting disintegration by a

toothed arrangement adapted to pull the material apart. Crushers or grinders, involving impact disintegration, are not so suitable. While the dry slabs are often so hard as to be resonant, they are quite porous; the rubber-carrying fibers being to a great extent separated by voids left in evaporation of water from the dilute latex used.

The fineness of disintegration desirable is determined partly by the original length of fiber and partly by the degree of flow needed in molding. Thick walled products can be satisfactorily made from rather coarse granules; while, for thin walled products, such as battery boxes and the like, the granules should be relatively fine. Sometimes I granulate and then separate different size grains, using each fraction for special purposes. Very fine material, I sometimes remove by sifting and use as such or return to another wet batch.

In drying the slabs, I try not to have the temperature exceed 150° F. and I employ conditioned air. In drying, the moisture left should be less than the normal water of condition of any hygroscopic materials which may be present. It is sometimes convenient to effect a final complete drying of the granulated material by tumbling in a rotary drum in a current of conditioned air. This yields a loose granular material ready for molding. Sometimes, however, I wet-mold my mixture into slabs, completely dry these slabs and keep the material in slab form until it is wanted for use, granulating just before use. This has the convenience that the slabs may be put into stock and only granulated when wanted, thereby shortening the time during which the material is held in granular form exposed to the air.

In drying the slabs, the degree of porosity naturally influences the drying time considerably. For example, for making 2-inch paving blocks, the equivalent material, in the slab form, may be made occupying 3 times this volume, i. e., as a 6-inch slab. This will ordinarily require a drying period of about 48 hours, at about 150° F. in conditioned air of 20 per cent humidity, while the same amount of material in the form of a 4-inch slab will require nearly double the drying time. But if the slabs be dried on warm shelves in vacuo, the drying times will be reversed, because of the better heat conductivity of the less porous block. Equal drying may be effected in about half the time by the use of vacuum rather than of conditioned air, but the expense is higher.

As so far stated, the final articles being produced by simple drying have a bond of gelled rubber, which I regard as more advantageous than a bond of coagulated rubber. However, when coagulated rubber is desired it can be obtained by the expedient of limiting the amount of protective colloid present, so

that the rubber of the latex slowly coagulates during the various operations. Even so, however, there is the disadvantage that the reticulate nature of any coagulum, however fine the coagula, tends to localize the resulting rubber more or less into specks or nodules, rather than the thin fiber coating films here desirable. With this localization, more rubber is needed to effect bond. Coagulation rubber is better adapted for articles containing much more rubber; say, 25 to 45 per cent, or more.

What has been said regarding asbestos applies also to composition made with granular mineral fillers, such as zinc oxid, whiting, talc, etc. It also applies, with some modification, to the manufacture of compact and dense articles with the aid of short cords and threads; for example, the cords coming from the comminution of old tire stock. Cords treated with diluted latex do not dry down to rocky products; and there is no great difficulty in compressing the agglomerated dried material, as it comes from the drier in rough molded form, to the final shape and density required. Nevertheless, it is convenient, and I regard it as within the present invention, to produce a fine fibrous material in loose dry form which can be used by weight or measure to make individually molded shapes.

As stated, in the production of molded shapes from asbestos under the present invention, it is desirable to have a protective colloid present to prevent or hinder coagulation; and as this colloid, I find hemoglobin the most advantageous. Pure vegetable fiber, such as cotton cords, does not coagulate ammoniacal latex, but, on the other hand, reclaimed cord from old tires does have a coagulative influence, because of the presence of particles of rubber. Hemoglobin is therefore advantageous in using tire scrap for this reason; and it is also advantageous, even with clean cotton, in that it prevents stickiness or tackiness of the dry fiber, thereby much facilitating shredding, and assemblage. Commercial latex often contains a "creamy" portion consisting of finely divided coagula particles and these are filtered out by the cotton threads and form an exterior sticky layer. The presence of hemoglobin obviates this tackiness, even with poor latex.

While other protective colloids may be used in lieu of hemoglobin, hemoglobin has the advantage that in a particular dry condition, it is cured by heats and pressures like those used in vulcanizing rubber, and its use therefore contributes to the final bond.

In using latex on cords, the non-creamy, or normal, portion of the latex enters the capillaries and produces a rubber impregnation throughout. Sometimes, impregnation in this sense is not wanted and in this case, the cords need not be impregnated with the rubber; they may simply receive a firmly adhering