Dec. 1, 1936. L. N. WEBER 2,062,773

WIRE CLOTH

Original Filed Aug. 24, 1934

FIG. 1

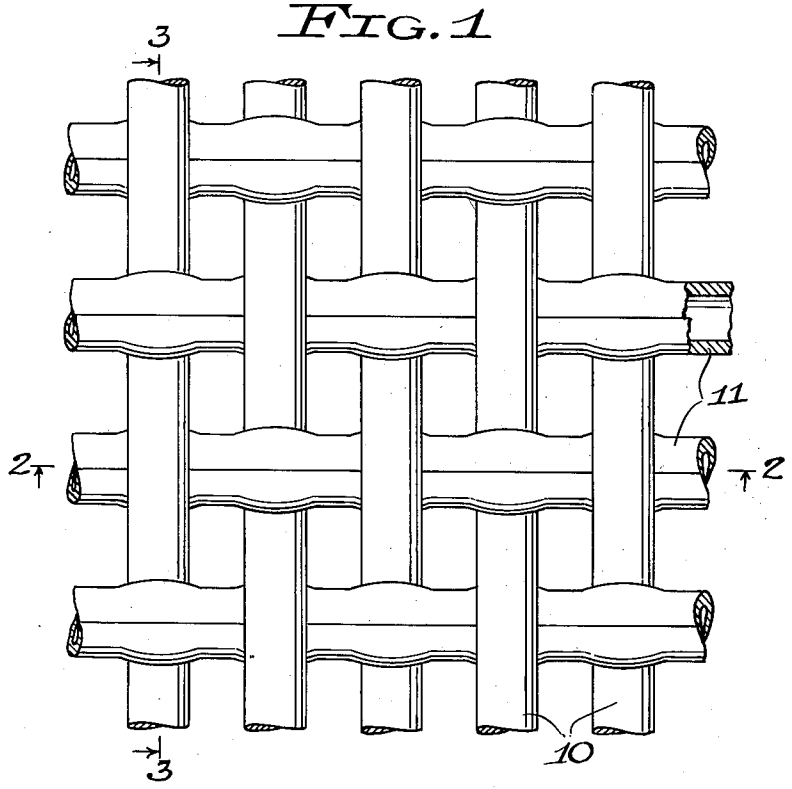


FIG. 2

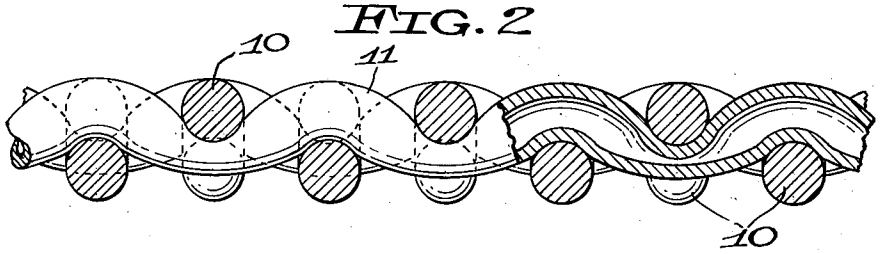


FIG. 3

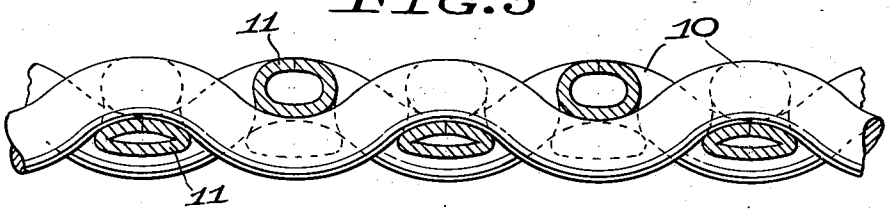
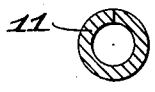


FIG. 4



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WIRE CLOTH

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9 Claims. (Cl. 139—425)

The invention relates to woven wire cloth and more particularly to wire cloth for use on paper making machines.

In the weaving of wire cloth for Fourdrinier wires it has been customary to use round solid weft wires. The amount of crimp obtainable with a round solid weft wire is limited, and if it is attempted to use a weft wire smaller in diameter than the warp wire, in order to increase the crimp, the weft wire is likely to be damaged or cut.

An object of the present invention is to provide an improved woven wire cloth having tubular weft wires, so as to permit increased crimping and to secure other advantages.

In the accompanying drawing, which shows one embodiment of the invention,

Fig. 1 is a plan view of a portion of wire cloth constructed in accordance with the invention;

Fig. 2 is a sectional view of the cloth taken along the line 2—2 of Fig. 1;

Fig. 3 is another sectional view of the cloth taken along the line 3—3 of Fig. 1, and

Fig. 4 is a transverse sectional view of one of the hollow weft wires.

In this drawing, the wire cloth is shown on a greatly enlarged scale, and consists of warp wires 10 and weft wires 11 of any suitable material, such as brass or bronze.

The warp wires 10 are the usual round solid wires. In the case of Fourdrinier wire belts, each warp wire is a few thousandths of an inch in diameter, and the spacing between adjacent warp wires is also a few thousandths of an inch.

The weft wires 11 are hollow or tubular and are preferably larger in diameter than the warp wires. The weft wires are preferably of circular cross-section, as indicated in Fig. 4, but in many instances the weaving operation may cause them to assume an elliptical or flattened cross-section at the knuckles, as indicated in Fig. 3. The hollow weft wires crimp readily and to a substantially greater extent than round solid wires.

The improved crimping of the weft wires permits the top knuckles of the weft wires to be close to the plane of the top knuckles of the warp wires, so that the fibres of the paper web have twice as many supports as with ordinary wire cloth wherein only the warp knuckles support the fibres.

The weft wires are crimped at the under side of the cloth in such manner that the bottom knuckles of the weft wires are spaced upwardly a substantial distance from the plane of the bottom face of the cloth. The warp wires will thus receive the wear, and the weft wires will not be weakened by wear.

The variation of the crimp between the top and bottom sides of the cloth can be regulated by the set of the loom in a manner well known to the art by merely providing a different degree of tension for the upper and lower wires of the shed. By so adjusting the tensions that the top shed does not have as much tension as the bottom shed, the hollow shute wire is thrown to the top of the fabric with the resulting difference in degree of crimp thereof, its bottom knuckles receiving a deeper crimp than its top knuckles.

Wire cloth made with hollow weft wires will have a longer life than conventional cloth because the warp knuckles are much longer, there being more metal to wear before cracking occurs, and less fracture of the knuckles in weaving. The longer knuckles on the top side of the cloth will leave less pronounced wire marks in the sheet of paper. The cloth has a greater tensile strength than the customary type of cloth, as the warp wires are subjected to less damage in weaving.

In weaving Fourdrinier wires it has heretofore been customary to cause the lay to deliver a full blow and a secondary tap blow to each weft wire. The tap blow has been found essential to replace the weft wire to its proper position because of the tendency for the weft wire to fly off after the full blow is struck. When a hollow weft wire is used, the crimp put in it by the first blow is so great that the wire does not fly off, thus permitting the secondary tap blow to be eliminated and making possible an increase of about fifty per cent. in loom speed.

In weaving ordinary wire cloth there is a tendency for the cloth to wrinkle at its face. The hollow weft wires, however, crimp so much that the cloth remains flat in weaving.

The hollow weft wires can be used in the regular weave of cloth shown in the drawing or in any special weaves, such as the so-called twill weave, double chain weave, and triple chain weave.

The characteristics of the cloth can be varied according to the requirements of the paper machine. A larger diameter of hollow weft wire will produce a stronger cloth but will modify the paper making surface. The diameter of the opening in the tubular weft wire and the thickness of the weft wire walls can be changed to suit conditions and to obtain different characteristics in the cloth.

In actual practice it has been found that paper formed on the hollow weft Fourdrinier wire of

this invention has a smoother surface than the same grade of paper formed on Fourdrinier wires of ordinary construction. By having the top knuckles of the weft wires in approximately the same horizontal plane as the top knuckles of the warp wires, and by broadening the said weft wire knuckles incident to their bending around the lower warp wire knuckles, there is greater supporting surface for the paper pulp and less opportunity for the knuckles to protrude and become embedded in the fibre mat, so as to leave indentations in the surface of the paper. The result is the paper has a smoother printing surface which approximates that of the more expensive coated papers, and it is suitable for use in color illustration printing that has required coated paper.

Not only is the quality of the paper product greatly improved by the present invention, but the life of the fabric is increased for several reasons. In the first place, the hollow or tubular weft wire makes it possible by flattening or deflating the bends thereof during weaving, where they cross beneath the warp wires, to elevate them well above the bottom bearing surface of the fabric, thus confining the wear to the solid warp wires and avoiding any scraping of the weft wires on the support. Furthermore, the flattening or deflating of the readily deformable hollow tubular weft wires in the operation of weaving results in a reduced crimp of the warp wires, permitting them to bend on curves of longer radii to produce longer knuckles, or knuckles having longer bearing surfaces, acting like sled runners to minimize friction and wear. Finally, the reduced crimp in the warp wires permits of the use of harder wire, or wire having a higher modulus of elasticity, and therefore of longer wearing quality.

In practice the tubular weft wire has been formed by flattening a round wire and drawing it through diamond dies to the tubular shape, but it is contemplated that it may be possible to successfully extrude the metal as a seamless tube and then draw it to the necessary degree of fineness.

The weft wires may be said to be rendered deformable by making them hollow or tubular as they are then compressible or collapsible, so that they automatically flatten at the knuckle bends or points of intersection with other wires during the weaving operation, the degree of flattening and the positioning of the knuckles depending on the tension, the alloy, the force of blow struck by the reed, the size of the hollow core and the diameter of the weft wire.

What I claim as new and desire to secure by Letters Patent is:

1. A Fourdrinier wire fabric formed with wires having a hollow center to render them deformable at the intersections.

2. A Fourdrinier wire fabric formed with wires having a central hollow space rendering them compressible so that they are somewhat flattened or deformed at the points of intersection with other wires.

3. A Fourdrinier wire fabric containing tubular wires depressed and flattened at the intersections with other wires.

4. A Fourdrinier wire fabric having hollow wire members which are compressible and tend to flatten at the bends at the intersections with other wires to form flattened knuckles.

5. A Fourdrinier wire fabric having a weft wire tubular in form to render it relatively soft and impressionable to automatically take a deep flattened crimp during the operation of weaving.

6. A Fourdrinier wire fabric having a tubular weft wire with a deep flattened crimp automatically produced in the operation of weaving as the result of its being rendered soft and impressionable by being made tubular in form.

7. A Fourdrinier wire fabric having tubular weft wire knuckles spread and reduced in height by reason of the weft wire being made soft and impressionable by being tubular in form.

8. A Fourdrinier wire fabric having solid warp and hollow weft wires with warp and weft knuckles in approximately the same plane on the top and in different planes on the bottom.

9. A Fourdrinier wire fabric having solid warp and hollow weft wires, the warp and weft knuckles of which are in approximately the same plane on the top and in different planes on the bottom, where the warp knuckles are in a lower plane than the weft knuckles to take the wear.

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