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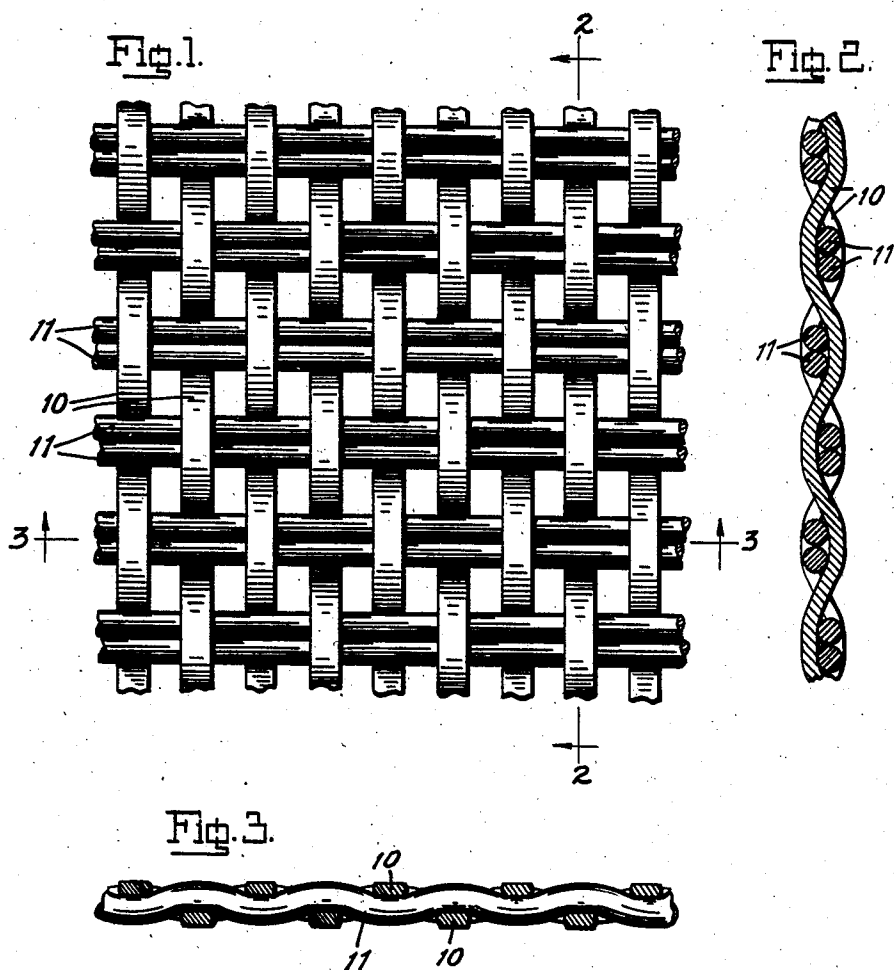
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WOVEN WIRE BELT FOR PAPER MAKING MACHINES

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2 Sheets-Sheet 1



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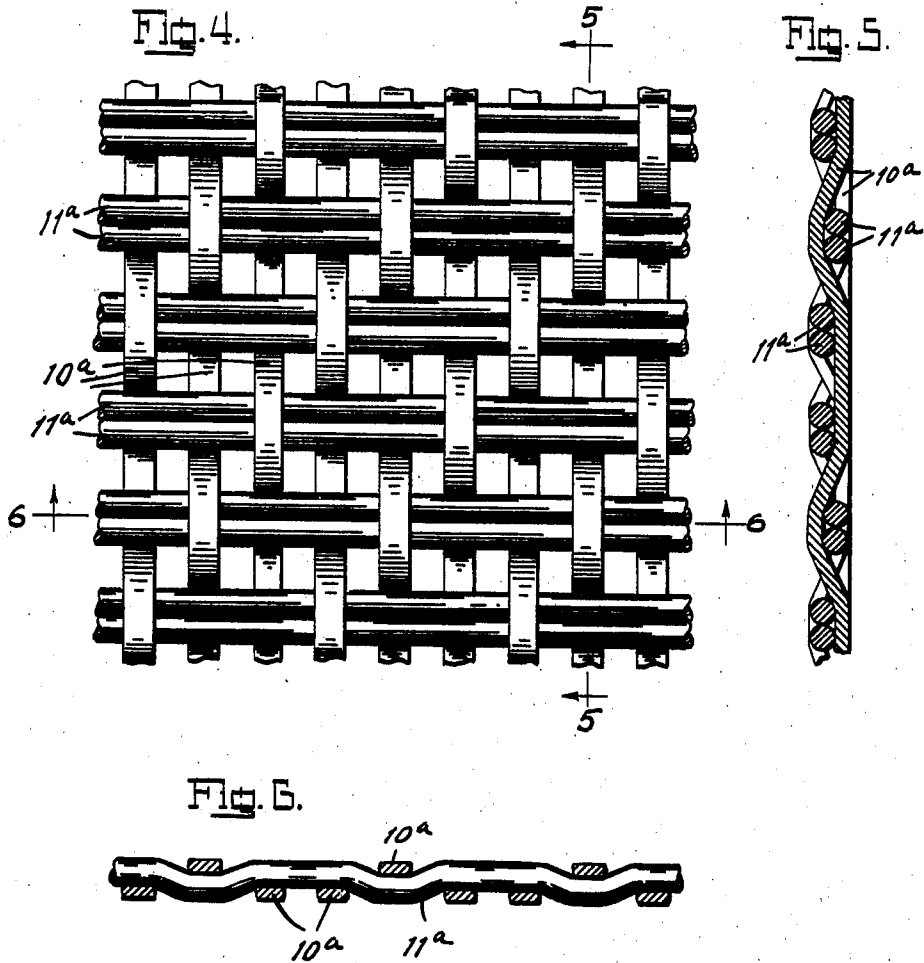
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WOVEN WIRE BELT FOR PAPER MAKING
MACHINES

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2 Claims. (Cl. 245—8)

The present invention relates to woven wire belts particularly for paper making machines of the Fourdrinier type, and is an improvement over the woven wire belts disclosed in my U. S. Letters Patent Nos. 2,003,123 and 2,003,124 granted May 28, 1935. These belts, as is well known, are in the form of a continuous band of fine wire mesh which moves over spaced supporting rolls and in contact with suction boxes and rolls. According to the inventions disclosed in said patents greater strength and flexibility, as well as improved drainage characteristics and better paper formation surface, were obtained by providing the warp wires in the form of flat ribbon like wires which were interwoven with shoot or weft wires of circular cross-section, the knuckles of the weft wires being formed about the flattened surfaces of the warp wires. Also according to these inventions, a much finer beat up of the woven wire was permitted, with an increase in the flat knuckle surfaces of the warp wires whereby a greatly increased wearing surface was produced.

It is proposed in the present invention to provide shoot or weft wires which will permit of a flatter type of weave, that is, a decrease thickness dimension without sacrifice of strength, and in which the weft knuckles will provide larger surfaces contiguous to the paper formation side and wear side, so that the wire will have a better paper formation surface and a greatly increased wear surface. To this end it is proposed to provide the shoot or weft wires in the form of pairs of circular cross-section wires arranged side by side.

The invention has application in both regular weave wires, and in twill weave wires in which the warp wires are carried under two and over one weft wire to provide longer knuckles and greater wearing surface at the under side. In the case of twill weave the relatively large paper formation and wear surfaces of the warp and weft wires will make for a much finer paper formation surface, as distinguished from the usual type of twill weave in which the paper formation surface had long deep depressions due to the spacing of the warp knuckles to every third weft wire instead of to every second weft wire as in the regular weave. By increasing the length of the weft knuckles, and at the same time obtaining a finer beat up due to the ribbon like warp wires, the depressions are not only decreased in size, but the walls of the mesh openings have less convergence and therefore will provide better support for the paper fibres with

less tendency for the fibres to turn down into the mesh openings.

According to my invention there will be an increase in the weft knuckle surfaces both in the direction of the weft and in the direction of the warp wires, the increase in the direction of the weft wires being due to the formation of the weft knuckles over the flat warp wires, and the increase in the direction of warp being due to the increased dimension of the pair of weft wires in the direction of the warp, as distinguished from the single circular cross-section weft wires heretofore employed.

With the above and other objects in view embodiments of the invention are shown in the accompanying drawings, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is an enlarged plan view of a portion of a regular weave wire belt, according to one illustrated exemplary embodiment of my invention.

Fig. 2 is a longitudinal sectional view, taken along the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view, taken along the line 3—3 of Fig. 1.

Fig. 4 is an enlarged plan view of a portion of a twill weave wire belt, according to another illustrated exemplary embodiment of my invention.

Fig. 5 is a longitudinal sectional view taken along the line 5—5 of Fig. 4.

Fig. 6 is a transverse sectional view, taken along the line 6—6 of Fig. 4.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to Figs. 1 to 3 of the drawings, the Fourdrinier wire, according to the exemplary embodiment shown therein, comprises warp wires 10 of flat ribbon-like form, and double weft wires 11—11 of circular cross-section arranged in side by side relation, and replacing the usual single circular cross-section weft wire. The upwardly crimped knuckles of both the warp and weft wires provide the upper paper formation surface, and the downwardly bent knuckles provide the lower wearing surface. The warp wire is preferably a rolled or drawn bronze wire which is annealed before weaving, and the weft wires are preferably brass.

In the proper weaving of the wire the warp should control or predominate the weft. The stronger warp wires permit of beating the weft

wires up to a finer mesh, the flattened warp wires being highly flexible and directly taking the punishment and strain necessary in this operation. The weft wires, which are shaped by and follow the action of the warp wires, only indirectly take the strain imposed by the beating up operation, and should not be such as to overcome the predominance or control of the warp wires. Where both the warp and weft are of the same material, this control is lost to a certain extent as neither the warp nor the weft will predominate over the other. Other material than bronze and brass may be used for the warp and weft, as for instance stainless steel for the warp and bronze or brass for the weft.

The dimension of the warp wires are proportioned with respect to the weft wire diameter, the width being such as to provide a relatively wide paper formation and wear surface and the thickness being such as to permit a fine beat up of the weft, and at the same time allow the knuckles of the weft, with a lesser deformation in the crimping of the weft than in the warp, to come into or very close to the plane of the flat warp wires, it will be seen, allows beating up a large number of weft wires per inch, while their relative wideness gives an area equivalent to or greater than that of the largest round warp wire permissible. The edges of the warp wires are preferably slightly rounded to allow free drainage through the mesh openings.

The cross-sectional width dimension of the double weft wires 11-11 is approximately twice the thickness dimension, and as the spaced crests of the two wires provide a bridging support for the warp knuckles the latter will have relatively long flat surfaces in the upper and lower surface planes of the woven wire, thus producing a relatively flatter type of weave in which the paper formation and wear surfaces of the warp wires are increased from line contact surfaces, as is the case when the knuckles are formed over single circular cross-section weft wires, to surface contact areas substantially corresponding in length to the distance between the crests of the double weft wires. This is of particular advantage at the beginning of the use of the wire as wide contact areas are present both before the knuckles are worn down and after wearing down, so that an approximately uniform wear surface is maintained throughout the life of the wire.

The knuckles of the double weft wires are increased in the weft direction by being formed over the flat warp wires and are increased in the warp direction by the double crests of each knuckle. The two directional flat knuckles of the warp as well as the two directional wide knuckles of the weft produce a paper formation surface in which the fibres will be supported by flat contact, as distinguished from the point contact with wires having circular cross-section warp and single circular cross-section weft wires. At the same time the fine beat up of

the weft provides a smooth surface which will support the paper stock without the usual tendency to turn down into the mesh and clog it. Without sacrificing this support the mesh openings may be of adequate size to provide full drainage.

The double weft also disposes double the number of weft knuckles on the wear side and as these have substantially flat surfaces in the weft direction the wearing life will thereby be greatly increased.

The flat warp wires while providing a much greater tensile strength are at the same time more flexible than circular cross-section warp wires, and this in addition to the long knuckles formed over the double weft wires enables the woven wire to be operated at high speed over rolls for a considerably greater time than heretofore before fatigue sets in.

In the modification shown in Figs. 4 to 6 20 the Fourdrinier wire is a twill weave, the warp wires 10^a being woven under two pairs and over one pair of the double weft wires 11^a-11^a, thus providing very long knuckles on the wear side.

I have illustrated and described a preferred and satisfactory embodiment of my invention, but it will be obvious that changes may be made therein, within the spirit and scope thereof, as defined in the appended claims.

Having thus described my invention what I 30 claim and desire to secure by Letters Patent is:—

1. Woven wire fabric for paper making machines comprising interwoven warp and weft shoots, each comprising a pair of weft wires, with knuckles produced in both the warp and weft wires, the warp wires throughout their length being of non-circular cross-section elongated in one dimension, said elongated dimension being parallel to the plane of the woven wire fabric whereby the weft knuckles cross the elongated faces of the warp wires and have their outer projected surfaces substantially co-extensive transversely with said elongated faces, the pair of weft wires of each shoot being arranged side by side whereby the warp knuckles cross the spaced crests of said weft wires and have their outer projecting surfaces substantially co-extensive transversely with the spaces between said crests.

2. Woven wire fabric for paper making machines comprising interwoven warp and weft shoots, each comprising a pair of weft wires, with knuckles produced in both the warp and weft wires, the warp wires being carried over one and under a plurality of weft shoots, the warp wires throughout their length being of noncircular cross-section elongated in one dimension, said elongated dimension being parallel to the plane of the woven wire fabric whereby the weft knuckles cross the elongated faces of the warp wires and have their outer projected surfaces substantially co-extensive transversely with said elongated faces, the pair of weft wires of each shoot being arranged side by side whereby the warp knuckles cross the spaced crests of said weft wires and have their outer projecting surfaces substantially co-extensive transversely with the spaces between said crests.

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