S. J. & A. A. HARRIS.

RUBBER ARTICLE.

APPLICATION FILED OCT. 31, 1917.

1,266,936. Patented May 21, 1918.

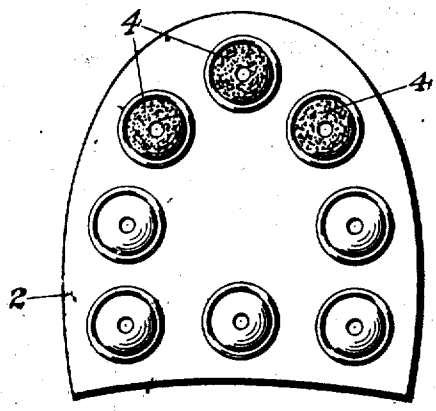


Fig 1

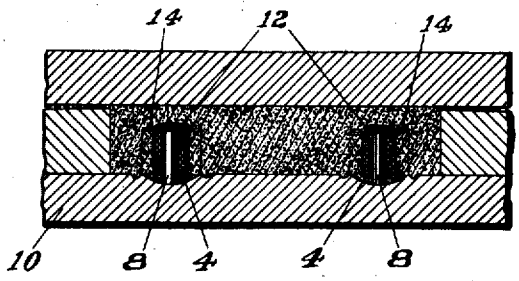


Fig 2

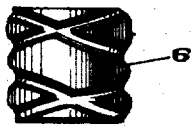


Fig 4

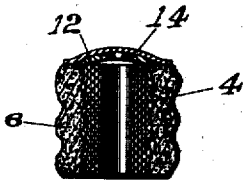


Fig 3

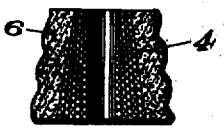


Fig 5

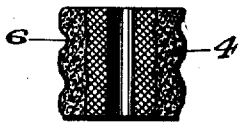


Fig 6

INVENTOR

Samuel J. Harris

and

Allan A. Harris

By their attorneys

McDermott & McCready.

UNITED STATES PATENT OFFICE.

SAMUEL J. HARRIS AND ALLAN A. HARRIS, OF RANDOLPH, MASSACHUSETTS.

RUBBER ARTICLE.

1,266,936. Specification of Letters Patent. Patented May 21, 1918.

Application filed October 31, 1917. Serial No. 199,405.

To all whom it may concern:

Be it known that we, SAMUEL J. HARRIS and ALLAN A. HARRIS, citizens of the United States, residing at Randolph, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Rubber Articles, of which the following is a specification.

This invention relates to rubber articles having surfaces that are subjected to severe wear, such for instance, as heels, soles, tires, crutch tips and the like, and it is particularly concerned with articles of this kind which are provided with friction plugs or inserts designed to prevent slipping or to increase the wear resisting qualities of the articles. These plugs or inserts usually are secured in the heel, sole or other article merely by the adhesiveness of the rubber, and in order to promote this adhesion it is usual to impregnate the parts of the plug with rubber cement prior to the vulcanizing operation. It is found, however, that the bond or union thus formed between the plug and the rubber body of the article is often destroyed after the article has been in service for only relatively a short time, or when it is subjected to a hard usage, and the plugs consequently are allowed to drop out of the article.

The present invention is directed to the solution of the problem presented by these conditions, and it aims to devise a thoroughly practical means for securing plugs of this character in rubber articles and to improve the methods of manufacture of rubber articles provided with inserts of this character.

The invention will be readily understood from the following description of the invention as embodied in a rubber heel and the novel features will be pointed out more particularly in the appended claims.

Referring now to the drawings,

Figure 1 is a plan view of the tread face of a rubber heel having several friction plugs embedded in it;

Fig. 2 is a transverse, cross sectional view through the molds in which the heel is formed and shows the construction of the plugs in the heel shown in Fig. 1;

Fig. 3 is a cross sectional view on a large scale of a friction plug of the construction shown in Fig. 2, and shows the plug provided with a cap and jacket;

Fig. 4 is a side elevation of the jacket of the plug shown in Fig. 3;

Fig. 5 is a cross sectional view of a somewhat different form of plug; and

Fig. 6 is a cross sectional view of another form of plug.

Fig. 1 of the drawings shows a heel 2 provided with three friction plugs 4 which are embedded therein and have their ends exposed at the tread face of the heel.

The plugs may be made out of any suitable material but according to the preferred method they are made of some textile fabric, such for instance, as canvas or duck impregnated or coated in the usual way with rubber cement and rolled on an arbor of an appropriate size. The roll of fabric so formed is then cut up to form plugs of the desired length. These plugs preferably are then pressed in suitable dies or presses to corrugate their peripheral surfaces or shape their peripheries in some manner that will serve to mechanically lock them in the body of the heel. In the construction shown in Fig. 3 the peripheral surface of the plug 4 has been corrugated as just described. A rubber jacket 6 is then rolled around the plug and is corrugated, as shown in Fig. 4, by using suitable dies or in any other convenient manner. If desired the plug may be partly vulcanized at this stage in the process of manufacture in order to give it more stability. Usually, however, this is not necessary. In assembling a heel the desired number of plugs are positioned on pins 8 in the molds 10. A washer 12 is then placed at the end of each plug on the tip of each pin 8, and finally a cap 14 which consists of a disk of sheet material, such for instance as canvas or duck suitably rubberized, is then placed over the washer 12. The rubber stock is placed in the molds in the usual way and the vulcanizing operations are performed in the usual manner. Obviously, if desired, the washer 12 and cap 14 could be assembled on the plug prior to placing the plug on the mold pin 8.

In following this process it is preferable to make the jacket 6 of a somewhat better composition than that which is ordinarily used for heels, and to use such a composition that it will unite or bond to the body of the heel and also to the plug more securely than the plug and the body of the

heel would bond to each other if the jacket were not present. In other words, the plug is bonded to the jacket and the jacket is bonded to the body of the heel. The composition of the jacket, of course, will depend upon the material used in making the plug and upon the composition used in the body of the heel; but the proper compound to be used in a given case will be obvious to those skilled in this art. This feature is regarded as very important regardless of the construction given to the jacket and the plug for the purpose of mechanically locking the plug in the heel. It is obvious, however, that the corrugating of the plug and the pressing of the jacket into the corrugations facilitates, through mechanical action, the locking of the plug in the heel. This corrugated construction of the plug and jacket also gives additional surface for the adhesion thereto of the adjacent bodies.

In the construction shown provision is made for driving nails or fastenings through the aperture in the plug and through the hole in the washer 12, which alines with said aperture, these fastenings coöperating with those driven through other parts of the heel to secure the heel to the shoe. The fabric cap 14 distributes the pressure which the nail head applies through the washer 12 to the adjacent parts of the heel, and its union with the jacket 6 also serves to secure the plug to the nail and thus enable the nail to exert a substantial amount of holding power on the plug independently of the adhesion of the plug to the body of the heel. This cap 12 also performs the additional function of preventing the rubber stock as it is forced into the mold during the process of manufacture from separating the plies of fabric. It will be noted that the plies of fabric that make up the plug 4 extend transversely to the tread face of the heel, while the cap 14 at the inner end of this plug extends substantially parallel to the tread face of the heel. Consequently, while the rubber stock is being forced into the mold against the end of the plug, the cap protects the inner end of the plug from the action of the stock that would tend to tear it apart and force it into a shapeless mass.

The plug shown in Fig. 5 is made by rolling fabric in the manner above described and then pressing it into the tapered form shown. This plug preferably is also provided with a jacket 6. When inserted in the heel, the small end of the plug is placed at the tread face of the heel, so that its tapered shape will assist in mechanically locking it in the heel independently of its union with the adjacent parts of the heel. It is obvious that if it were desired to use a solid plug the fabric would not be rolled on an arbor but the manufacturing processes otherwise would be the same.

Fig. 6 shows a construction in which the plug after being cut from the roll of fabric as above described is first incased in the jacket 6 without being corrugated and receives its corrugated form from the pressure transmitted through the jacket during the corrugation of the latter member.

While we have herein shown and described the best embodiments of the invention of which we are at present aware, it is obvious that these embodiments may be modified in many ways while still retaining the essential spirit and characteristics of the invention.

What we claim as new, is:—

1. A rubber article having a wear-receiving face, a friction plug embedded in said article and having a portion thereof exposed at said face, and a rubber jacket of substantial thickness for said plug bonded both to said plug and also to the body of said article.

2. A rubber article having a wear-receiving face, a friction plug embedded in said article and having a portion thereof exposed at said face, a rubber jacket of substantial thickness encircling said plug and mechanically and adhesively locked both to said plug and also to the body of said article.

3. A rubber article having a wear-receiving face, a friction plug embedded in said article and having a portion thereof exposed at said face, said plug comprising a plurality of plies of fabric extending transversely of said face, and a disk of fabric covering the inner end of said plug.

4. A rubber article having a wear-receiving face, a friction plug embedded in said article and having a portion thereof exposed at said face, said plug consisting of a roll of fabric having the plies thereof running transversely of said face, and a disk of fabric at the inner end of said plug extending substantially parallel to said face.

5. A rubber article having a wear-receiving face, a friction plug embedded in said article and having a portion thereof exposed at said face, said plug consisting of a hollow roll of fabric, a washer at the inner end of said plug having an aperture formed therethrough in alinement with the aperture in said plug, and a disk of fabric covering said washer.

6. A friction insert for a rubber article having a wear-receiving face, comprising a plug of friction material having its outer surface corrugated, and a rubber jacket of substantial thickness adhesively secured to said corrugated surface and fitting into the corrugations.

7. A friction insert for a rubber article having a wear-receiving face, comprising a roll of fabric having the layers of said roll extending substantially parallel to the axis of the roll and the outer surface of said roll

having corrugations formed therein extending circumferentially thereof.

8. That improvement in the process of manufacturing rubber articles provided with friction inserts, which consists in interposing a rubber jacket of substantial thickness between said insert and the body of the article of such a composition that it will bond both to the article and to the insert more securely than the insert and article would bond to each other.

9. That improvement in the process of manufacturing rubber articles provided with friction inserts, which consists in providing an insert, incasing said insert in a rubber jacket of substantial thickness, operating on said insert and jacket to lock them together, and vulcanizing said insert and jacket in the body of the article.

10. That improvement in the process of manufacturing rubber articles provided with friction inserts, which consists in utilizing a rubber jacket of substantial thickness to incase said insert and secure the insert and article together.

In testimony whereof we have signed our names to this specification.

SAMUEL J. HARRIS.
ALLAN A. HARRIS.

Witnesses:
EDITH L. FRENCH,
HUBERT F. FRENCH.