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S. REICHERT

FLOOR COVERING AND METHOD OF MAKING THE SAME

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Fig. 1.

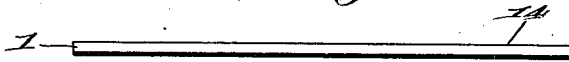


Fig. 2.

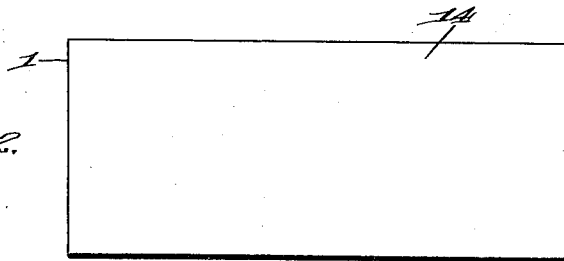


Fig. 3.

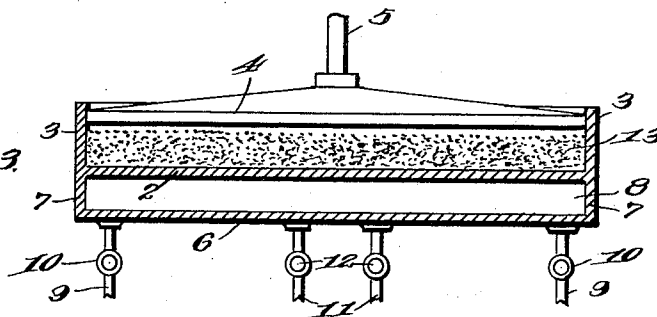


Fig. 5.

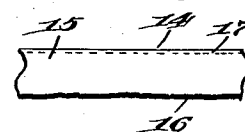
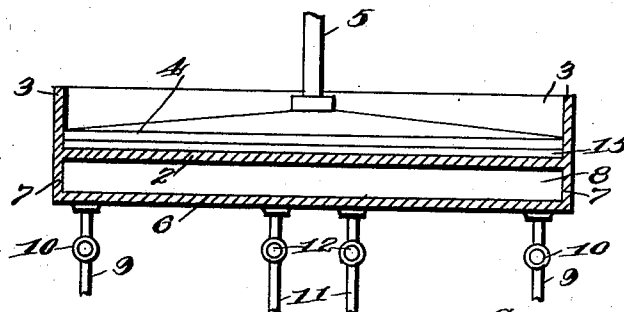


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FLOOR COVERING AND METHOD OF MAKING THE SAME.

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The object of this invention is to reclaim, into a useful product, or products, the discarded outer casings of pneumatic tires, and it is an especial object to convert this hitherto waste material into floor coverings such as mats, rugs and running board and foot board coverings.

It is well known that these outer casings are made up of rubber and cord or fabric reinforcement which are cemented and vulcanized into a unitary structure. The presence of cord or fabric, and in addition, the cement, renders this waste material valuable in the formation of my improved product where clear rubber, such as is found in inner tubes would be useless unless some form of binder was added. It is well known that when an outer casing is discarded, or worn out, the cord or fabric is usually intact, or in good condition, and likewise the rubber, the latter being of an unusually good grade. It is also obvious that a worn out casing is not discarded because the bond between the cord or fabric, and the rubber, is broken or impaired. Therefore, for the purposes of my invention, I find in this usually waste material, not only all the qualities, but also, all the requisites for the manufacture of my improved products.

In accordance with my improved method, a plurality of these discarded casings are reduced to preferably a comminuted fineness, such for instance as that of granulated sugar. I then thoroughly mix and intermingle the particles with a view of distributing the cord or fabric particles substantially uniformly throughout the rubber particles. These mixed and ground or macerated particles are then placed in a mold, and in the presence of both heat and pressure, are vulcanized into an integral or unitary body of a dimension in accordance with the mold employed. In order to retain the form to which the material has been compressed, I preferably subject the body to a sudden lowering of temperature before pressure is released.

My invention also resides in the product, and has other features which will be more

fully described in connection with the accompanying drawing and which will be more particularly pointed out in and by the appended claims.

In the drawing:—

Fig. 1 is an edge view of a small size mat made in accordance with my invention.

Fig. 2 is a plan view thereof.

Fig. 3 is a vertical sectional view of one form of vulcanizing press for carrying out my improved process, the press being shown before pressure is exerted to compress the material.

Fig. 4 is a view similar to Fig. 3, showing the material vulcanized and the press in the position which it would occupy.

Fig. 5 is an edge view of modified form of mat, having a tread layer incorporated therewith.

Like characters of reference designate similar parts throughout the different figures of the drawing.

As shown, 1 designates a small size floor mat which may have imparted to it any form of design on the face-up side, although I have shown the same plain, as the design does not form a feature of my invention. The main characteristics of this product being its relative thinness, its pliability to fold or be rolled, and its resilience to walking tread. Further, the rubber, of which it is mainly formed, is bonded by an infinitude of minute fibers distributed substantially uniformly throughout the length and thickness of the product, and disposed in an infinitude of directions. Thus, it will be clear that the rubber is re-inforced against all the multitude of stresses that any floor covering could be subjected. It is well known that the stresses to which a floor covering is subjected, are, to a major extent, compression stresses. Such stresses in tension, to which a floor covering is subjected, are relatively light, and hence, a product to efficiently perform the functions of a floor covering must be fortified primarily not only to take compressive stresses, but in addition, to afford the requisite resiliency.

Before further developing the novelty

and structure of my improved product, I will next describe my improved method of making the same.

For the purposes of illustration of my method, I have shown a vulcanizing structure which is so conventional that it is almost diagrammatic in its simplicity for the reason that the claims hereto annexed do not involve or are not addressed to the apparatus.

I take a number of worn-out or discarded outer tire casings and remove any metal in, or entirely remove the stiffened clincher or wheel engaging rims. The casings are then macerated or otherwise reduced in a suitable machine (not shown) to practically the fineness of granulated sugar, the particles being in what might, in deference to the greatest accuracy, be termed a comminuted condition. Now some of these casings are re-inforced by cord, and some by fabric, but in practice, this difference is immaterial to my invention. It is also known that rubber cement is employed in the initial construction. Therefore, the resulting product coming from the reducing machine or grinder consists of a mass of comminuted material composed of fibers of cord or fabric, rubber cement and rubber. Some of these particles may consist of all three of these substances, and some may consist of any two and some of any one of these three substances.

In practice, and by reasons of the obvious fact that there is a preponderance of rubber particles, I find it advantageous to thoroughly mix the mass of particles with a view of substantially uniformly distributing the bonding fibres throughout the mass of rubber particles, and this step may be performed by hand, or any suitable type of machine, dependent upon the scale on which the manufacture is carried on.

The mixed material is now ready for the vulcanizing mold which I will now describe in detail.

The mold portion, as shown, has a flat bottom 2, and upright walls 3 on all sides thereof, whereby a suitable receptacle is formed to receive the material. A pressure plunger 4, may be operated from a stem 5, by any suitable means (not shown) to be lifted out of range with walls 3, to permit the mold to be charged, and then caused to descend against the material to compress the same in the mold. It will thus be seen that the mold is filled from the top thereof, and in this specific embodiment, no means is provided for heating the pressure plunger 4. The mold is shown provided with a false bottom 6, having walls 7, in steam tight connection with the mold, the bottom 2, of the latter, forming the top of a steam and cooling chamber 8. Leading to this chamber 8, is a pair of steam pipes 9, having

valves 10, and a pair of water pipes 11, having valves 12. Thus, steam may be admitted to heat the wall 2, to vulcanize the material, and then the steam may be shut off and cold water admitted to quickly lower the temperature of wall 2, the purpose of which will later appear.

Now assume that the mold chamber has been filled with this comminuted material to a depth dependent on the desired thickness of the product to be formed, and the pressure to be exerted, as indicated at 13, the plunger 4, will be caused to descend and compress the material 13. At the same time, one or both valves 10, will be opened to supply steam and afford heat necessary to vulcanize the material. In practice, it may be found desirable to have one pipe 9, connected with a source of supply of steam, the other pipe being a discharge pipe to carry off condensation and afford circulation to quickly heat walls 2 and 3. In any event, heat is applied and as the heat is applied the plunger is caused to descend to substantially the position shown in Fig. 4. Preferably, this position is reached before actual vulcanization starts and desirably, the heat application is continued after this position of the plunger has been reached. In fact, a very considerable application of heat will be applied subsequent to the attainment by the plunger 4, of the final position shown in Fig. 4. It is well known that the extent of hardness of the final product, is dependent on the pressure, the temperature of the heat and the prolongation of the latter. This is all within the skill of a mechanic skilled in this art, and need not be detailed herewith. It is sufficient to say that I desire to obtain the pliability equal to the average rubber door mat, and hence, the vulcanizing treatment would be gauged accordingly.

After the material has been vulcanized, the valves 10 will be shut off and the valves 12, opened. By suddenly admitting cold water to chamber 8, before releasing the plunger 4, I lower the temperature of the product and cause the latter to retain the form to which it has been compressed. Further, by cooling the mold body, the finished product is easily released and does not adhere to the mold and can readily be removed.

I find that if I use a thin layer of rubber, not mixed with fibers, and spread the rubber over the bottom 2, and then on top of this layer disposed the mixed material heretofore described, the surface 17 of the finished product will not only be continuously smooth but actually polished, or like a polished surface. This thin layer of rubber prevents the fibers from reaching the surface of the product although the fibers can be seen through this finished surface. Therefore, that surface which is next to

the bottom 2, will be the usable surface of the finished product.

It will be noted that the process, throughout, is entirely a dry process.

5 By reason of the fact that heat is only applied to the usable face, which is designated at 14, and which is the tread surface, it will be seen that the density is not uniform throughout the cross section. For instance, the tread zone, which I indicate at 15, will be a harder and more dense zone than the next zone closer to the plunger 4. In other words, the density decreases from the tread surface 14 toward the bottom 16. 15 Now therefore, it will be clear that the less dense area nearer 16, will afford a cushioning area affording the requisite resiliency notwithstanding the relative hardness of the tread area. Hence, I have the advantage 20 of a dense wearing surface without reducing resiliency, which is a feature of great importance in a floor covering for houses and offices.

In tire casings that are worn only slightly and are discarded on account of a blow-out, for instance, there will be a preponderance of rubber with respect to the fibers, but in nearly completely worn out casings where the tread is almost gone, the fabric or cord may be equal to the rubber, in volume. Therefore, in making some products, care may be exercised in selecting the casings to be ground or reduced to get approximately the desired relative quantity of fibers with respect to the rubber. 35

At any rate, there will be present such a multitude of fine short fibers, extending in every direction, that the bond and reinforcement of the rubber content will not only be greater but distinctly different from any other article now known, of this character. 40

While I have herein before referred to tire casings, it will be clear that any fabric-reinforced rubbered will answer my purpose.

It is to be believed that my invention will be clear from the foregoing description and

I do not wish to be limited thereto except for such limitations as the claims may import. 50

I claim:—

1. The herein-described method of making a floor covering, which consists, in grinding fabric-rubber to a comminuted fineness, in thoroughly mixing the ground mass to substantially completely distribute the fabric throughout the rubber content, in spreading the mixed mass over a mold bottom, in compressing the mass in the presence of heat on one side only to vulcanize the mass into an integral body of the desired thickness, and in suddenly cooling the heated side of said body to retain the form of the latter. 55 60 65

2. The herein-described method of making a floor covering, which consists, in shredding or comminuting waste fabric-rubber, in compressing the reduced mass, and in vulcanizing the compressed mass with heat applied only to the tread portion of the product, whereby the resulting product will have a relatively dense tread portion and a less dense resilient subjacent portion. 70 75

3. The herein-described method of making a floor covering, which consists, in comminuting a re-enforced rubber, in compressing the comminuted mass against a thin layer of tread surface forming rubber and vulcanizing the whole into an integral sheet-like floor covering. 80

4. A floor covering of sheet-like form composed of fabric-rubber comminuted and vulcanized into an integral body and having a relatively hard and dense tread portion and a relatively less dense subjacent cushioning portion. 85

5. A floor covering of sheet-like form composed of fiber reinforced rubber comminuted and vulcanized into a sheet-like body of varying density and hardness. 90

In testimony that I claim the foregoing as my own, I hereby affix my signature.

SAMUEL REICHERT.