This invention relates to soles and methods of making the same, and is an improvement of the article and method disclosed in my co-pending application Serial No. 401,179, filed July 5, 1941, Patent No. 2,361,938, issued on November 27, 1944. It is particularly directed to an outside for a shoe, slipper or like article of footwear. It has been found that soles, such as described in my co-pending above-mentioned application, when made with reclaimed rubber or rubber of poor quality, there is insufficient penetration of the rubber into the fibers during the molding operation. When such a sole is subjected to rough wear the fiber strips or braid, being soft, squash down or flatten tending to tear away from the rubber and eventually causing spreading of the sole. It is therefore an object of this invention to provide an improved method of making outsides of the character described which will prevent spreading. This object is attained by incorporating into the braid during the braiding operation a thread or core or strand of uncured rubber or moldable plastic material which will integrate with the moldable strip between the braid whereby to facilitate integration or connection of the strips wound with the braid.

A further object of this invention is to provide an improved outside of the character described constructed to prevent spreading by incorporation into the braid of a metallic wire or filament passing through the braid.

Another object of this invention is to provide a sole of the character described which will withstand a great deal of wear and hold its shape.

Another object of this invention is to provide an improved method for making an outside of the character described in which integrating of the moldable material during the molding operation is facilitated.

Yet another object of this invention is to provide a strong, rugged and durable outside of the character described which shall be relatively inexpensive to manufacture and which shall yet be practical and efficient to a high degree in use. Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the combination of steps, features of construction, combinations of elements, and arrangement of parts which will be exemplified in the apparatus and method hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible illustrative embodiments of this invention, Fig. 1 is a side view of a piece of braid with which the improved sole embodying the invention is made, and showing the strands, the cores, and the strip of moldable material opened up for the purpose of illustration;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a top plan view of a sole made in accordance with the present invention;

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 1 but illustrating a modified construction;

Fig. 6 is a view similar to Fig. 5 but illustrating a further modified form of the invention;

Fig. 7 is a view similar to Fig. 6 and illustrating still another modified form of the invention; and

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 7.

Referring now in detail to the drawing, Fig. 10 designates a sole embodying the invention. The sole is made by winding into the general shape of an outside, a braided strip 11 shown in Fig. 1, to one side of which has been attached a strip 12 of uncured rubber or moldable plastic material such as "Vinylite," acetyl, ethyl cellulose or any other suitable plastic material.

The braid 11 may be made from strands of cotton, jute, flax, sisal or manila. The braid 11 may be made as shown in Fig. 1 for the purpose of illustration, of 3-ply, 3-carrier braid, braided about parallel cores 16. Thus Fig. 1 shows a 3-carrier, 3-ply construction as there are three strands 15 coming off each spool, and there are spools or carriers during the braiding operation, as is well known in the art.

The braid 11 although shown for the purpose of illustration as a 3-carrier, 3-ply braid may of course, be of any other suitable construction.

The cores 16 are preferably made of uncured rubber or plastic material.

Extending through one or both of the cores 16 or encased therein, may be a thin flexible filament or wire such as steel, magnesium alloy, copper or any other suitable metal. Furthermore, filament, thread or wire 18 may be twisted with, or lie alongside a thread or core of uncured rubber or moldable plastic material. Filament 18 may also be a thread of cotton, jute, manila, vegetable fiber or any other suitable material. The strip 12 may be narrower than the braid, and the edges 12a thereof are preferably spaced from the upper and lower edges 11a of
the braid. The strip 12 may be extruded and rolled between rollers together with the braid 11. The strip 12 is in tacky condition as it comes from the extruder and is pressed against one side of the braid 11 and sticks thereto.

The braid 14 is made using uncured rubber or moldable plastic cores during the braiding operation. The braid together with the strip 12 stuck thereto is wound into the general shape of an outsole in the usual manner, and the wound outsole is then placed in a mold and molded under heat and pressure. The uncured or plastic cores therewith before the molding operation, which will fuse with the moldable filament or strand therein, during the molding operation to prevent spreading open of the sole when given rough wear.

The strips 12 as well as the cores 15 or yarns 15a or 15b or the sheath 40 may be made of moldable material in which is incorporated strands or threads, preferably of lengths from about ½” to 4”. One way of obtaining such material is by grinding carcasses of tires and then mixing with rubber, either reclaimed or new or plastic material together with vulcanizing compounds. The fiber content of this material gives additional strength. Thus the vulcanizable material with the threads of enhanced strength. Of course, any suitable threads may be added to either new or reclaimed rubber or plastic material in order to mix the threads with the vulcanizable material.

It will thus be seen that there is provided an article and method in which the several objects of the invention are achieved, and which is well adapted to meet the conditions of practical use. As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth, or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An outsole made of wound braid comprising strands of fibrous material, one or more cover strands of molded material, and one or more cores of molded material.

2. An outsole made of wound braid comprising strands of fibrous material, one or more cover strands of molded material, and molded material between the windings of the outsole.

3. An outsole made of wound braid comprising strands of fibrous material, one or more cover strands of molded material, and molded material between the windings of the outsole.

4. An outsole made of wound braid, said braid comprising cover yarn braided around cores, and including cover yarn of moldable material and cover yarn of textile thread, adjacent windings of said thread being fused together by said moldable material.

5. An outsole made of wound braid, said braid comprising cover elements braided around core elements, at least one of the cover elements comprising molded material, at least one of said core elements comprising molded material.

6. An outsole made of wound braid, said braid comprising cover elements braided around core elements, at least one of the cover elements comprising molded material, at least one of said core elements comprising molded material, one of said elements of moldable material having a flexible, substantially unstretchable filament embedded therein.

7. A sole made of contiguous braided strip portions having a core, and cover yarn of moldable material, and cover yarn of fibrous thread, the molded cover yarn of adjacent strip portions being fused.

8. An article made of contiguous strip portions having strands of moldable material, and fibrous strands, the moldable strands of adjacent strip portions being fused together to unite said strip portions.

9. A sole comprising a wound braided strip, said strip comprising a core, and cover yarn of.
thermoset material and cover yarn of fibrous thread, the thermoset yarn in adjacent windings of the braided strip being fused together and penetrating the fibrous threads to unite the windings.

10. A sole comprising a wound braided strip, said strip comprising cover yarn of thermoset material and cover yarn of fibrous thread, the thermoset yarn in adjacent windings of the braided strip being fused together and penetrating the fibrous threads to unite the windings, said braided strip having core yarns of textile thread about which the cover yarns are braided.

11. A sole made of a wound strip of textile material, the thickness of the sole being equivalent to the width of said strip, said strip comprising fibrous yarn and thermoset yarn, the thermoset yarn in adjacent windings of the strip being fused together and penetrating the fibrous yarn to unite the windings.

12. A sole made of a wound strip of textile material, the thickness of the sole being equivalent to the width of said strip, said strip comprising fibrous yarn and thermoset yarn, the thermoset yarn in adjacent windings of the strip being fused together and penetrating the fibrous yarn to unite the windings, the thermoset yarn having a core of fibrous thread.

13. An article of manufacture, comprising a braided strip wound in a single plane, said strip comprising cover yarn of thermosetting material and cover yarn of fibrous thread, the thermoset yarn in adjacent windings of the braided strip being fused together and penetrating the fibrous threads to unite said windings, said braided strip having cores about which the cover yarns are braided.

JON GREGG.

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