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W. C. JOHNSON, JR., ET AL  
DOUBLE-Y MULTIPLE WALL ATTACHMENT

2,710,157

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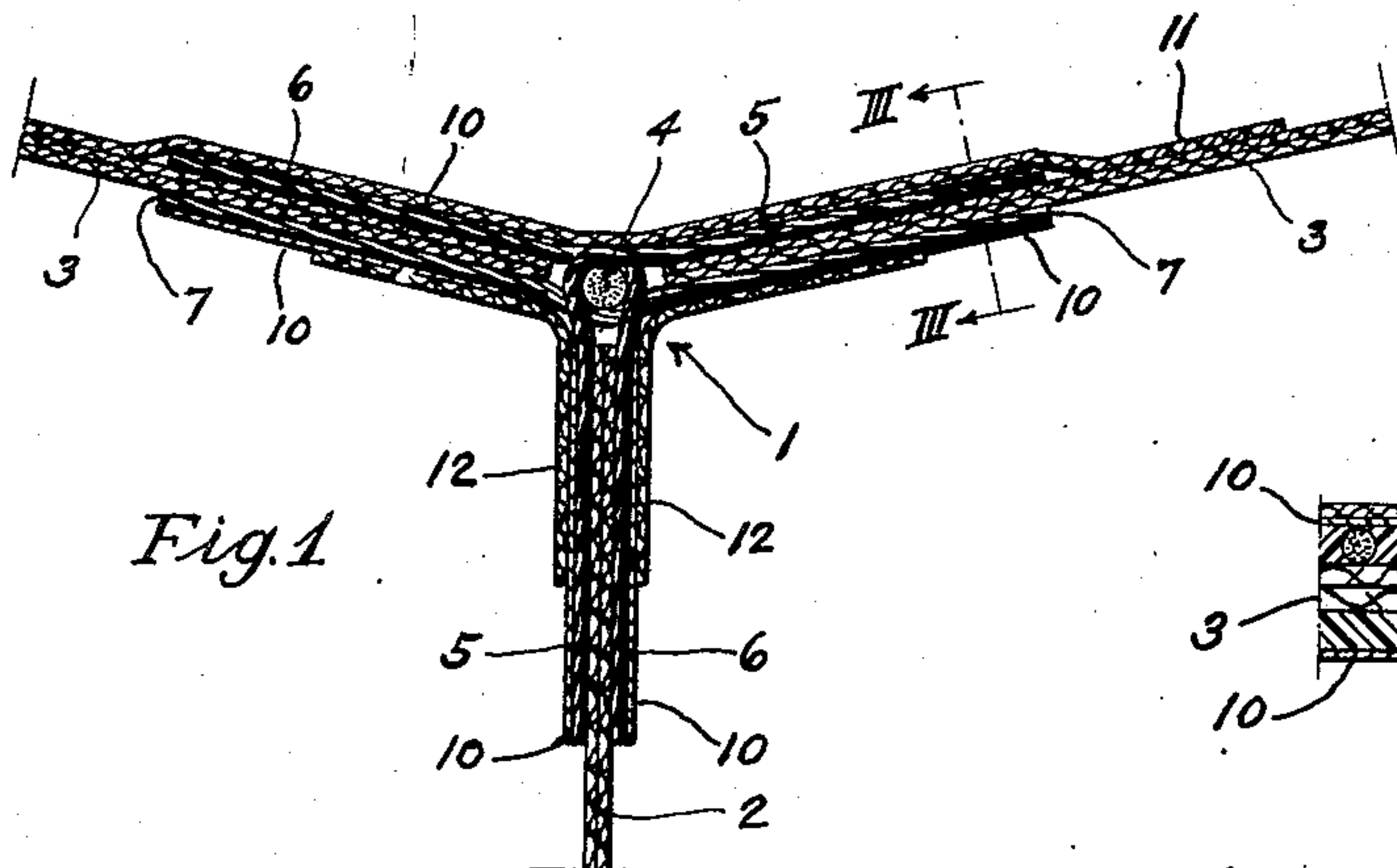


Fig. 1

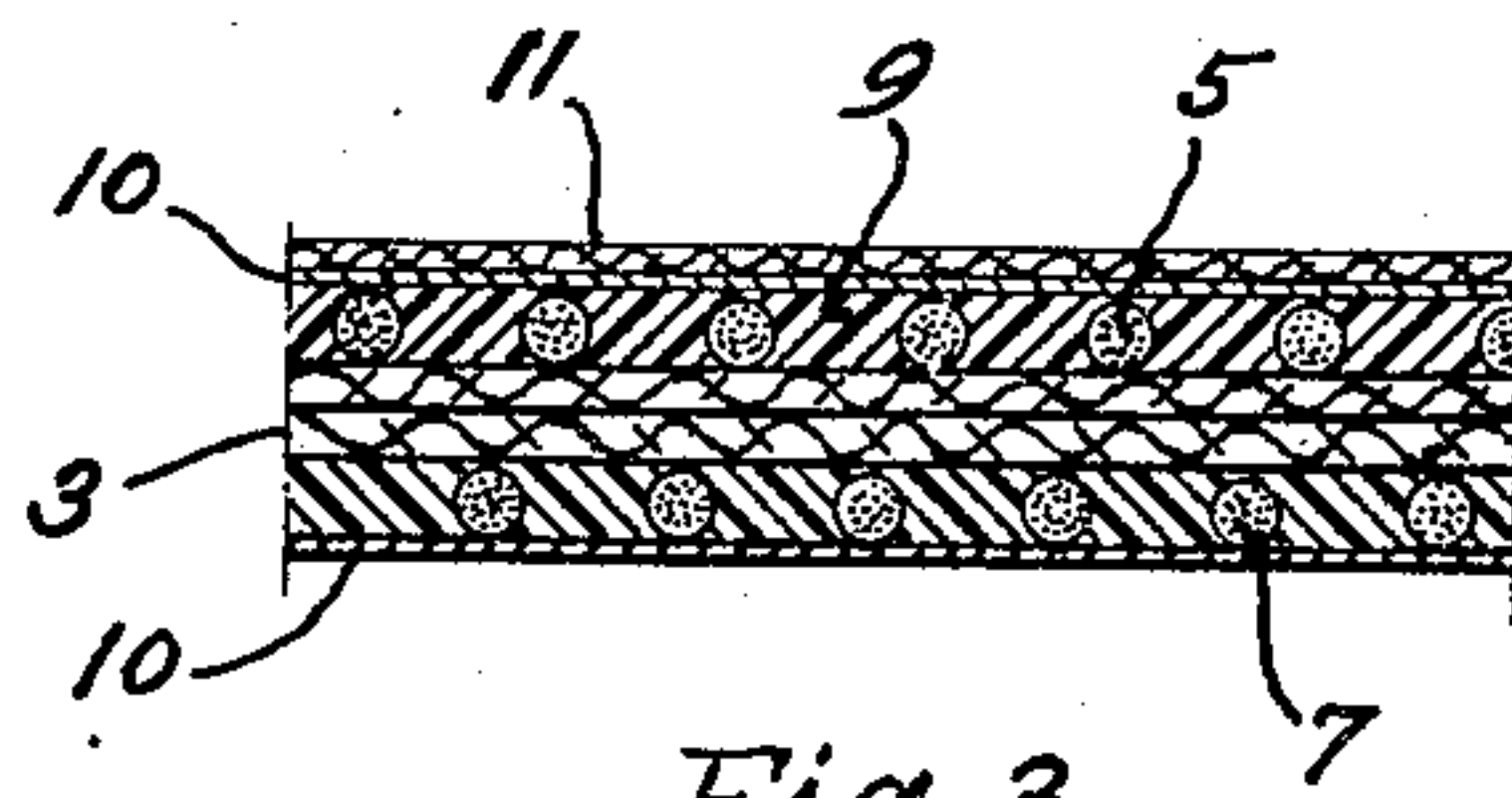


Fig. 3

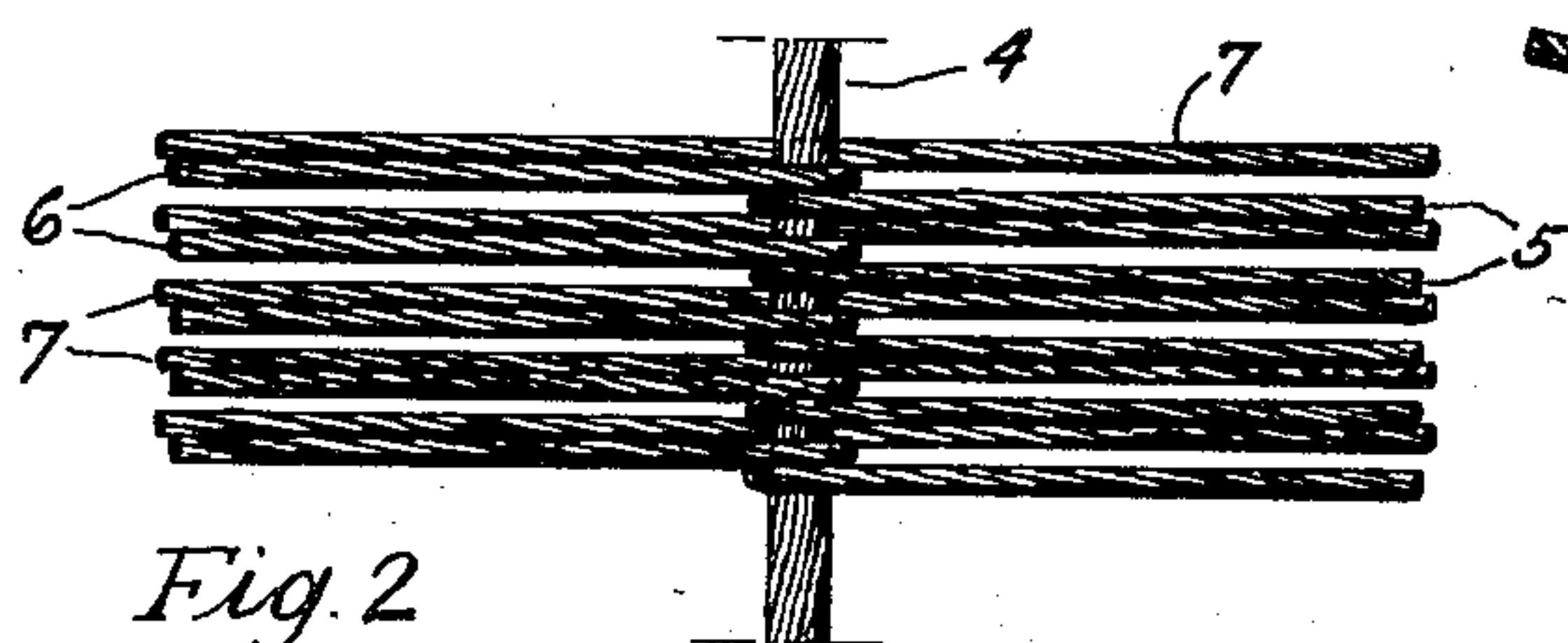


Fig. 2

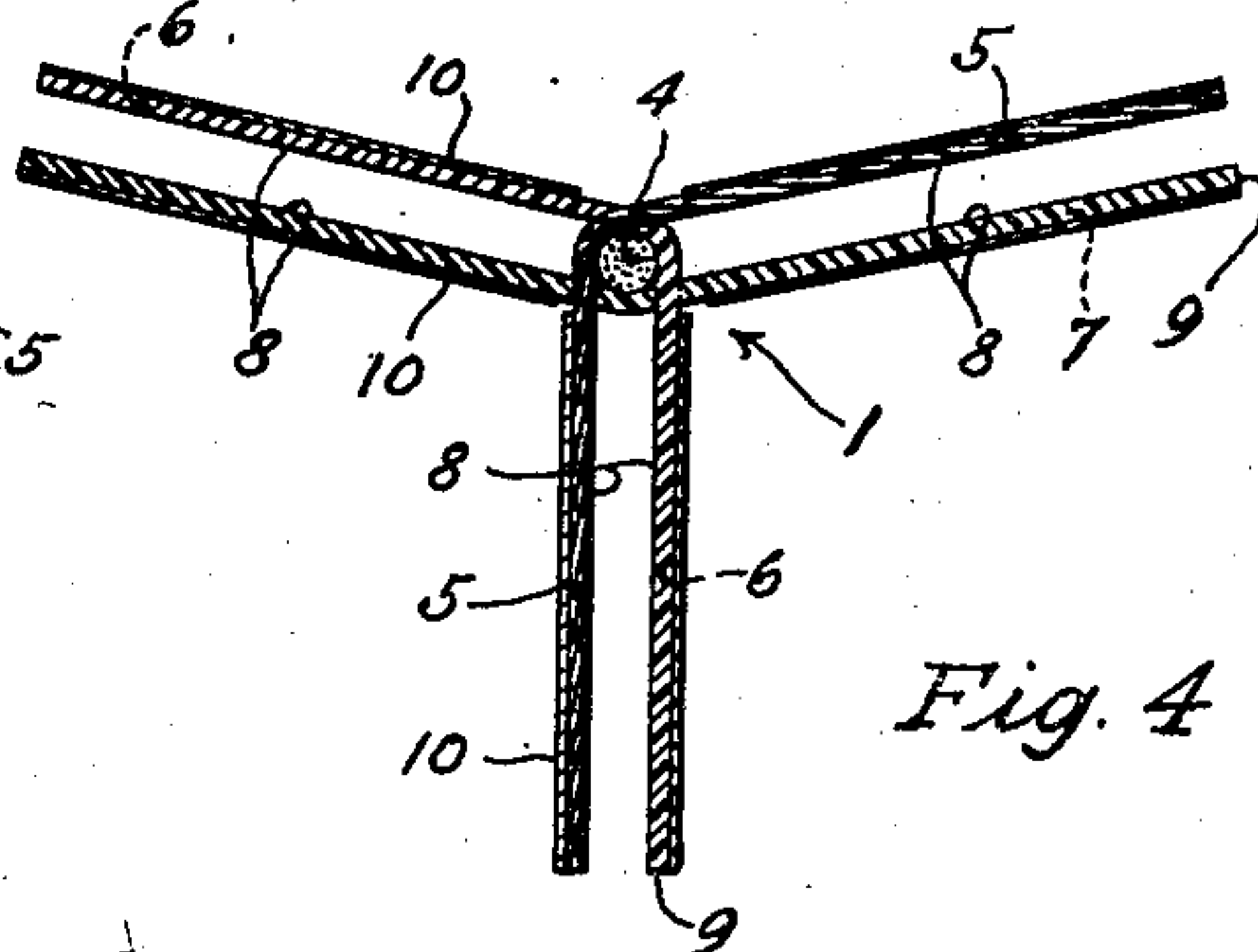


Fig. 4

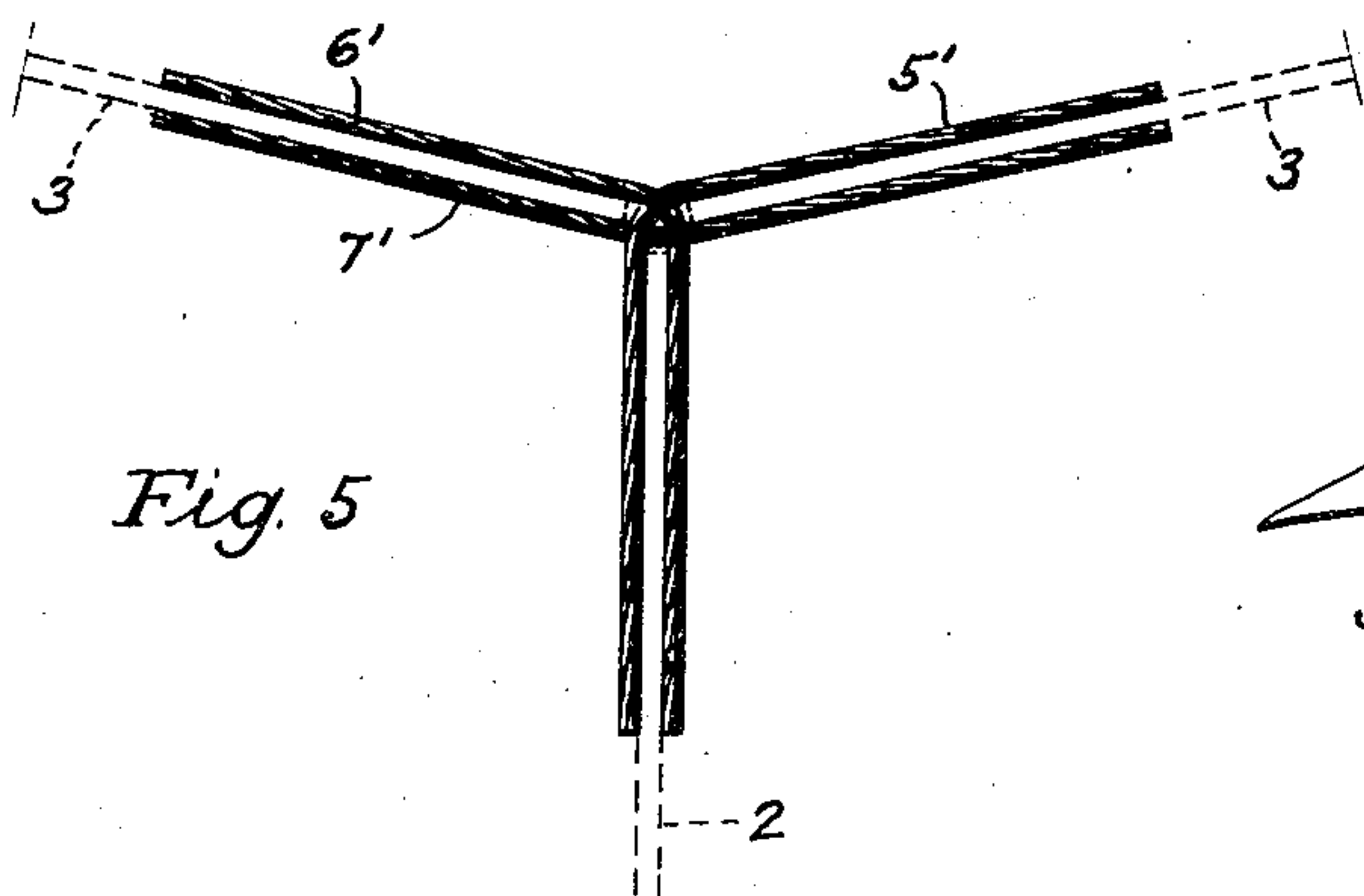


Fig. 5

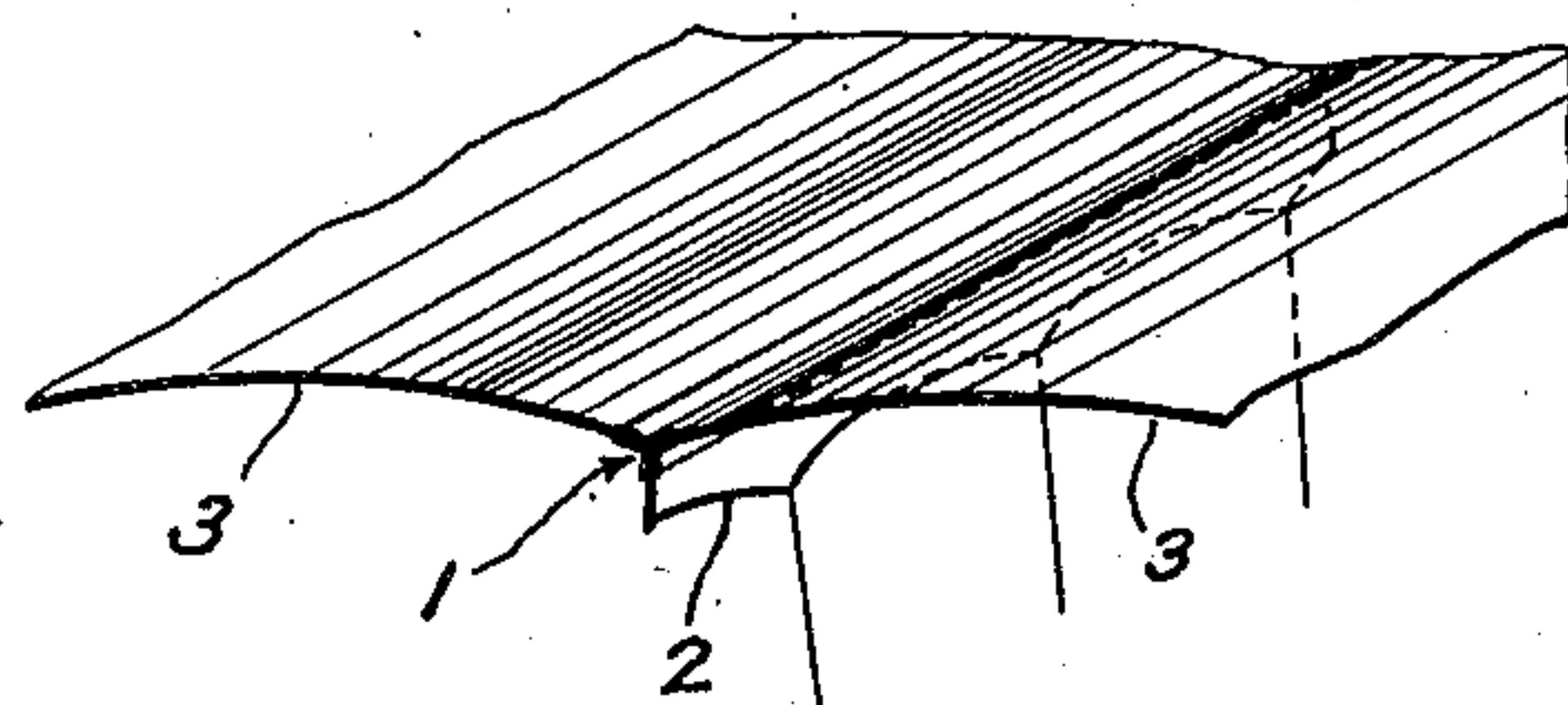


Fig. 7

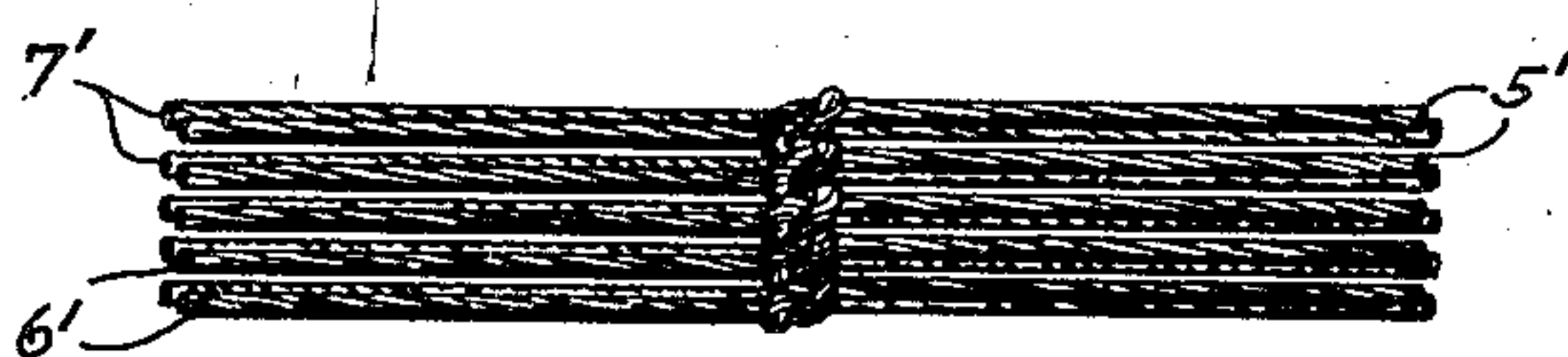


Fig. 6

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## DOUBLE-Y MULTIPLE WALL ATTACHMENT

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9 Claims. (Cl. 244—127)

This invention relates in general to the attachment of three or more walls along a common intersecting line and more especially to a prefabricated connecting means for attaching a loadcarrying catenary curtain to a non-rigid airship envelope.

Hitherto, it has been the practice to attach a catenary curtain made of rubberized fabric to an airship envelope by providing it along its fastening border with oppositely facing flanges cemented to the outer surface of to-be-joined sections of the envelope and covering the joint with protecting and sealing strips. Although such a joint serves its purpose, it is rather stiff and heavy and there is a tendency of distorting and weakening it because of its angular and eccentric connections.

It is the general object of the invention to avoid and overcome the foregoing and other difficulties of and objections to prior art practices by the provision of prefabricated attachment means suitable for connecting three or more sheets of fabric intersecting at a common line through which all forces are transmitted.

Another object of the invention is to use a prefabricated longitudinal connecting means of greatest possible strength combined with least weight for uniting at least three separate sheets of fabric along a common intersecting line.

Another object of the invention is to simplify the attachment of catenary curtains to an airship envelope.

The aforesaid objects of the invention and other objects which will become apparent as the description proceeds, are achieved by providing an attachment element for connecting three or more sheets of fabric. This element is formed by strips bent around a common axis and intersecting each other so that one strip connects together one side of two sheets and another strip connects together the other sides of these sheets. This is made possible by forming the strips of closely spaced cords running transversely of the strips and being tied together by rubber. A central strand may be used as support for the cords; however, the strand could also be omitted.

For a better understanding of the invention reference should be had to the accompanying drawings, wherein,

Fig. 1 is a cross-sectional view of one embodiment of the invention connected to a wall assembly,

Fig. 2 is a top view of Fig. 1, showing only the base structure of the attachment element,

Fig. 3 is a longitudinal cross-sectional view, in larger scale, taken on line III—III of Fig. 1,

Fig. 4 is a cross-sectional view of the pre-fabricated attachment element by itself,

Fig. 5 is a modification of the cord arrangement shown in Figs. 1 and 2,

Fig. 6 is a top view of Fig. 5, and

Fig. 7 is a perspective, fragmentary view of an airship envelope utilizing the invention.

Although the invention is shown for three sheets to be united, this type connecting element can also be used for uniting more than three sheets. Nor is this construction restricted to flexible fabric sheets but may be used for

rigid walls made of any material and for any purpose. Also, the base structure may be made of any suitable material such as glass fibre or metal fibres.

With specific reference to the form of the invention illustrated in the drawing the numeral 1 indicates in general a longitudinal attachment element particularly developed for connecting a catenary curtain 2 with airship envelope sheets 3. The attachment element 1, shown in Fig. 1, is suitable for uniting along a common axis three sheets of fabric and consists of a strand 4 about which are laid transversely thereof side by side rubberized cord pieces 5, 6 and 7 in angular configuration so that each set of cords crosses the other two sets of cords and which form together the basic structure for three spaced pairs of opposite attachment strips 8 for tying the sheets 2 and 3 together. Each cord forms a part of two non-parallel attachment strips, that is, they form together double Y shapes so that the tension forces from the catenary sheet 2 are transmitted by the most direct way into the sheets 3 of the envelope. A rubber filling 9 between the longitudinally spaced cords ties the cords 5, 6 and 7, respectively, together to make the attachment strips 8 continuous. Besides, thin rubberized fabric tapes 10 may be cemented to the outside of the strips 8 to prevent their edges from curling up. To make the connection gas tight, rubberized sealing strips 11 and 12 are provided, respectively, outside and inside thereof.

Although the use of the strand 4 is the preferred construction it may be omitted therefrom without serious consequences since the cords, then, will rest against the outer edges of the sheets.

A modification of the base structure, shown in Fig. 1, is that shown in Fig. 5, also without using a strand support, however, with the cords 5', 6' and 7' interlocking.

The term "fabric" is intended to include sheet material of various types, it being apparent that the attachment of the invention could be used to join sheet metal.

The term "Y-shape" as employed in the specification and claims is intended to include reasonable variations such as T-shaped or modifications thereof.

The terms "rubber and rubberized" shall include natural, as well as, synthetic rubber, or any substance having rubber like qualities.

From the foregoing description and illustrations of the invention it will be obvious that the construction of the attachment element is a considerable improvement over constructions of the prior art practice in that it is much stronger, lighter in weight, and more economical.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in this art that various changes and modifications may be made therein without departing from the spirit and scope of the invention.

What we claim:

1. A pre-fabricated longitudinal attachment element suitable for uniting at least three sheets of fabric subjectable to tension and radiating in different directions from a common axis, comprising a base structure consisting of rubberized cord pieces of angular configuration laid side by side in crossed relation to each other transversely of said element to form a plurality of pairs of spaced parallel rows of cords one pair being provided for each of said sheets, and rubber fillings between said cords tying them together transversely to form continuous attachment strips for both sides of each of said sheets.

2. A pre-fabricated longitudinal attachment element suitable for uniting at least three sheets of fabric subjectable to tension and radiating in different directions from a common axis, comprising a base structure consisting of rubberized cord pieces of angular configuration laid side by side in crossed relation to each other trans-



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versely of said element to form a plurality of pairs of spaced parallel rows of cords one pair being provided for each of said sheets, rubber fillings between said cords tying them together transversely to form continuous attachment strips for both sides of each of said sheets, and tapes cemented to the outside of each pair of the attachment strips.

3. A pre-fabricated longitudinal attachment element suitable for uniting at least three sheets of fabric subjectable to tension and radiating in different directions from a common axis, comprising a base structure consisting of a strand, rubberized cord pieces of angular configuration laid side by side in crossed relation to each other upon said strand to form a plurality of pairs of spaced parallel cord rows one pair being provided for each of said sheets, and rubber fillings between said cords tying them together transversely to form continuous attachment strips for both sides of each of said sheets.

4. A Y-shaped catenary curtain attachment for airship envelopes and the like including in combination a pair of envelope fabric sheets lying substantially at a flat angle to each other to form the arms of the Y, said sheets being slightly separated, a support fabric sheet extending in substantially angle-bisecting direction towards and spaced slightly from the separated sheets of the envelope to form the leg of the Y, a first plurality of rubberized cords connecting the bottom of the fabric sheets forming the arms of the Y, a second plurality of rubberized cords connecting the top of the fabric sheets forming one arm of the Y and the opposite side of the leg of the Y, and a third plurality of rubberized cords connecting the top of the fabric sheets forming the other arm of the Y and the other side of the leg of the Y, the first, second and third plurality of cords being alternated with each other to provide a substantially uniform load-bearing structure.

5. A Y-shaped catenary curtain attachment for airship envelopes and the like including in combination a pair of envelope fabric sheets lying substantially at a flat angle to each other to form the arms of the Y, said sheets being slightly separated, a support fabric sheet extending in substantially angle-bisecting direction toward and spaced slightly from the separated sheets of the envelope to form the leg of the Y, a first plurality of rubberized cords connecting the bottom of the fabric sheets forming the arms of the Y, a second plurality of rubberized cords connecting the top of the fabric sheet forming one arm of the Y and the opposite side of the leg of the Y, and a third plurality of rubberized cords connecting the top of the fabric sheet forming the other arm of the Y and the other side of the leg of the Y, the first, second and third plurality of cords being alternated and interlocked with each other to provide a substantially uniform load-bearing structure.

6. A Y-shaped catenary curtain attachment for airship envelopes and the like including in combination a pair of envelope fabric sheets lying substantially at a flat angle to each other to form the arms of the Y, said sheets being slightly separated, a support fabric sheet extending in substantially angle-bisecting direction towards and spaced slightly from the separated sheets of the envelope to form the leg of the Y, a first plurality of rubberized

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cords connecting the bottom of the fabric sheets forming the arms of the Y, a second plurality of rubberized cords connecting the top of the fabric sheets forming one arm of the Y and the opposite side of the leg of the Y, a third plurality of rubberized cords connecting the top of the fabric sheets forming the other arm of the Y, and the other side of the leg of the Y, the first, second and third plurality of cords being alternated with each other to provide a substantially uniform load-bearing structure and a cord-supporting strand element extending between the fabric sheets at the intersection of the arms and leg of the Y and about which each of the plurality of the cords is bent.

7. A catenary curtain attachment for airship envelopes and the like and including in combination a plurality of fabric sheets extending towards each other at an angle and spaced slightly apart at the point of intersection, and a plurality of sets of rubberized cords, each set of cords being connected to one side of a fabric sheet extending through the point of intersection and connected to one side of another fabric sheet, a sufficient number of sets of cords being used so that both sides of each fabric sheet are connected to another fabric sheet, the cords of the plurality of sets of cords being alternated with each other to provide a substantially uniform load-transmitting structure.

8. A catenary curtain attachment for airship envelopes and the like and including in combination a plurality of fabric sheets extending towards each other at an angle and spaced slightly apart at the point of intersection, and a plurality of sets of rubberized cords, each set of cords being connected to one side of a fabric sheet extending through the point of intersection and connected to one side of another fabric sheet, a sufficient number of sets of cords being used so that both sides of each fabric sheet are connected to another fabric sheet, the cords of the plurality of sets of cords being alternated and interlocked with each other to provide a substantially uniform load-transmitting structure.

9. A catenary curtain attachment for airship envelopes and the like and including in combination a plurality of fabric sheets extending towards each other at an angle and spaced slightly apart at the point of intersection, a strand element extending between said fabric sheets, and a plurality of sets of rubberized cords bent over said strand element, each set of cords being connected to one side of a fabric sheet extending through the point of intersection and connected to one side of another fabric sheet, a sufficient number of sets of cords being used so that both sides of each fabric sheet are connected to another fabric sheet, the cords of the plurality of sets of cords being alternated with each other to provide a substantially uniform load-transmitting structure.

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