Sept. 9, 1941. C. E. PINK 2,255,452

WIRE FABRIC

Filed Aug. 29, 1939

Fig. 1.

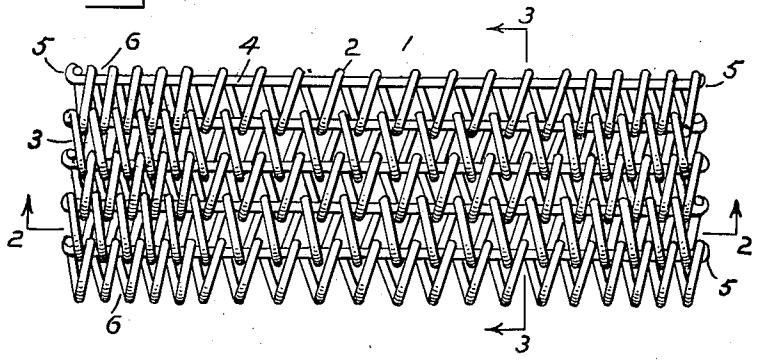


Fig. 2.

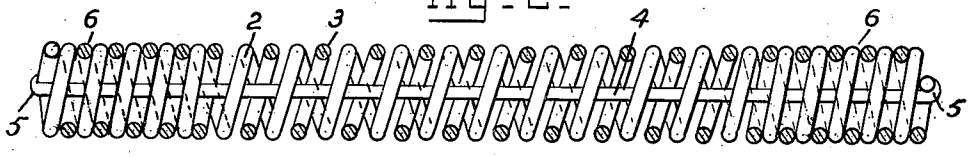


Fig. 3.

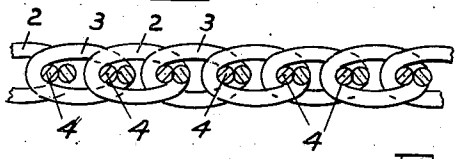


Fig. 4.

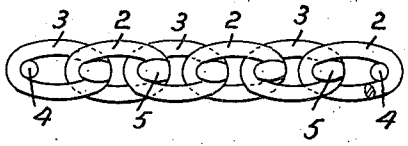


Fig. 5.

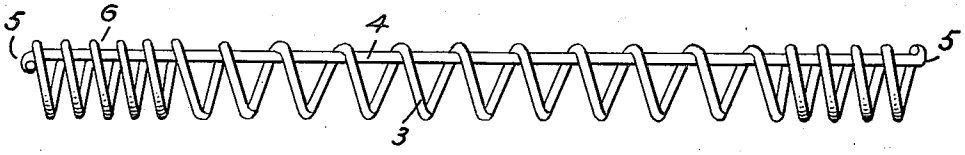


Fig. 6.

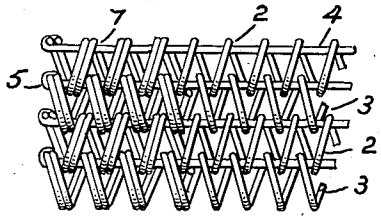


Fig. 7.



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UNITED STATES PATENT OFFICE

2,255,452

WIRE FABRIC

Clarence E. Pink, Cambridge, Md.

Application August 29, 1939, Serial No. 292,490

12 Claims. (Cl. 245—6)

This invention relates to improvements in woven wire fabrics, and particularly to spiral woven wire fabrics of that type made up of non-interlaced spiral elements hingedly connected to each other by cross rods to give a desired degree of flexibility to the fabric. More particularly the invention relates to a selvage construction of fabric of this character adapted for use as a conveyor belt wherein the spirals of the belt are prevented from moving longitudinally along on the hinge rod, thereby keeping the convolutions of the body portion in proper relation to each other.

In the manufacture of conveyor belts of spiral fabrics it has been found that forming the belt of like spiral elements provided with spirals wound in the same direction is objectionable in causing a considerable side travel or creeping of the belt in operation. This objection has been overcome, to at least a fairly satisfactory extent, by constructing the belt fabric of hingedly connected spiral elements wound in opposite directions and alternating in arrangement with each other, the opposite windings tending to produce a balancing action to prevent such side travel or creeping of the belt. Such spiral fabric belts (known to the trade as "balanced belts") as heretofore constructed, however, do not lend themselves to the use of straight connector rods for hingedly connecting the spiral elements together without unpreventable and undesirable tendency of the spiral elements to shift transversely of the belt on the rods, thereby varying the size of the openings of the belt. To overcome this difficulty it has been the practice to employ crimped rods, the crimps of which engage the convolutions of the spiral elements, to prevent such undesirable shifting movements thereof. Laboratory tests and practical belt service operations show that a belt constructed with crimped connector rods is open to certain objections as compared with a belt constructed of straight connector rods in that a belt constructed of straight connector rods has greater tensile strength and less width contraction than a belt constructed with crimped connector rods.

One object of my invention is to provide a belt formed of non-interlaced coils connected by hinge rods, with a selvage formed of spiral convolutions more closely associated with each other than the convolutions of the body fabric.

A further object of the invention is to provide a balanced spiral fabric belt which allows of the highly satisfactory use of straight connector rods, increasing the tensile strength and reducing the width contracting tendency of the belt, while preventing lateral shifting of the spiral elements with relation to one another on the rods.

A still further object of the invention is to provide a balanced spiral fabric belt having a novel construction of selvaged edges reinforcing and giving ruggedness to the belt and serving also to firmly hold the spirals in predetermined relation to each other without materially reducing the flexibility of the belt.

A still further object of the invention is to provide a balanced spiral fabric belt which attains these objects in a simple and effective manner.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which—

Fig. 1 is a plan view of a portion of a balanced spiral fabric constructed in accordance with the invention.

Fig. 2 is a vertical transverse section through the fabric taken on line 2—2 of Fig. 1.

Fig. 3 is a vertical longitudinal section through the fabric taken on line 3—3 of Fig. 1.

Fig. 4 is a view in side elevation of the fabric.

Fig. 5 is a view of one of the spiral elements and the cross connector rod connected therewith.

Fig. 6 is a plan view showing a modified manner of forming a selvage.

Fig. 7 is a view of one of the spiral elements shown in Fig. 6.

In the form of embodiment of the invention as herein exemplificatively disclosed in Figs. 1 to 5, inclusive, 1 designates a balanced spiral fabric comprising spiral elements or strands 2 and 3 alternating in arrangement with each other. These elements or strands 2 and 3 are similar in construction to each other except that they are spirally wound in opposite directions so that the coils or convolutions extend in opposite directions to produce a balancing action and thereby prevent side travel or creeping of the fabric in its use as a conveyor belt during operation. In accordance with the invention the spiral elements are non-interlaced, that is to say, the coils or convolutions of adjacent spiral elements are not directly meshed or engaged with each other but are hingedly connected by cross connector rods or strands 4 which extend through the spirals of adjacent coils from side to side of the fabric or between the opposed longitudinal edges of the fabric. The ends of these cross rods are

suitably secured to the ends of the elements 2 and 3 in any suitable manner, as by welding, as indicated at 5, so as to hold the parts assembled and to allow free swing of the elements 2 and 3 on the rods in a direction perpendicular to the plane of the fabric. Preferably the elements 2 and 3 are so wound or are so compressed in a direction perpendicularly to the plane of the fabric as to make their convolutions of generally oval or elliptical form and so as to dispose the major axes of the convolutions in the direction of length of the fabric. By this means the cross rods 4 are brought to lie in the ends of the loops formed by the convolutions of the spiral elements, the cross rod connected to the ends of any spiral element being thus engaged freely with the loops of the convolutions of an adjacent spiral element.

The fabric is provided at and in the region of two of its opposed margins, as in the region of its longitudinal side edges, with reinforced portions 6. These reinforced portions are formed by lateral compression of two or more end convolutions of each spiral element so as to dispose such convolutions closer together than the remaining or intervening convolutions of the spiral element. This construction prevails throughout the length of the fabric with the result of providing the fabric with rugged selvages materially increasing its strength and wearing qualities. These reinforcing portions or selvages also perform several other important and desirable functions, namely, (1) that of reinforcing the fabric longitudinally, (2) that of reinforcing the fabric laterally and preventing contraction of the fabric, (3) that of preventing lateral shifting of the spiral upon the straight wire connectors, and (4) that of preventing relative movements of adjacent spiral elements in a direction transversely of the fabric.

As stated, balanced belts are generally made with crimped wire rod connectors instead of straight wire connectors in order to prevent lateral shifting of the spiral elements upon the connectors, which would occur in the use of straight wire connectors in balanced belts as heretofore constructed. Also as stated, it has been found not only by laboratory tests but in actual belt service, that a balanced belt having straight wire connectors possesses greater strength and resistance to contraction than belts employing crimped connector wires. The present invention by the provision of the reinforcing selvages 6 overcomes the above stated objection to balanced belts using straight wire connectors and permits of the use of straight wire connectors in place of the weaker crimped wire connections in such manner as to prevent relative shifting of the spiral elements and connectors and produce a stronger and more desirable belt and one highly resistant to contracting action. This is of importance from the standpoint of maintaining a uniform conformation of the belt and preventing non-uniformity of the mesh openings, which should remain their original size and shape in order that the belt may best serve to purpose for which it was designed.

It will, of course, be understood that the width of the reinforcing or selvage portions may be varied as desired by varying the number of end convolutions of the spiral elements which are laterally compressed. It is also to be understood that these reinforcing or selvage portions may be formed, as described, of convolutions of the elements 2 and 3 or by the use of equivalent means at the ends of these elements. Figs. 6 and 7 illustrate, for example, another embodiment of my invention in which the closely associated convolutions at the edges of the belt are obtained by threading one or more short coils 7 between the normally spaced end convolutions of each belt spiral, so that they will embrace the two rods within said spiral in the same manner as shown in my Patent No. 1,895,345 for Connectors for woven wire conveyor belts.

What I claim is:

1. A balanced spiral fabric comprising alternately arranged spirally coiled elements wound in opposite directions, each two adjacent spiral elements being hingedly connected by a straight wire rod extending transversely of the fabric through the convolutions of said elements and fixed at its ends to the end convolutions of one of the spiral elements, certain of said elements including coil portions adjacent to the side edges of the fabric more closely related than the coil portions disposed therebetween in the width of the fabric to provide selvages at the sides of the fabric operating to prevent lateral shifting of the spiral elements in relation to each other.

2. A balanced spiral fabric comprising alternately arranged spiral elements wound in opposite directions, each two adjacent spiral elements being hingedly connected by a straight wire rod extending transversely of the fabric through the coils of said spiral elements and fixed at its ends to the terminal coils of one of the spiral elements, certain of said elements including coils at the side edges of the fabric compressed to be closer together than coils at other points in the width of the fabric to provide selvages.

3. A balanced spiral fabric comprising alternately arranged oppositely wound spiral elements, each two adjacent spiral elements being hingedly connected by a straight wire rod extending transversely of the fabric through the convolutions of said spiral elements and connected at its ends to the end convolutions of one of the spiral elements, said spiral elements having a plurality of their end convolutions at each side of the fabric compressed in the direction of width of the fabric to lie in closer relation to each other than their intervening convolutions so as to provide selvages stiffening the spiral elements against lateral shifting in relation to each other.

4. A balanced spiral fabric made up of alternately arranged oppositely wound spiral elements having flattened convolutions of substantially elliptical form disposed with their major axes in the direction of length of the fabric, each two adjacent spiral elements being hingedly connected by a straight rod extending through the convolutions of said spiral elements and fixed at its ends to the extremities of one of the spiral elements, and loosely engaged by all the convolutions of the other spiral element, said spiral elements having a plurality of their end convolutions at each side of the fabric compressed in the direction of width of the fabric to lie in closer relation to each other than their intervening convolutions so as to provide selvages stiffening the spiral elements against lateral shifting in relation to each other.

5. A balanced spiral fabric structure made up of parallelly arranged spiral elements, each two adjacent spiral elements being hingedly connected by a straight cross rod extending through the convolutions of one of the spiral elements and fixed at its ends to the end convolutions of said spiral element and loosely engaged by the convolutions of the other spiral element, and selvage forming means at the sides of the fabric operat-

ing to prevent relative lateral shifting of the convolutions of the spiral elements on the rod.

6. A balanced spiral fabric structure made up of parallelly arranged spiral elements, each two adjacent spiral elements being hingedly connected by a straight cross rod extending through the convolutions of one of the spiral elements and fixed at its ends to the end convolutions of said spiral element and loosely engaged by the convolutions of the other spiral element, said fabric structure including spiral elements having more closely spaced convolutions at the sides of the fabric than at points therebetween forming selvages and stops operating to prevent lateral shifting of the spiral elements in relation to each other.

7. A spiral fabric comprising parallelly arranged, non-interlaced spiral elements, each two adjacent spiral elements being hingedly connected by a straight wire rod extending through their convolutions transversely of the fabric and fixed at its ends to the end convolutions of one of said elements, the side edges of said fabric having convolutions of said spiral elements more closely related than convolutions at other points in the width of the fabric to provide selvages.

8. A wire fabric comprising non-interlaced single strand long wire coils extending in parallel relation across the fabric from side to side thereof, and short wire coils wound similarly to and coaxially with a plurality of end convolutions of each long coil at and adjacent to each side edge of the fabric, said short coils extending from the side edges of the fabric only partially across the fabric and having their convolutions forming with the adjacent convolutions of said single strand long coils multiple strand selvages at the side edges of the fabric, and a wire rod extending through the convolutions of each long single strand coil and fixed with relation to said coil, said rod also extending through and being loosely engaged by the convolutions of an adjacent long coil and hingedly connecting said long coils with each other.

9. A wire fabric comprising long wire non-interlaced single strand coils extending in parallel relation across the fabric from side to side thereof, some of said long coils being wound in one direction and others of said long coils being wound in the opposite direction, and short coils wound similarly to and coaxially with a plurality of end convolutions of each long coil at and adjacent to each side edge of the fabric, said short coils extending from the side edges of the fabric only partially across the fabric and having their convolutions forming with the adjacent convolutions of said single strand long coils multiple strand selvages at the side edges of the fabric, and a wire rod extending through the convolutions of each long coil and fixed with relation to said coil, said rod also extending through and being loosely engaged by the convolutions of an adjacent long coil and hingedly connecting said long coils with each other.

10. A wire fabric comprising alternately arranged single strand long wire coils wound in opposite directions and extending in parallel non-interlaced relation across the fabric from side to side thereof, and short wire coils wound similarly to and coaxially with a plurality of end convolutions of each long coil at and adjacent to each side edge of the fabric, said short coils extending from the side edges of the fabric only partially across the fabric and having their convolutions forming with the adjacent convolutions of said single strand long coils multiple strand selvages at the side edges of the fabric, and a wire rod extending through the convolutions of each long coil and fixed with relation to said coil, said rod also extending loosely through the convolutions of an adjacent long coil and hingedly connecting said coils with each other.

11. A spiral wire fabric structure made up of parallelly arranged non-interlaced spiral elements, and a wire rod extending through the convolutions of each spiral element and fixed with relation to said element, said rod also extending through the convolutions of an adjacent spiral element and hingedly connecting said elements together, said fabric structure including convolutions at the sides of the fabric more closely related than intervening convolutions to provide selvages.

12. A balanced spiral fabric comprising parallelly arranged non-interlaced spiral elements, each two adjacent spiral elements being wound in opposite directions, and a wire rod extending transversely of the fabric through the convolutions of each spiral element and fixed at its ends to the end convolutions of said element, said rod also extending through and being loosely engaged by the convolutions of an adjacent spiral element and hingedly connecting said elements together, the side edges of said fabric having convolutions of said spiral elements compressed in the direction of width of the fabric to dispose said convolutions to lie closer together than convolutions at other points in the width of said fabric to provide selvages.

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