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WELL STRAINER AND PROCESS OF MAKING IT

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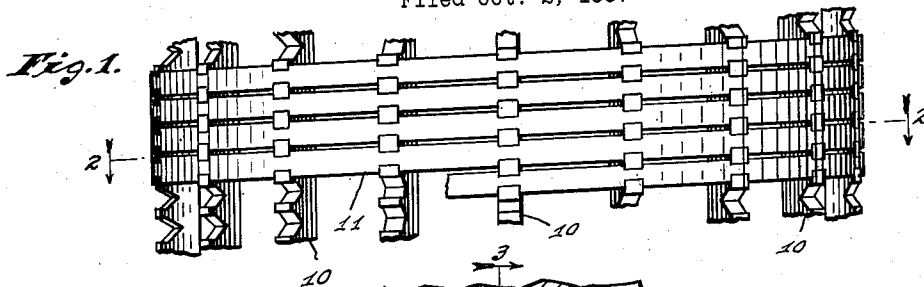


Fig. 2.

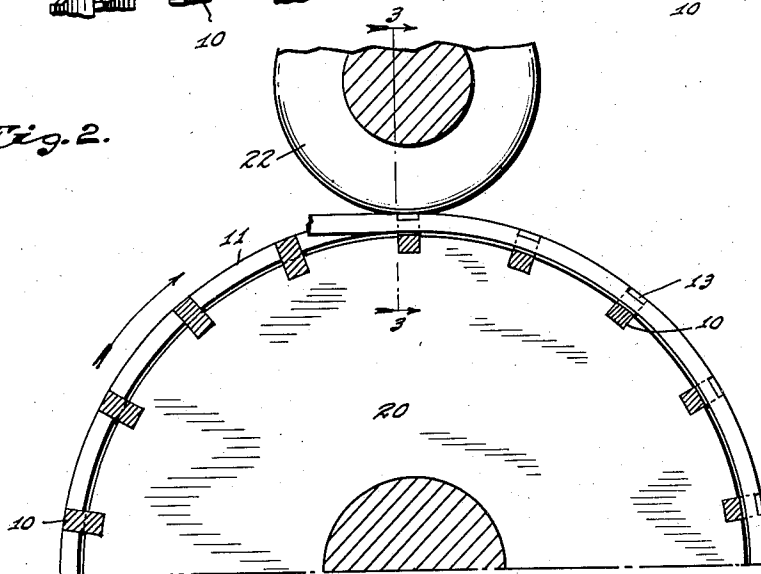


Fig. 3.

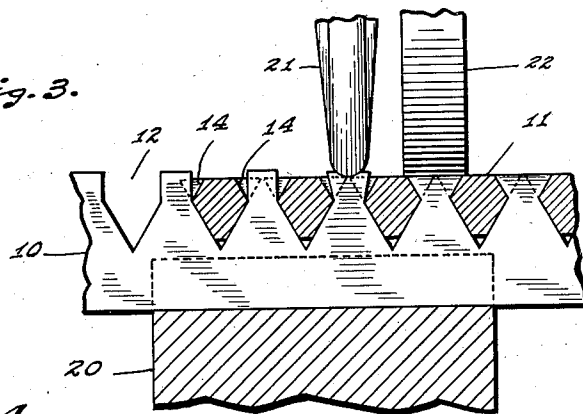


Fig. 4.

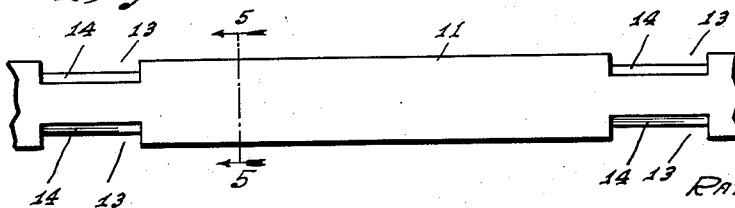


Fig. 5.



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WELL STRAINER AND PROCESS OF
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6 Claims. (Cl. 29—163.5)

My invention relates to well strainers, and particularly to that type of well strainer which is formed by a wire helically wound upon an annular series of longitudinally extending supporting bars. In strainers of this type the openings through which the liquid passes are in the form of slots created by spaces between adjacent turns of the wire, and the wire is formed with sides which converge inwardly of the strainer so as to create strainer-slots which are of minimum width at the outer surface of the strainer.

In strainers of this type, largely because of the inwardly converging sides of the wire, some difficulty has been experienced in forming a satisfactory joint at the points where the helically wound wire crosses the longitudinal supporting bars. Methods commonly used for securing the wire to the longitudinal bars comprise notching the bars, depositing the wire in the notches as it is helically wound, and then calking the metal of the bars to displace it either over the outer surface of the wire or into a continuous groove extending longitudinally of the wire along one side thereof. The former method has the disadvantage that the bars are unduly weakened if notched to a depth sufficient to provide between the notches an adequate amount of metal for satisfactory calking; while the second method is objectionable in that the re-entrant grooves in the wire either are of insufficient depth to result in a strong calked joint or are so deep as to weaken the wire unduly.

It is the object of my invention to produce a well strainer of the type mentioned which will be free from the disadvantages noted above. More specifically, it is my object to form a well strainer in which the wire will be held in place on the supporting rods by calked joints produced without unduly weakening either the wire or the rods which support it.

In carrying out my invention, I notch the two outer edges of the wire at the point where it crosses each of the supporting bars, such notches being so shaped that their bottoms, in general, converge outwardly of the strainer. The longitudinal supporting bars are also provided with notches shaped to receive the notched portions of the wire, the notches in the bars being of such a depth that the outer surface of the wire is, at most, only a slight distance below the outer surface of the bars. After the wire has been wound on the bars with its notched portions received in the notches of the bars, the material of the bars between adjacent notches therein is calked or displaced into the notches

in the wire. Because the bottoms of the notches in the wire converge outwardly, this displacement of the metal forms a dove-tail joint which holds the wire firmly in place.

The accompanying drawing illustrates my invention: Fig. 1 is a fragmental side elevation of a portion of the body of a well strainer; Fig. 2 is a fragmental transverse section on the line 2—2 of Fig. 1; Fig. 3 is a fragmental longitudinal section on the line 3—3 of Fig. 2, on a larger scale; Fig. 4 is a fragmental elevation of the notched wire from which the strainer is wound; and Fig. 5 is a section on the line 5—5 of Fig. 4.

The strainer illustrated in the drawing comprises an annular series of longitudinally extending bars 10 which are notched at intervals for the reception of the helically wound wire 11. The particular wire illustrated is of triangular section with its inner edge truncated slightly, as is clear from Fig. 5; but the particular cross-sectional shape of the wire is immaterial except for the fact that it is desirable to have its sides converge inwardly to produce strainer slots which have their minimum width at the outer surface of the strainer. Such slots are not subject to clogging.

At each point where the wire 11 crosses the rods 10, its outer edges are provided with opposed notches 12 and 13. As shown in the drawing, the notches have plane bottom surfaces 14 which converge outwardly, as is clear from Fig. 3. The shape of the notches, however, may be varied to some extent, the only requirement being that in the plane of each pair of notches the wire 11 is narrower at the surface of the bar 10 than it is at some point spaced inwardly from such surface.

The notches 12 in the rods 10 are shaped to receive closely the notched portions of the wire 11 and desirably have a depth slightly greater than the radial thickness of the wire. As is clear from Fig. 3, the sides of each notch 12 are substantially parallel near the outer surface of the rod 10, but below such parallel portions the sides of the notches 12 converge inwardly in conformity to the inwardly converging sides of the wire.

In constructing the strainer, the bars 10 are supported in proper relation in any suitable manner, and the wire 11 is wound with those portions which are of reduced cross-sectional area by reason of the notches 12 deposited in the notches 12 of the bars. Following the winding of the wire, the material between adjacent notches 12 is calked or displaced longitudinally of said rods

to form lugs extending into the notches 13 of the wire, as indicated at the right in Fig. 3. Desirably, the calking operation is performed as the wire is wound, the strainer being fed longitudinally relatively to a support in the form of a rotatable disk 20 having in its periphery an annular series of notches for the reception of the bars 10. The calking operation may be performed by a calking roll or by a series of calking rollers disposed in the plane of the support 20. As shown in the drawing, two calking rollers 21 and 22 are employed, the roll 21 being relatively narrow and serving to groove the tongue of metal between adjacent notches 12 in the bar 10 and the roll 22 having a cylindrical surface which completes the calking operation and, desirably, finishes the calked tongue-metal flush with the outer surface of the wire 11.

It is to be noted that my improved method of securing the wire 11 to the bars 10 leaves the wire of full-cross section between the bars and, at the same time, avoids notching the bars to the depth which would be necessary in the absence of the wire-notches 13. Further, since the calked metal of the bars may be finished substantially flush with the outer surface of the wire 11, the appearance of the strainer is improved.

I claim as my invention:

1. A well strainer, comprising an annular series of longitudinal rods, and a wire helically wound about said series of rods with its outer edges defining restricted strainer openings, each of said rods being provided with a longitudinally extending series of notches in which the respective turns of said wire are received, each of said notches having a depth at least equal to the radial thickness of said wire, said outer wire-edges of said wire being provided with transverse notches at points where said wire crosses said rods, and the material of said rods between the notches therein being displaced longitudinally of said rods to form lugs extending into said notches in the wire.

2. A well strainer, comprising an annular series of longitudinal rods, and a wire helically wound about said series of rods with its outer edges defining restricted strainer openings, each of said rods being provided with a longitudinally extending series of notches in which the respective turns of said wire are received, said outer wire-edges being provided with transverse notches at points where said wire crosses said rods, and the

material of said rods between the notches therein being displaced longitudinally of said rods to form lugs extending into said notches in the wire.

3. A well strainer, comprising an annular series of longitudinal rods, and a wire helically wound about said series of rods with its outer edges defining restricted strainer openings, each of said rods being provided with a longitudinally extending series of notches in which the respective turns of said wire are received, each of said notches having a depth at least equal to the radial thickness of said wire, at least one of said outer wire-edges being provided with transverse notches at points where said wire crosses said rods, and the material of said rods between the notches therein being displaced longitudinally of said rods to form lugs extending into said notches in the wire.

4. A well strainer, comprising an annular series of longitudinal rods, and a wire helically wound about said series of rods with its outer edges defining restricted strainer openings, each of said rods being provided with a longitudinally extending series of notches in which the respective turns of said wire are received, at least one of said outer wire-edges being provided with transverse notches at points where said wire crosses said rods, and the material of said rods between the notches therein being displaced longitudinally of said rods to form lugs extending into said notches in the wire.

5. In a process of forming a well strainer comprising an annular series of longitudinal rods and a helically wound wire deposited in notches in said rods, the steps of notching the outer edges of said wire with transverse notches at points to be received in the notches in said rods, progressively depositing the notched portions of the wire in the notches in the rods, and progressively displacing the material of the rods longitudinally of the rods and into the notches in the wire.

6. In a process of forming a well strainer comprising an annular series of longitudinal rods and a helically wound wire deposited in notches in said rods, the steps of notching one outer edge of said wire with transverse notches at points to be received in the notches in said rods, progressively depositing the notched portions of the wire in the notches in the rods, and progressively displacing the material of the rods longitudinally of the rods and into the notches in the wire.

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