Dec. 14, 1926. 1,610,319

E. J. RAY

RUBBER HEEL

Filed Feb. 28, 1925

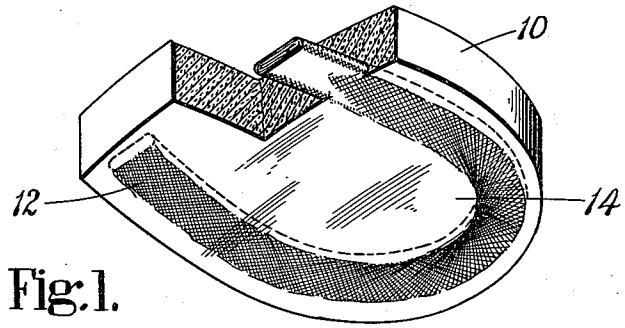


Fig. 1.

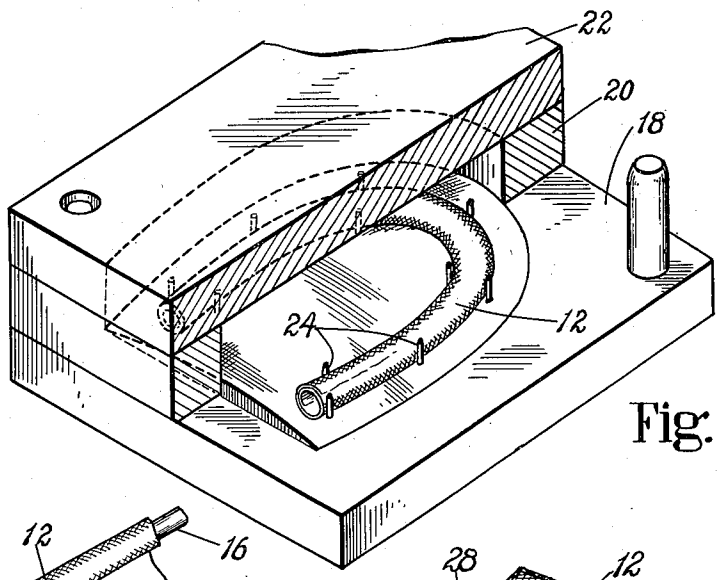


Fig. 3.

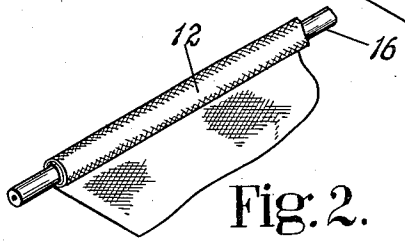


Fig. 2.

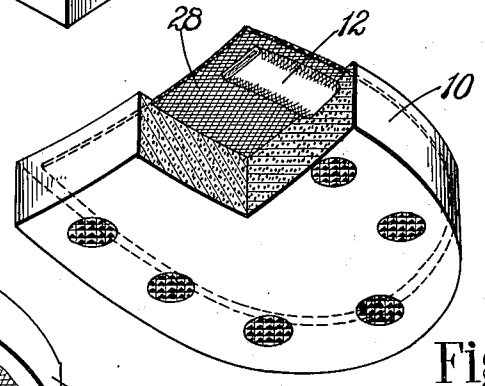


Fig. 5.

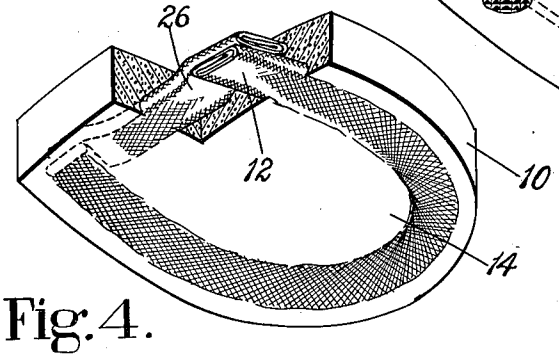


Fig. 4.

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UNITED STATES PATENT OFFICE.

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RUBBER HEEL.

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This invention relates to rubber heels and methods of their manufacture, and especially to the type of rubber heel which has embedded and vulcanized in it an insert of some material different from, and less yielding than, the main or body portion of the heel.

It has heretofore been proposed, for example, to embed in soft rubber heels inserts of various materials among which may be mentioned fabric, woven wire, wood, fibrous compositions and the like. The function of such inserts may be to anchor the attaching nails, stiffen the heel, modify the action of the heel when flexed, cheapen the heel, etc. When a woven material, such as fabric or woven wire, is used the insert is died out of a sheet of the woven material and has raw edges which not infrequently fray, with the result that stray ends of the threads may be visible at an edge surface of the finished heel and make the heel unsaleable. When an insert is used as a nail anchorage it is sometimes made U-shaped to save material but, even then, there is a considerable waste of material incident to the dieing out of the U-shaped pieces from a flat sheet. It has not been practicable to cut woven material into straight strips of the proper width, which could be done without waste of stock, and then bend such strips into U shape, because of the inevitable kinking of the material when it was bent. It has also been customary to build up rubber heel inserts with a plurality of separate plies of material secured together by rubber or cement, and it sometimes occurs that the plies come apart with the result that the heel is damaged or destroyed.

It is the object of the present invention to overcome the difficulties mentioned above and to provide a rubber heel which is improved as compared with those heretofore known in respect to both durability and appearance while the cost of manufacture is cheapened and waste of material is eliminated. To these ends, I have provided a nail anchoring insert in the form of a hollow tube of woven material capable of being bent to U shape without kinking. This insert may be made of any suitable material such as woven wire, canvas or the like and in the embodiment of the invention herein illustrated is made of a textile fabric of appropriate strength. I have discovered that one way by which it is possible to make a tubular nail anchoring element from woven materials of the kinds referred to which is capable of being bent to the desired U shape without kinking is by disposing the meshes of the material diagonally to the axis of the tube. The tube may be made by rolling upon a mandrel a piece of fabric of the proper size which has been cut on the bias. If the weave or mesh of the fabric runs longitudinally of the tube the tube cannot be bent without kinking, but when the tube is made of bias mesh fabric it may be bent easily to the required shape without the formation of kinks or wrinkles.

A rubber heel insert made according to the present invention has no raw edges and, consequently, does not fray. Heels in which it is embodied are uniform in appearance, and there are no rejects resulting from the ends of threads working to the exposed surfaces.

In this connection the invention, in one of its aspects, comprises a process of making a rubber heel, consisting in forming a hollow nail anchoring insert, assembling the hollow insert with a mass of uncured rubber, molding the rubber into heel form, collapsing the insert and vulcanizing the insert and rubber together.

The insert, while in tubular form, may be readily bent to the desired shape and inserted in a rubber heel mold, after which a biscuit of uncured rubber is placed in the mold and vulcanizing heat and pressure are applied. The insert is thus flattened and securely vulcanized into the attaching face of the heel. The resulting product is an improved rubber heel having vulcanized therein a woven fabric insert conforming generally in shape to the outline of the heel and having a continuous folded edge which is regular and smooth in appearance.

In winding the fabric tube a sufficient number of convolutions is provided so that when the tube is flattened the insert consists of a plurality of layers or plies which, in the heel, are approximately parallel to the tread face thereof, but, since the insert as a whole consists of only a single piece of material, the tendency of the plies to separate is minimized or eliminated. This feature of the invention, namely, a multi-ply, one-piece,

nail-anchoring insert, the plies of which are approximately parallel to the tread face of the heel in which the insert is embedded, is capable of use in other specific forms than the one herein illustrated, and in this aspect of the invention the insert might be otherwise than tubular in its formation.

The tubular form of insert is particularly advantageous in that it uses no more material than is necessary for providing adequate anchorage for the heel attaching nails, and there is no waste of material whatever in making it. All the manufacturing operations involved in its use are simple and easily performed by unskilled labor, and its use results in the production of a rubber heel of superior durability and appearance at a minimum manufacturing cost. While the word "rubber" is used herein for convenience to designate the material of the body of the heel, it should be understood that it is employed in the sense in which it is commonly used in the trade, namely, as descriptive of any rubber or other similar vulcanizable composition having the properties of resiliency and elasticity required in a cushion heel.

Certain specific embodiments of the invention will now be described in detail in connection with the accompanying drawings, in which—

Fig. 1 is a perspective view of a rubber heel embodying the invention;

Fig. 2 is a view illustrating a detail in the formation of the tubular insert;

Fig. 3 shows portions of a rubber heel mold with the insert located therein;

Fig. 4 illustrates a slightly modified form of the invention; and

Fig. 5 illustrates a still further modification of the invention.

Referring now to the drawings, 10 indicates a heel of any desired size and shape, the principal, or body, portion of which is made of rubber or equivalent cushioning material.

A nail anchoring insert 12 is vulcanized into the heel 10 flush with the inner attaching face 14 of the heel and serves to prevent the heel from being pulled off the heads of the attaching nails. The insert 12 is made of material less yielding than the rubber of the body of the heel and sufficiently firm to be held securely by the attaching nails, which are driven from the tread face of the heel through the rubber and the insert until their heads are seated firmly upon the insert, securing the heel tightly against the heel base or heel seat of the shoe to which the heel is attached. The area and arrangement of the insert 12 are such as to cover all the locations at which it is desired to drive the attaching nails and to this end the insert may conveniently be U-shaped, as shown in Fig. 1.

In the illustrated embodiment of the invention the insert 12 is made of woven sheet material, such as canvas or duck. A piece of rubber-frictioned canvas of the proper size and shape may be rolled upon a mandrel 16 into the form of a hollow, collapsible tube, as illustrated in Fig. 2. The piece of canvas from which the tube is made is preferably cut on the bias and when it is wound into tubular form the meshes of the fabric are disposed diagonally to the axis of the tube. A tube of woven material thus constructed may be bent readily into U shape without kinking and placed in a rubber heel mold, as shown in Fig. 3, wherein 18, 20 and 22 indicate respectively the bottom plate, the intermediate plate and the top plate of a single cavity vulcanizing mold suitable for the production of a rubber heel. A series of small, upright pins 24, in the bottom plate of the mold, serve to locate and maintain the contour of the insert 12 in the mold while the heel is being made.

After the insert 12 is placed in the mold a biscuit of uncured rubber composition containing the amount of material necessary to fill the mold is placed therein, whereupon the mold is closed and subjected to heat and pressure in a vulcanizing press. The pressure causes the tubular insert to become collapsed or flattened until the convolutions or plies of the fabric are in intimate contact with each other and the insert, while maintaining its U-shaped contour, takes the form of a multi-ply, one-piece element, the plies of which are approximately parallel to the tread face of the heel, said element having continuous, folded edges which are cleanly defined and free from any tendency to fray.

As vulcanization proceeds the plies of the rubber-coated fabric become vulcanized securely together and to the rubber body of the heel, and the finished product is a heel of good appearance and superior strength and durability.

If it is desired to drive one or more attaching nails in the breast portion of the heel an additional piece 26 of the tubular material from which the insert 12 is made may be utilized, as illustrated in the modified form of heel shown in Fig. 4.

Under certain circumstances it may be desired to provide the attaching face of the heel with a fabric or other covering, as shown at 28 in Fig. 5, and this may easily be done since the presence of the insert 12 will not interfere with the vulcanization and adhesion of such a covering to the heel.

It will be observed that there is no waste of material whatever in making a heel according to the present invention and that all the manufacturing operations are simple and easily performed by unskilled labor, with the result that the cost of manufacture is reduced to a minimum while the heel itself is of superior quality.

Having described the invention, what is

claimed as new and desired to be secured by Letters Patent is:

1. A nail anchoring insert for rubber heels consisting of a collapsible tube of woven material capable of being bent to U shape without kinking.

2. A nail anchoring insert for rubber heels consisting of a hollow tube of woven material the meshes of which are disposed diagonally to its axis.

3. A nail anchoring insert for rubber heels consisting of a hollow tube made of bias mesh textile fabric.

4. A rubber heel having vulcanized therein a flattened tubular fabric nail anchoring insert.

5. A rubber heel having vulcanized in its attaching face a U-shaped fabric insert folded into a plurality of layers and presenting folded inner and outer edges.

6. A rubber heel having vulcanized therein a woven fabric insert conforming generally in shape to the outline of the heel and having a continuous, folded edge.

7. A rubber heel having embedded therein a multi-ply, one piece nail anchoring insert, the plies of which are approximately parallel to the tread face of the heel.

8. The process of making a rubber heel which consists in forming a hollow nail anchoring insert, assembling the hollow insert with a mass of uncured rubber, molding the rubber into heel form, collapsing the insert and vulcanizing the insert and rubber together.

9. The process of making a rubber heel having a nail anchoring insert embedded therein which consists in forming a straight, hollow, tubular, nail anchoring element, bending said element to approximately the shape of the desired insert, assembling the insert and a mass of uncured rubber, molding the rubber into heel form, collapsing the insert, embedding the insert in the rubber and vulcanizing the insert and rubber together.

In testimony whereof I have signed my name to this specification.

EUGENE J. RAY.