

May 26, 1936.

R. C. PIERCE

2,041,950

EXPANSIBLE COVER

Filed Aug. 5, 1935

2 Sheets-Sheet 1

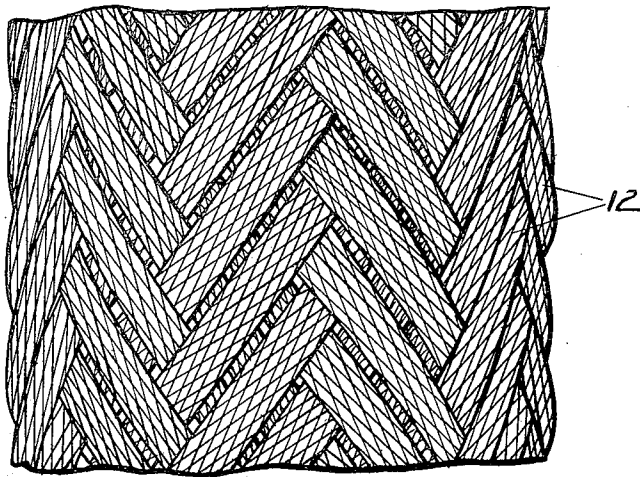
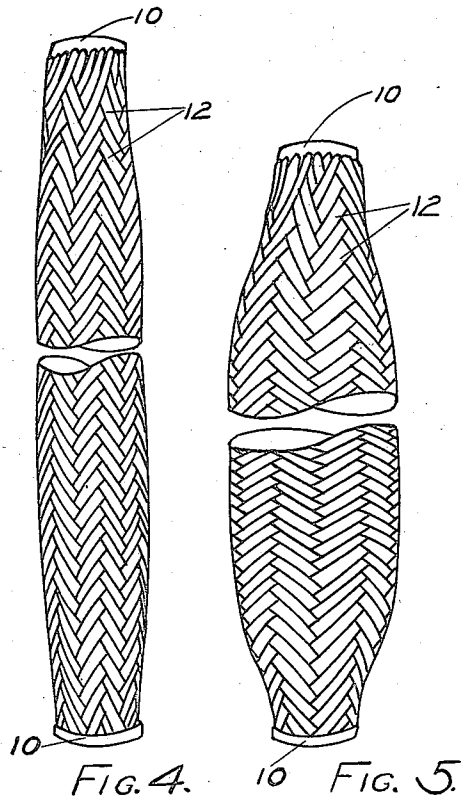
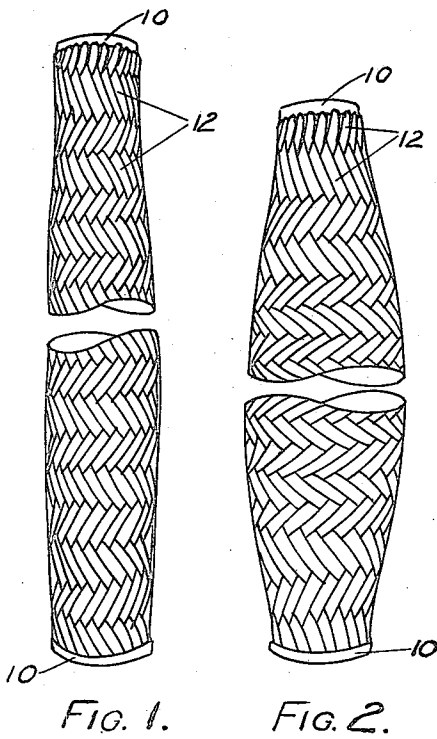


FIG. 6.

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2 Sheets-Sheet 2

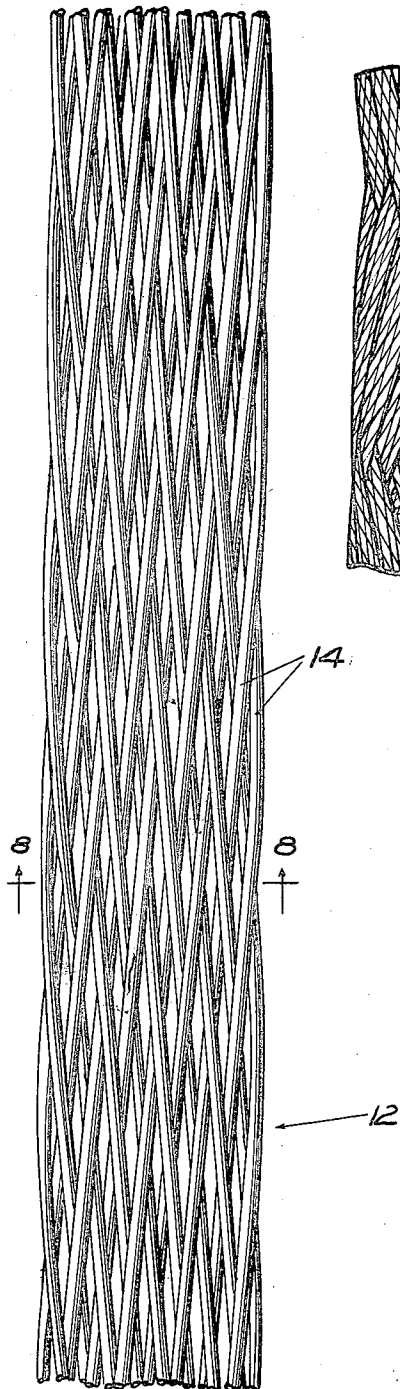


FIG. 7.

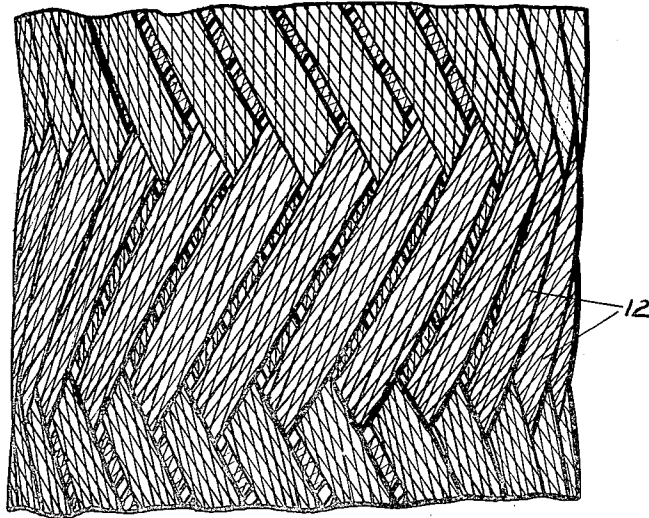


FIG. 3.

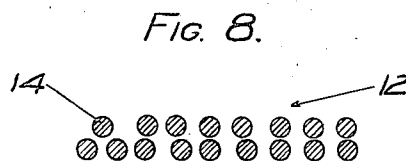


FIG. 8.

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UNITED STATES PATENT OFFICE

2,041,950

EXPANSIBLE COVER

Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Mich., a corporation of Michigan

Application August 5, 1935, Serial No. 34,672

2 Claims. (Cl. 96—25)

This invention relates to expansible tubular covers, and has for an object the construction of such a cover in a manner making it extremely strong while at the same time the resistance to expansion is minimized. I attain great strength by making the cover of wire braids, each consisting of wires extending the full length of the braid and which are braided together to form a flat tape of extremely great strength. The braids are connected to end members such as rigid end rings, and in order to insure a minimum of friction as they slide over each other in expanding the cover, they are so laid that each one goes alternately over and under three or more of the others. I prefer to have each one go alternately over and under four of the others, this arrangement being readily laid either by hand or by machine, and giving relatively long sections of braid sliding quite freely over or under, as the case may be, the four other braids.

The above and other objects and features of the invention, including various novel features of construction and arrangement, will be apparent from the following description of the illustrative embodiments shown in the accompanying drawings, in which:

Figure 1 is a side elevation of one embodiment, before it is expanded;

Figure 2 is a side elevation thereof after expansion;

Figure 3 is a partial side elevation thereof on a larger scale, showing the arrangement of the braids;

Figures 4, 5, and 6 correspond respectively to Figures 1, 2, and 3, but show a different braid arrangement;

Figure 7 is a plan view of a section of the braid; and

Figure 8 is a section through the braid.

Both forms of covers comprise broadly end members such as rigid metal rings 10 connected by a series of wire braids 12. As appears in detail in Figures 7 and 8, each of the braids 12 comprises wires 14, each of which extends the full length of the braid, so that the braid has the cumulative tensile strength of all the wires.

The wires are formed into a flat braid, as illustrated, and each braid is so arranged that it extends spirally about the cover, and is attached to the rings 10. They are shown welded or otherwise permanently secured to the lower ring 10, and as extending through slots in the upper ring and either secured thereto, or carried back down the other side of the cover so that both ends of each braid are secured to the lower ring and

the center is secured to the upper ring by passing through the slot.

Figures 1, 2, and 3 show one arrangement of the braids, and Figures 4, 5, and 6 show a somewhat different arrangement, but in both each braid goes alternately over and under at least three, and preferably four, of the others. In the drawings each braid is shown going alternately over and under four of the others.

In Figures 1, 2, and 3, the arrangement is such that the zones of braid sections on the exterior of the cover run circumferentially around the cover; in Figures 4, 5, and 6 these zones run lengthwise of the cover. The details of the braid arrangement in both cases are shown in Figures 3 and 6.

In both cases, in expanding the covers from the form shown in Figures 1 and 4 to that of Figures 2 and 5, an operation which also shortens the covers lengthwise as shown, the sections of braid which lie either over or under the intervening braids are long enough to slide freely, thus minimizing the resistance of the cover to expansion.

One use of the expanding cover is in coal mining or the like to replace the use of dynamite in blowing down the coal. The face of coal is undercut in the usual manner and a series of holes are drilled across the top of the face of a size to receive closely the covers in their contracted condition as shown in Figures 1 and 4. Covers are inserted in these holes with an expansible rubber bladder or the like in each cover and when the bladders are inflated the covers will expand as in Figures 2 and 5 increasing their diameters from two to two and one-half times and forcing the coal down. As the covers expand no interstices of appreciable size are opened up between the braids, and the bladders will be fully protected at all times.

While two illustrative embodiments have been described in detail, it is not my intention to limit the scope of my invention to those particular embodiments, or otherwise than by the terms of the appended claims.

I claim:

1. An expansible tubular metallic cover having rigid rings at its ends connected by a series of wire braids, each braid being connected to said rings at the ends of the cover and each consisting of wires extending the full length of the braid and braided together to form a flat braid extending spirally about the cover, said braids being laid so that each of them goes alternately under and over at least three of the others where-

by said cover expands readily when pressure is applied thereto internally.

2. An expansible tubular metallic cover having rigid rings at its ends connected by a series of wire braids, each braid being connected to said rings at the ends of the cover and each consisting of wires extending the full length of the

braid and braided together to form a flat braid extending spirally about the cover, said braids being laid so that each of them goes alternately under and over four of the others whereby said cover expands readily when pressure is applied thereto internally.

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