

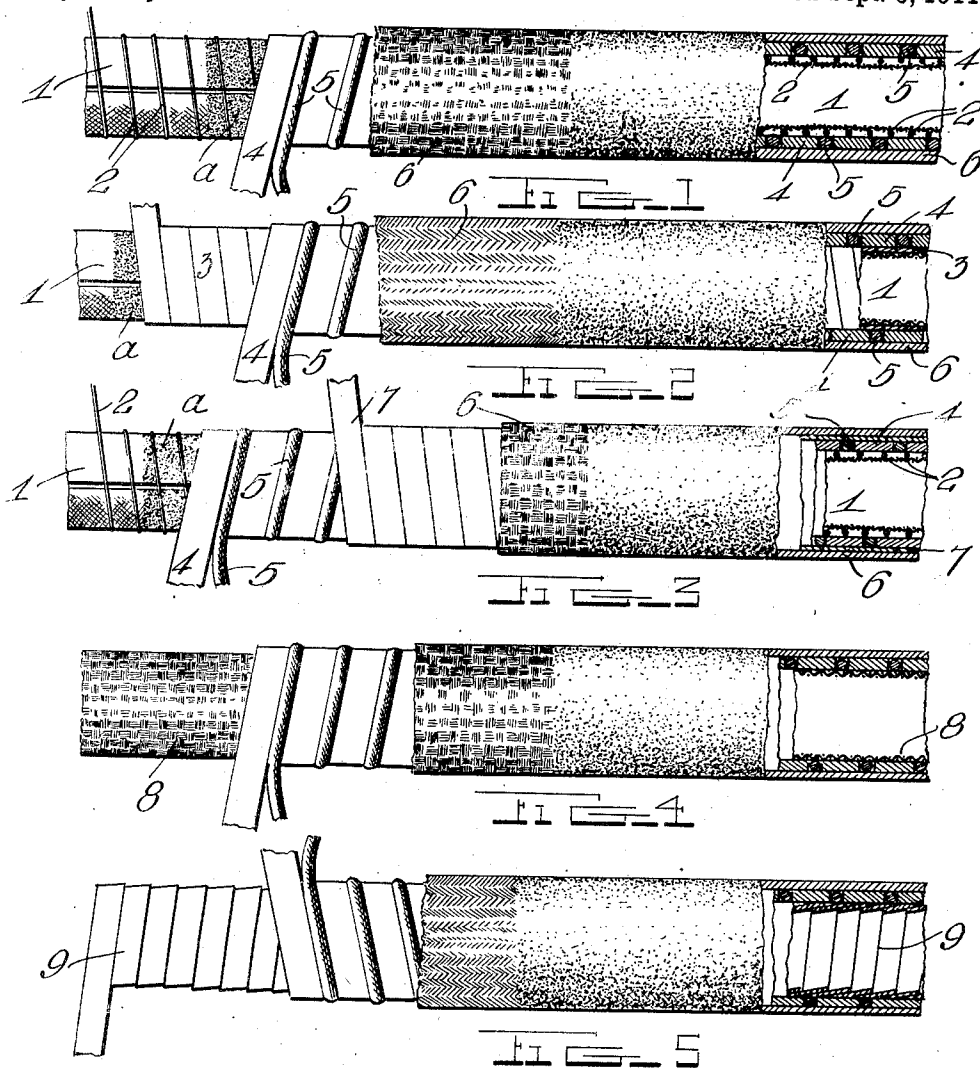
U. S. ARMSTRONG & J. H. PARKER.

FLEXIBLE CONDUIT.

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1,002,481.

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Witnesses

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ULYSSES S. ARMSTRONG, OF NEW KENSINGTON, PENNSYLVANIA, AND JOHN H. PARKER, OF CLIFTONDALE, MASSACHUSETTS.

FLEXIBLE CONDUIT.

1,002,481.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ULYSSES S. ARMSTRONG, a citizen of the United States, residing at New Kensington, in the county of Westmoreland and State of Pennsylvania, and JOHN H. PARKER, a citizen of the United States, residing at Cliftondale, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Flexible Conduits, of which the following is a full, clear, and exact specification.

This invention relates to improvements in flexible conduits.

The object of the invention is to provide a conduit of this character which may be readily bent to form curves without producing angles or sharp ridges in the material forming the fabric or cracking the compositions used in connection therewith.

With this and other objects in view the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings: Figure 1 is a side view partly in section of one form of the improved conduit having a woven outer covering and showing the manner in which the conduit is constructed; Fig. 2 is a similar view of the conduit having a braided covering and showing a different construction of the inner tube winding; Fig. 3 is a similar view showing a different construction of the wrapping from that shown in Figs. 1 and 2; Fig. 4 is a side view partly in section of a conduit having the same intermediate wrapping and outer covering as shown in Fig. 1 and illustrating a different form of inner tube the latter being shown in this instance as formed of a continuous woven fabric; Fig. 5 is a similar view showing the inner tube formed of a spirally wound adhesive tape having an intermediate wrapping of flat tape and cord as shown in Figs. 1 and 2 and an outer woven covering such as shown in Fig. 1.

In the embodiment of the invention as shown in Figs. 1, 2 and 3 of the drawings we provide an inner tube 1 formed of burlap, canvas or other suitable material which is stiffened with starch, glue sizing or other stiffening preparation and is formed in the desired size and shape upon a suitable

mandrel or other tube forming device. The edges of the material forming the inner tube are drawn and held together by means of a thread or adhesive tape which is tightly wound around the tube. In the form of the conduit shown in Fig. 1 of the drawings the inner tube 1 is wound with thread 2 and has applied thereto an adhesive or cementing preparation *a* which will retain the thread wrappings in place and firmly cement the fiber wrappings to the inner tube. In Fig. 2 of the drawings the inner tube 1 has also applied thereto an adhesive or cementing preparation *a* and is wound with a tape 3 of suitable width which when engaged with the adhesive surface of the inner tube will be thereby held in place thus securely binding the edges of the tube together. After the inner tube has thus been wound an intermediate wrapping is applied thereto said wrapping consisting of a flat strip or tape 4 and a round strip or cord 5. These strips are preferably formed of paper or fiber and are wound alternately around the inner tube as clearly shown in Figs. 1, 2 and 3 of the drawing. After the tube has thus been wrapped with the fiber strip and cord a covering 6 of braided or woven fabric is applied to the same over the strip and cord wrappings. In Fig. 1 the covering 6 is shown in the form of a woven fabric while in Fig. 2 this covering is shown in the form of a braided fabric.

In the form of the conduit shown in Fig. 3 of the drawings the inner tube may be wound and wrapped in the manner shown in either Fig. 1 or Fig. 2 of the drawings and is shown as being wrapped in the same manner as Fig. 1. After being thus wrapped an additional wrapping 7 which is preferably in the form of an adhesive tape is wound around over the fiber strip and cord wrapping as shown. After the adhesive tape wrapping 7 has been thus wrapped an outer covering 6 is applied thereto said covering being either of woven fabric as shown in Fig. 1 or as braided fabric as shown in Fig. 2 of the drawing. After the conduit has thus been formed the same is subjected to and saturated with a fire resisting and water proof composition after which powdered mica is applied to the outer surface of the conduit to relieve the same of stickiness from the composition applied thereto.

In Fig. 4 of the drawing is shown a modi-

5 fied form of inner tube 8, said tube being constructed of a woven fabric, and is formed as a continuous tube. The inner tube 8 has applied thereto the intermediate fiber and cord wrappings and an outer covering of either woven or braided fabric and is treated in the same manner as described in connection with the first forms of the conduit.

10 In Fig. 5 of the drawings, the inner tube 9 is shown as being formed from a spirally wound strip of adhesive tape and the inner tube when thus constructed has applied thereto a tape and cord wrapping, after which an outer cover of either braided or
 15 woven fabric is applied thereto and treated in the same manner as described in connection with the previous forms of the invention.

20 In the last form of the conduit, the inner adhesive tape tube has preferably applied to its inner surface powdered mica or similar material to relieve the same of any stickiness which may be caused by any uncovered inner surface of the adhesive strip or tape forming
 25 the same.

The use of a round cord alone for the intermediate wrappings in flexible conduits has not heretofore proven satisfactory. Owing to the small bearing surface of the
 30 cord on the inner tube, distortion of the tube would permit the cord to become detached from the tube and the tube would then collapse. The use of the flat strip alone has been unsatisfactory for the reason that,
 35 while it adhered firmly to the inner tube, the bending of the tube would cause the strip to break through the outer covering and moisture would then leak in and be absorbed by the fiber. In our conduit, we overcome
 40 all these objections by providing an intermediate wrapper consisting of spiral coils of

a flat strip and a round cord arranged alternately side by side, the flat strip adhering closely to the inner tube and preventing collapse of the same, while the cord acts as a
 45 hinge to accommodate bending and impart to the conduit the desired flexibility without permitting the excessive flexibility which existed when the round cord alone was employed.
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From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.
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Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended
 60 claim.

Having thus described our invention, what we claim is:

In a flexible conduit, the combination of an inner tube, an intermediate spiral wrapping applied exteriorly around said tube and consisting of a flat strip and a round cord having their coils alternating with each other, and an outer covering applied around said wrapping.
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In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.
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ULYSSES S. ARMSTRONG.
 JOHN H. PARKER.

Witnesses to signature of U. S. Armstrong:
 WM. G. YOHE,
 E. R. CRISS.

Witnesses to signature of J. H. Parker:
 JOSEPH KEEFE,
 HAYDEN M. SABEN.