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R. J. GUBA

2,214,739

WIRE FABRIC

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Fig. 1.

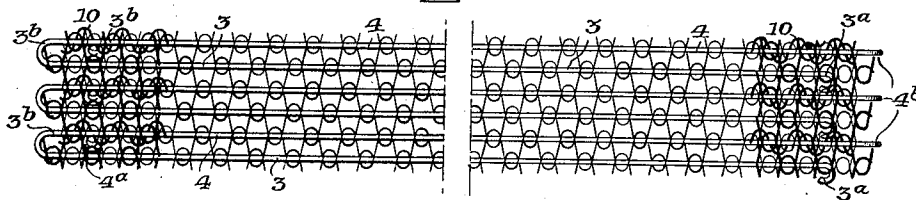


Fig. 3.

Fig. 2.

Fig. 4.

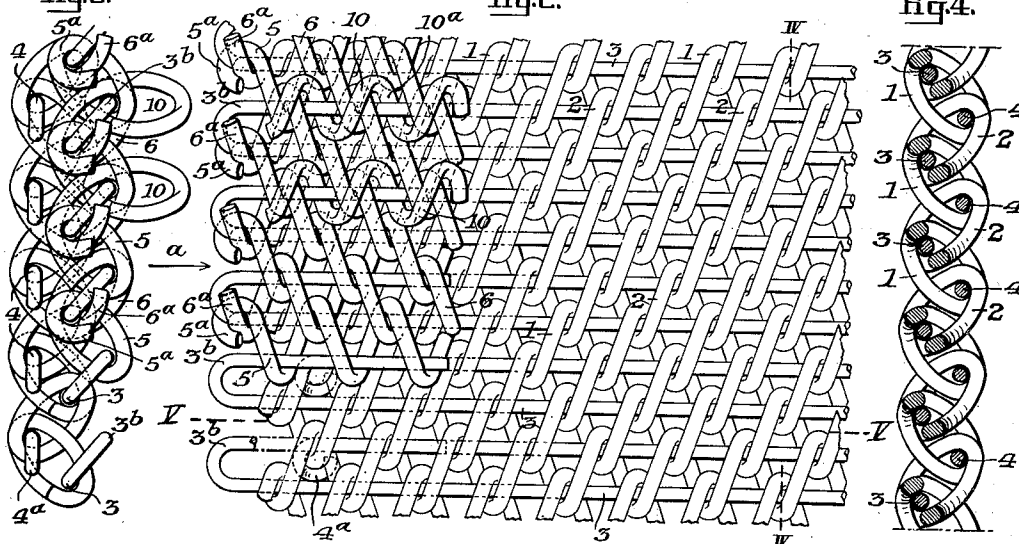
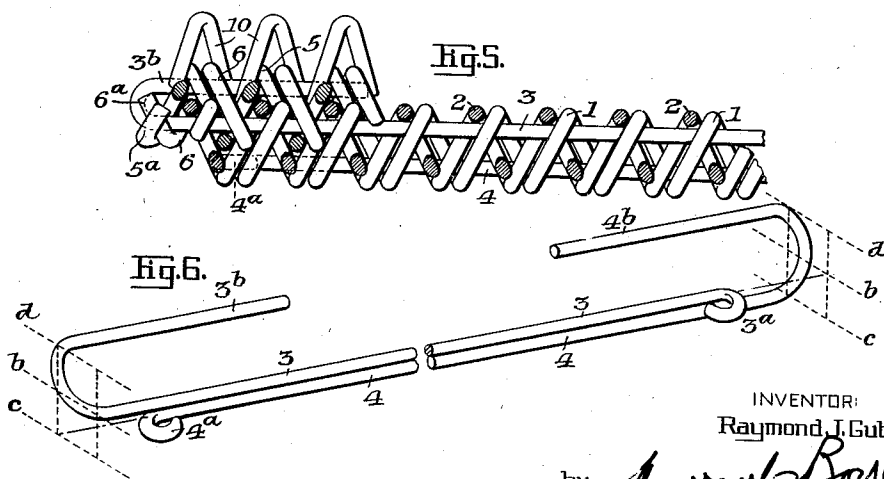


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE

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WIRE FABRIC

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19 Claims. (Cl. 198—193)

My invention relates to wire fabrics or structures made from helically coiled wires which are interlocked with each other in lateral relation, and to belts constructed from a plurality of such helically coiled wires connected together in interlocked relation longitudinally of the belt.

One object of my present invention is to provide a structure of the stated type with reinforcing selvages made up of short helically coiled wires in interlocked relation disposed at each side or edge of the belt longitudinally of the same; such reinforcing wires having a twist opposite to that of the belt wires.

A further object of my invention is to provide the helically coiled wires making up the belt with straight wire connectors which may extend the full width of the belt structure; each of said straight wire connectors having one end connected to one of the helices of belt wire while the other end has a return bend overlying the helically coiled belt wires and is associated with the short helically coiled wires to form the reinforcing selvages. The return bends of the connector wires alternate throughout the extent of the fabric on opposite sides or edges of the belt.

A further object of my invention is to arrange the cross wire connectors in two planes whereby their association with the helices of the belt wires will cause the latter to present a corrugated condition upon both surfaces of the belt; such corrugations extending transversely of the same.

A further object of my invention is to provide the short helically coiled wires associated with the return bends of the straight wire connectors and other portions of the same with additional short sections of helically coiled wires which will occupy a position substantially at right angles to the coils of the first named short wires, that is to say, the greatest dimension of the coils or helices of such additional wires will be disposed normally to the general plane of the belt or the reinforcing selvages thereof. These additional wires serve as retaining selvages to prevent discharge of articles or material conveyed by the belt.

These and other features of my invention are more fully set forth hereinafter; reference being had to the accompanying drawing, more or less diagrammatic in character, in which:

Fig. 1 is a diagrammatic plan view of a portion of a belt constructed in accordance with my invention.

Fig. 2 is an enlarged fragmentary view of a part of a belt structure of the type shown in Fig. 1, illustrating the several sets of helically

coiled wire making up the belt and one selvage portion thereof.

Fig. 3 is an elevation of an edge of the belt structure, looking in the direction of the arrow *a*, Fig. 2.

Fig. 4 is a sectional view on the line IV—IV, Fig. 2.

Fig. 5 is a sectional view of the line V—V, Fig. 2, and

Fig. 6 is a perspective view illustrating a detail of my invention.

Referring to the drawing, it will be noted that Fig. 1 illustrates diagrammatically a section of a belt structure showing both selvages of the same and indicating generally the features of the invention.

In carrying my invention into effect I produce a fabric of helically coiled wires in interengaging relation; that is to say, each wire—all being of the same helical formation, right or left as the case may be—is twisted into interlocking engagement with the directly adjacent wires at each side of the same. Between the bights of the helices or coils of the respective wires making up such fabric, I introduce cross connector wires or rods which are substantially the full width of the belt and these rods or wires are disposed in two planes so that the respective helically coiled wires extending transversely of the belt are canted slightly with respect to the general plane of the belt longitudinally of the same.

The result of this canting of the respective helically coiled wires produces a corrugated condition transversely of the belt and considering any pair of wires of such belt structure, one wire of such pair will be canted in one direction and the next adjacent wire will be canted in another direction, and so on throughout the entire extent of the belt. In other respects, the fabric is substantially the same as the flexible fabrics heretofore made of helically coiled wires. This corrugated condition of the belt prevents slippage of articles conveyed thereby.

The cross connector wires do not extend quite the full width of the belt and their opposite ends are of different formation. One end of each wire is provided with a return bend of a length substantially equal to the width of the selvages proposed to be employed, and these return bends of the respective wires occupy positions in planes above the planes of the upper cross connector wires and are spaced the same distance from the planes of said upper cross connecting wires as the latter are spaced from the planes of the lower cross connecting wires. These return bends are

utilized in the building up of the reinforcing and retaining selvages at the edges of the belt. The other end of each cross connector wire is looped around or otherwise connected with a coil or helix of one of the belt wires with which it is associated.

The return bends of the cross connector wires occupy different positions or relations at opposite sides of the belt; a condition that is clearly illustrated in Fig. 6 which shows, diagrammatically, the panes of the upper and lower cross connector wires, indicated at *b* and *c* and the planes of the return bends of the same, indicated at *d*. In this view it will be noted that the left ends of the upper cross connector wires are provided with return bends and that these return bends are laterally offset so that they occupy a position in substantially vertical alignment with the lower cross connector rods or wires, and this arrangement provides cross wire portions in proper relation for engagement by the belt wires as well as by the short helically twisted wires from which the selvages are built up. At the right side of the belt, however, it is the cross connector wires of the lower plane that are provided with the return bends, and these return bends are disposed in the same vertical plane as the cross wires of which they are part. It will be understood of course, that the relation of the cross connector rods or wires may be reversed without departing from my invention.

From this it will be observed that the cross wire portions at each side of the belt occupy positions which permit engagement of the helically coiled belt wires in the canted relation and also for the connection of the short helically coiled wires which make up the selvage portions.

In the present instance the main belt fabric is made up of helically coiled wires in interlocked relation, and inasmuch as it may be desirable to describe several portions of the belt in the exact relation occupied, it would seem to be desirable to describe the helically coiled belt wires in pairs and to consider, referring to Figs. 2 and 4, that the helically coiled wires indicated at 1, are those which are inclined toward the left, while the helically coiled wires indicated at 2, are those which are inclined toward the right.

Between the bights of each pair of wires at their interengaging portions, cross connector wires are placed in separate, and to a certain extent, predetermined planes; the connector wires of the upper plane being indicated at 3 and the connector wires of the lower plane being indicated at 4.

Upon referring to Figs. 2 and 6, it will be noted that the connector wires 3 are provided at one end, the right hand end in the present instance, with a hooked portion 3^a for engagement with a coil or helix of one of the wires through which it passes, while the opposite ends have the return bends 3^b which are offset laterally with respect to the main portion of said connector wires so as to overlie the connector wires 4, disposed in the lower plane, as clearly indicated in Figs. 2 and 3. At the other edge or selvage portion of the belt, the return bends 4^b of the lower cross connector wires 4 lie in the same vertical planes as said wires while the plane of said return bends 4^b longitudinally of the belt is substantially the same as the return bends 3^b of the connector wires 3. The opposite ends of the wires 4 are provided with hooked portions 4^a for connection with a coil or helix of one of the

helically coiled wires with which they are associated, in the same manner as the ends 3^a of the wires 3 are connected. It will be understood that these connections 3^a and 4^a are made after the cross wire connectors are assembled with the helically coiled wires making up the belt.

The section of belt fabric or structure illustrated in the drawing is shown as made up of wires of left hand twist, and it will be understood that the features of my invention may be employed with sections of belt fabric made up of wires having a right hand twist. In the construction of these belts it is the usual practice to make them of sections of right hand and left hand twist in alternate relation; such sections being joined by suitable connectors.

Figs. 2 and 3 of the drawing are largely diagrammatic and in order that the arrangement of the reinforcing and retaining selvages may be clearly understood, these views illustrate the several steps of building up the selvage portions.

In providing the reinforcing selvage portions of the belt I employ small helically coiled wires 5 and 6, which are shown in Figs. 2 and 3 with their respective outer ends 5^a and 6^a in looped relation or knuckled connection at the marginal edge of the belt fabric. These short helically coiled wires are interconnected with each other and with the cross connector rods or wires 3 and 4 and their respective return bends 3^b and 4^b, and in the present instance they are shown as having a twist opposite to that of the belt wires; the bights of said helically coiled wires 5 and 6 at one side of the same being engaged with the cross connector wires 3 and 4 in the spaces between the interengaging bights of the belt wires with which such cross connector rods or wires are associated, while the bights of said short wires 5 and 6 at their other side engage the respective return bends of the cross connector rods or wires. When such short selvage-forming wires are associated with the helically coiled belt wires they present the same corrugated appearance as the belt, as clearly indicated in Fig. 3.

In order to provide retaining selvages, which are built higher than the reinforcing selvages, I associate with the short wires, 5 and 6, whose helices are interengaged and looped around the connector rods or wires 3 and 4 and their respective return bends, 3^b and 4^b, other short helically coiled wires 10 which are separately connected to or interengaged with the return bends 3^b and 4^b of the wires 3 and 4, but are not connected together. The loops or bights 10^a of the short wires 10 which are interconnected with the return bends 3^b and 4^b lie in the spaces between the loops or bights of the wires 5 and 6 interconnected with such return bends. Additionally, these short wires 10 are disposed with the longer axis of their helices in planes normal to the plane of the belt. The shape of the helices of these wires 10, which are firmly anchored to the return bend portions 3^b and 4^b of the cross wire connectors by the tension of the short wires 5 and 6 which are also interengaged with the same, is such that they will stand up at the selvage portions of the belt in the position indicated in Fig. 3.

While the short helically coiled wires 10 which form the retaining selvages must be of the same pitch throughout so as to occupy the proper position with respect to the bights of the short helically twisted wires 5 and 6, the length of their

helices may vary in order that retaining selvages of different heights may be provided.

Various modifications may be made in the construction and arrangement of my improved belt fabric without departing from the spirit of my invention; all of which is deemed to be within the scope of the appended claims.

I claim:

1. A belt made up of a plurality of helically coiled wires in interengaging relation and extending transversely of said belt, and cross wires disposed in two planes and passing through the respective bights of pairs of said interengaged helically coiled wires; the relation of the cross wires with the helically coiled wires being such as to cause the latter wires to cant in opposite directions longitudinally of the belt and present transverse corrugations.

2. A belt made up of a plurality of helically coiled wires in interengaging relation and extending transversely of said belt, and cross wire connectors disposed in two planes and passing through the respective bights of pairs of said interengaged helically coiled wires; the relation of the cross wire connectors with the helically coiled wires being such as to cause the latter wires to cant in opposite directions longitudinally of the belt and present transverse corrugations on both surfaces of the belt and each of said cross wire connectors having a return bend overlying the helically coiled belt wires.

3. The structure set forth in claim 1, wherein the cross wires have return bends at opposite sides or margins of the belt, and short helically coiled wires disposed at the edges of the belt and interengaged with each other and with certain of the cross wires and their return bends.

4. The structure set forth in claim 1, wherein the cross wires have return bends at opposite sides or margins of the belt, and short helically coiled wires disposed at the edges of the belt and interengaged with each other and with certain of the cross wires and their return bends; said short wires having a twist opposite to that of the belt wires.

5. A belt made up of a plurality of helically coiled wires in interengaging relation and extending transversely of said belt, cross wires engaging the bights of said interengaged helically coiled belt wires; each of said cross wires having a return bend overlying the belt wires, and a series of separate short interengaging helically coiled wires disposed on top of the belt wires at the marginal edges of the belt and engaging said cross wire connectors and the return bends of the same.

6. A belt made up of a plurality of helically coiled wires twisted in one direction in interengaging relationship and extending transversely of said belt, cross wires disposed in two planes engaging the bights of said interengaged helically coiled belt wires; each of said cross wires having a return bend at one end in alternating relation and overlying the belt wires, and short helically coiled wires disposed on the top of the belt wires at the marginal edges of the belt and engaging said cross wires and the return bends of the same; said short wires having a twist opposite to that of the belt wires.

7. The structure set forth in claim 5, with a second series of short helically coiled wires independently connected with the return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set.

8. The structure set forth in claim 5, with a second series of short helically coiled wires independently connected with the return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set, said second series of short wires having a twist opposite to that of the wires of the first set.

9. The structure set forth in claim 5, with a second series of short helically coiled wires independently connected with the return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set; said second set of short wires being so disposed that the greatest axis of their coils is normal to the longitudinal plane of the belt.

10. The structure set forth in claim 5, with a second series of short helically coiled wires independently connected with the return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set; said second set of short wires being so disposed that the greatest axis of their coils is normal to the longitudinal plane of the belt and all of said short wires having a twist opposite to that of the belt wires.

11. A belt made up of a plurality of interconnected helically coiled wires transversely disposed, cross connector wires passing through the bights of each pair of adjacent interconnected helically coiled wires; each of said cross connector wires having a return bend at one end and a looped connection with one of the helices of a belt wire at the other end, and short coiled wires having their helices disposed in an opposite direction with respect to those of the belt wires and engaging said cross connector wires and the return bends of the same; said short coiled wires overlying the belt wires.

12. A belt made up of helically coiled wires transversely disposed in interconnected relation, cross connector wires disposed in two planes and passing through the bights of each pair of adjacent helically coiled belt wires; said connector wires having a return bend at one end and a looped connection with one of the helices of a belt wire at the other end, a series of short coiled wires having their helices disposed in an opposite direction with respect to those of the belt wires and engaging said connector wires and the return bends of the same at the marginal edges of the belt; said short coiled wires overlying the belt wires, and a second series of short coiled wires independently connected to the cross wire return bends between the short coiled wires of the first set and occupying an elevated position with respect to the same.

13. A belt made up of a plurality of helically coiled wires extending transversely of said belt, and cross wire connectors passing through the respective bights of pairs of said helically coiled wires and so disposed with respect to the same as to cause said wires to cant in opposite directions longitudinally of the belt and present transverse corrugations; each of said cross wire connectors having a return bend overlying the helically coiled belt wires, in combination with short helically coiled wires disposed at the edges of the belt and interengaged with each other and with certain of the cross wires and their return bands.

14. A belt made up of a plurality of helically coiled wires extending transversely of said belt, and cross wire connectors passing through the respective bights of pairs of said helically coiled

wires and so disposed with respect to the same as to cause said wires to cant in opposite directions longitudinally of the belt and present transverse corrugations; each of said cross wire connectors having a return bend overlying the helically coiled belt wires, in combination with short helically coiled wires disposed at the edges of the belt and interengaged with each other and with certain of the cross wires and their return bends and said short wires having a twist opposite to that of the belt wires.

15. A belt made up of a plurality of helically coiled wires extending transversely of said belt, cross wires engaging the bights of said helically coiled belt wires; each of said cross wires having a return bend overlying the belt wires, and a series of separate short helically coiled wires disposed on top of and interengaging with the belt wires at the marginal edges of the belt and engaging said cross wire connectors and the return bends of the same.

16. The structure set forth in claim 15, in combination with a second series of short helically coiled wires independently connected with the return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set.

17. The structure set forth in claim 15, in combination with a second series of short helically coiled wires independently connected with the

return bends of the cross wires and occupying an elevated position with respect to the short helically coiled wires of the first set; said second series of short wires having a twist opposite to that of the wires of the first set.

18. A belt made up of a plurality of helically coiled wires transversely disposed, cross connector wires passing through the bights of each pair of adjacent helically coiled wires; each of said cross connector wires having a return bend at one end and a looped connection with one of the helices of a belt wire at the other end, and short coiled wires having their helices disposed in an opposite direction with respect to those of the belt wires and engaging said cross connector wires and the return bends of the same; said short coiled wires overlying the belt wires.

19. A belt made up of a plurality of helically coiled wires extending transversely thereof, cross wire connectors passing through the respective bights of pairs of said belt wires; each of the cross wire connectors having a return bend overlying the belt wires, and supplemental helically coiled wires interconnected with the cross wire connectors and their return bends and so disposed as to cause the belt wires to cant in opposite directions longitudinally of the belt and present transverse corrugations.

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