M. P. REYNOLDS.

METHOD OF FORMING WOVEN WIRE FABRICS.

APPLICATION FILED DEC. 23, 1912.

1,078,380. Patented Nov. 11, 1913.

Fig. 1.

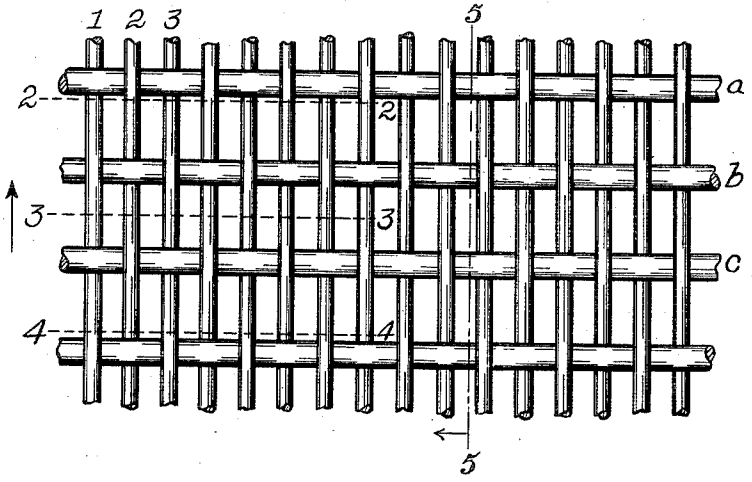


Fig. 2.

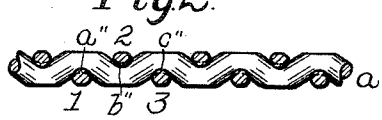


Fig. 3.

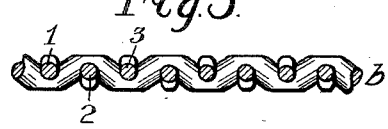


Fig. 4

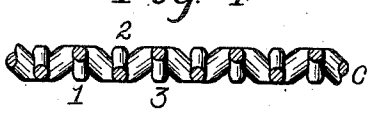
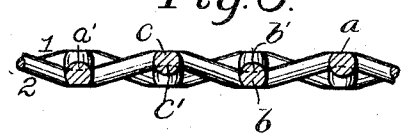


Fig. 5.



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UNITED STATES PATENT OFFICE.

MORLEY PUNSHON REYNOLDS, OF CLEVELAND, OHIO, ASSIGNOR TO THE W. S. TYLER COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

METHOD OF FORMING WOVEN-WIRE FABRICS.

1,078,380. Specification of Letters Patent. Patented Nov. 11, 1913.

Application filed December 23, 1912. Serial No. 738,133.

To all whom it may concern:

Be it known that I, MORLEY PUNSHON REYNOLDS, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Methods of Forming Woven-Wire Fabrics; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to methods of forming woven wire fabrics and has special reference to such fabrics to be used for screening purposes.

The object of my invention is to provide a cheap, simple and efficient method of forming a woven wire fabric for screening purposes, which fabric will have a comparatively smooth surface, and will be constructed to withstand abrasion of particles coming in contact with the same, as well as one with a great discharging surface or air space, thus producing a screen which will pass a relatively larger tonnage of particles through the same than the ordinary screen.

To these ends my invention consists generally stated in the novel method of forming woven wire fabrics for screens, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to practise and use my improved method of forming wire fabric for screens, I will describe the same more fully referring to the accompanying drawing, forming part of this specification, in which:—

Figure 1 is an elevation of a wire fabric embodying my invention. Fig. 2 is a cross section on the line 2—2, Fig. 1, looking in the direction of the arrow. Fig. 3 is a like section on the line 3—3, Fig. 1, looking in the direction of the arrow. Fig. 4 is a similar section on the line 4—4 looking in the direction of the arrow. Fig. 5 is a section on the line 5—5, Fig. 1.

Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing 1, 2, 3, etc. designate the warp wires, which are preferably circular in cross-section, and *a*, *b*, *c*, etc. designate the chute or weft wires, which may be circular in cross section or other shape in cross-section, such as rectangular, and as shown, are considerably larger in cross-sectional area than the warp wires. The warp wires are made of a high carbon metal wire, such as steel, and the chute or weft wires are made of a low carbon metal wire, and both of said wires are brought to substantially the same degree of softness before being woven, by the high carbon warp wires being brought to the lowest degree of annealing, in which great care is taken, while the low carbon weft wires are given regular annealing treatment without special care being taken to bring them to their lowest degree of point in annealing.

In forming my improved woven wire fabric for screens the warp wires and weft wires are preferably so woven together, as shown in the drawing, as to produce a fabric having an oblong mesh. The fabric thus woven is then pressed or rolled in order to bring the surfaces of the warp wires and the weft wires where they cross one another, into substantially the same plane. During this pressing or rolling operation, the weft wires will be flattened to any great extent and each warp wires where they cross said weft wires so as to form seats *a'*, *b'*, *c'*, etc. in said weft wires, while such operation will also form seats *a''*, *b''*, *c''*, etc. in the warp wires, at such crossings, by reason of said warp wires and weft wires being of substantially the same ductility, and thus by the mutual engagement of said seats in said warp and weft wires, the wires will be practically locked together. The surface of the fabric where the warp and weft wires cross one another will then be in substantially the same plane, but neither the warp wires nor the weft wires will be flattened to any great extent and each of said warp wires will maintain the crimped or undulating form which was imparted to it during the weaving operation, so that the portion of each warp wire between any pair of weft wires will be inclined in the opposite direction to the adjoining portion of each warp wire at each side thereof, and to illustrate, assuming that the screen is lying in a horizontal position, and taking for consideration the portions of the warp wires 2 and 3 lying between the weft wires *a* and *b* it will be seen that where such warp wires 2 and 3 cross the weft wire *b* the wire 2 is underneath the weft wire *b* and the wire 3 is above the same. The warp wire 2 then inclines upwardly and passes over the weft wires *a* and *c* while the warp wire 3 inclines downwardly and passes underneath these weft wires, so

that where the wires 2 and 3 cross the weft wire *a* the wire 3 is below the wire 2, while the central portions of such wires 2 and 3 between such wires *a* and *b* are in the same horizontal plane, so that if the distance between said portions of the wires 2 and 3 at their central points between the wires *a* and *b* and the distance between them where they cross either of the wires *a* or *b* be measured, it will be found that said wires 2 and 3 are farther apart where they cross the wires *a* and *b* than they are at their central points, and while the difference is very slight, it can be positively and readily observed.

After the fabric has been woven and rolled or pressed, as above described, it is subjected to a heat treatment in a suitable furnace with suitable degrees of heat, and then allowed to cool in any suitable manner, in order to temper the same, which permits the high carbon warp wires to become very hard, while the low carbon weft wires are not materially changed by such treatment and therefore remain in substantially the same soft condition as before the treatment.

It will thus be seen that a metallic wire fabric will be produced in which each mesh or opening has a greater capacity at its ends than at its center, and in actual use it has been found that this is a most valuable feature, as screens constructed of such a fabric do not become clogged and are free from other objections common to ordinary screens.

It will also be seen that another advantage in the screen lies in that by reason of the pressing or rolling operation to which the woven fabric is subjected the warp wires and weft wires are firmly interlocked with each other at their intersections, while such interlocking is greatly increased by the tempering of such wires, so that any tendency of the wires to move relatively to each other is practically eliminated, and a screening fabric is produced in which the meshes of the same will remain uniform in shape and size and will not vary in these particulars, as frequently occurs in the case of screening fabrics heretofore in common use. The weft wires of the fabric after tempering, being of softer metal than the warp wires, the fabric will better withstand vibration, as hard weft wires crimped and compacted or pressed or rolled in the manner described would crystallize and be very liable to break easily owing to their lack of ductility; while it will be understood, of course, that the difference in the hardness between the weft and warp wires in the finished fabric will materially depend upon the service to which the screening fabric is put, as in some screens the difference will be quite great and in others not so great.

The weft wires are also preferably made larger than the warp wires for the purpose of strengthening the screen, as there are fewer weft wires than warp wires and such weft wires also being softer than the warp wires in the finished fabric are more liable to wear and abrasion and hence should be larger to withstand the wear equally with the warp wires.

What I claim as my invention and desire to secure by Letters-Patent is:—

1. The herein-described method of forming a metallic screen fabric having warp and weft wires of different degrees of hardness, comprising the steps of forming the fabric from high carbon warp and low carbon metal weft wires of substantially the same degree of softness, compressing the fabric to press the wires into each other to interlock the same, and then subjecting the fabric to heat treatment to temper the same, thereby giving different degrees of hardness to the warp and weft wires composing it.

2. The herein-described method of forming a metallic screen fabric having warp and weft wires of different degrees of hardness and with the weft wires larger than the warp wires, comprising the steps of forming the fabric from high carbon warp and low carbon metal weft wires of substantially the same degree of softness, compressing the fabric to press the wires into each other to interlock the same, and then subjecting the fabric to heat treatment to temper the same, thereby giving different degrees of hardness to the warp and weft wires composing it.

In testimony whereof, I the said MORLEY PUNSHON REYNOLDS, have hereunto set my hand.

MORLEY PUNSHON REYNOLDS.

Witnesses:
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