E. E. JOHNSON.

WELL STRAINER.

APPLICATION FILED FEB. 6, 1905.

899,054.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 1.

Fig. 1.

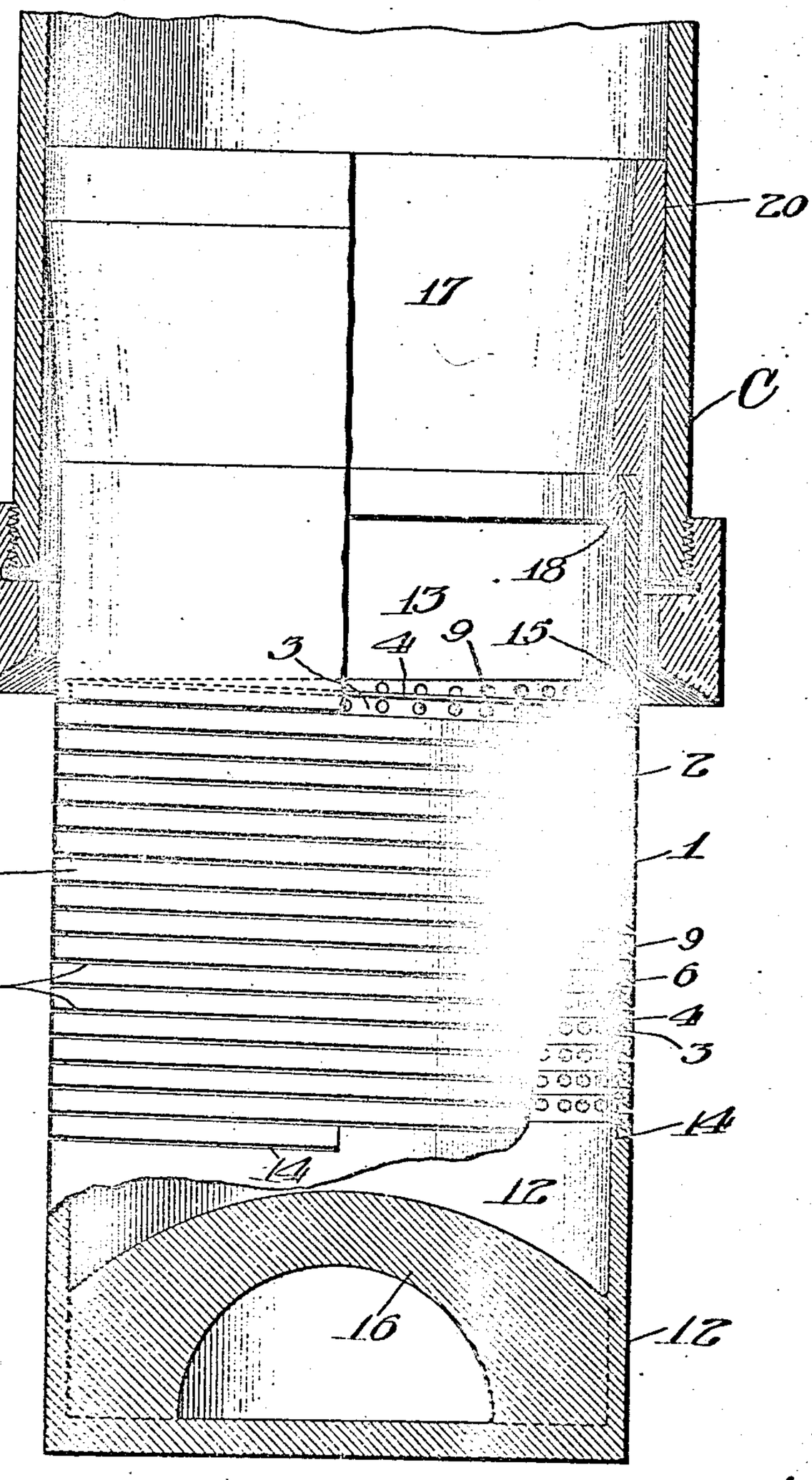
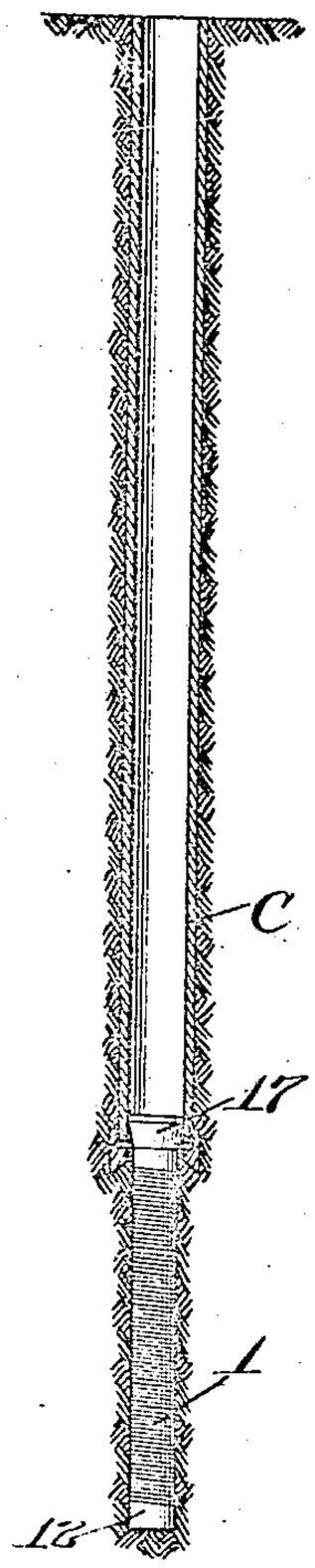


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3

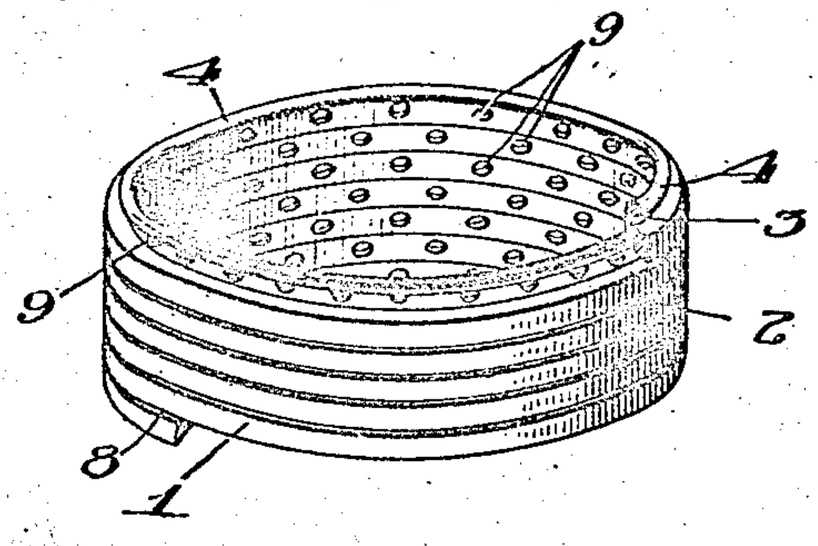


Fig. 6.

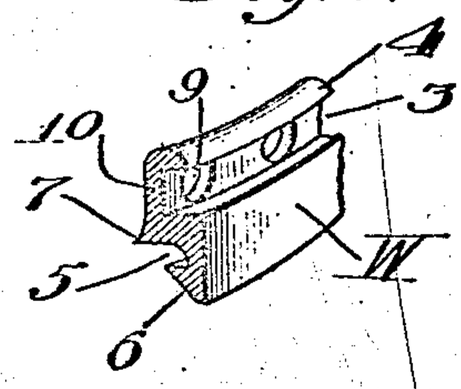


Fig. 5.

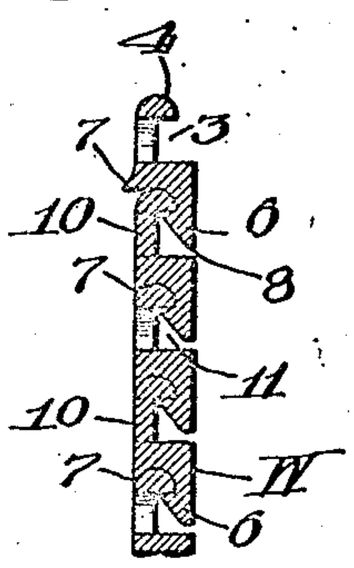
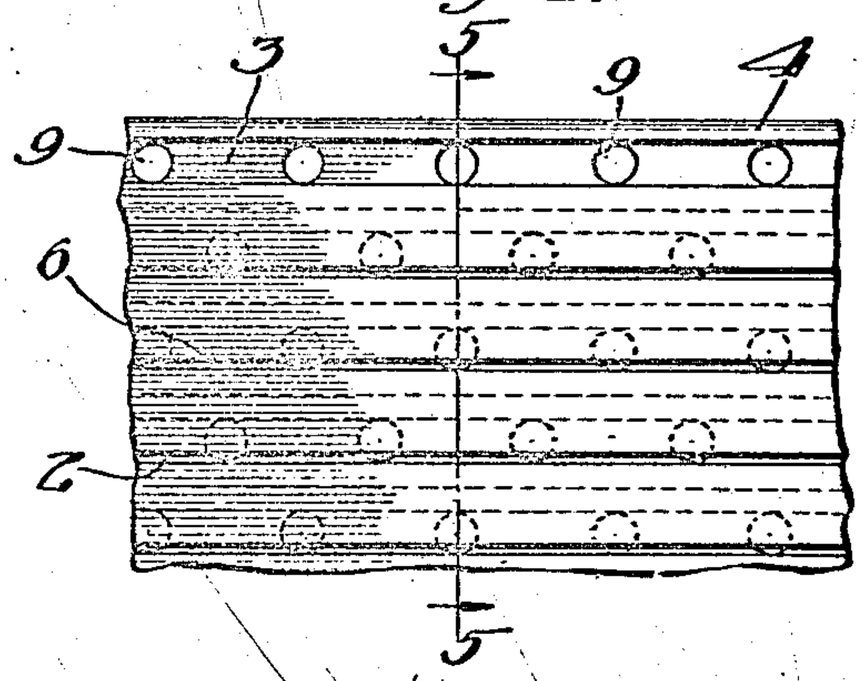


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 7.

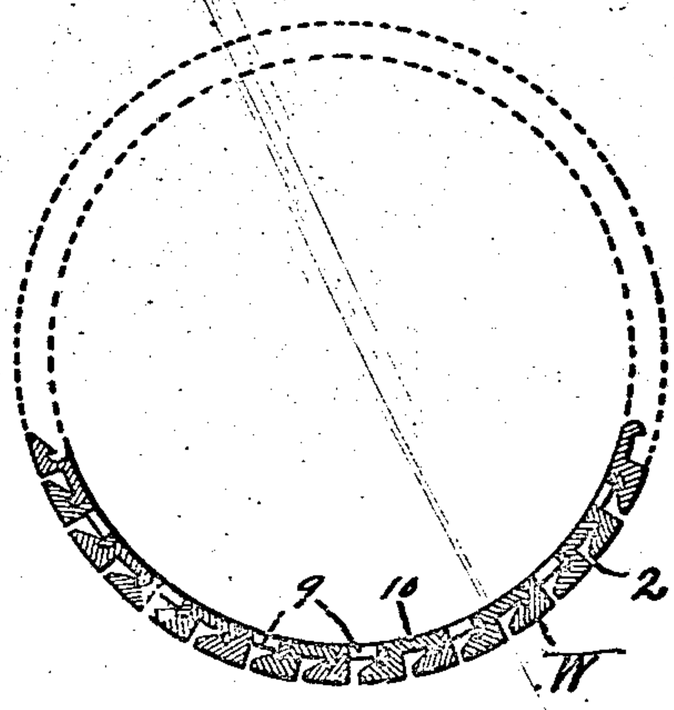


Fig. 8.

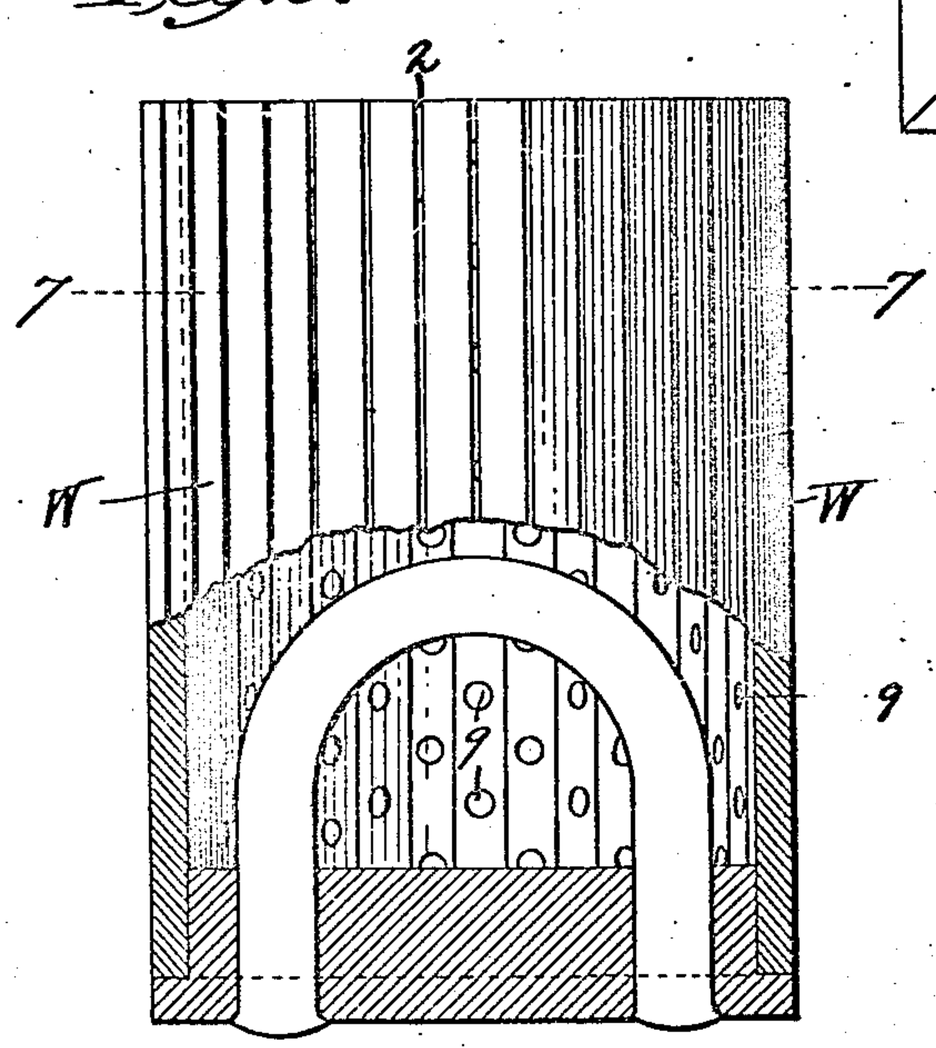
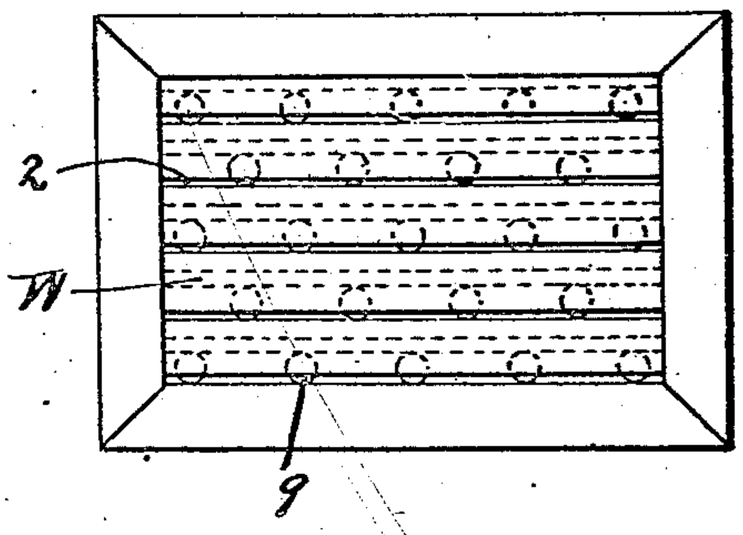


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

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WELL-STRAINER.

No. 899,054. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed February 6, 1905. Serial No. 244,266.

To all whom it may concern:

Be it known that I, EDWARD E. JOHNSON, a citizen of the United States, and a resident of White Bear, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Well-Strainers, of which the following is a specification.

This invention relates to well strainers of that class which are more particularly designed for use in bored or driven wells, and which are customarily attached to the lower end of the tubular casing or lining of the well to admit water to said casing while excluding the sand, etc., which tends to enter with the water.

The object of the invention is to provide an improved construction in devices of this character, and it consists in the matters thus and hereinafter set forth and particularly pointed out in the appended claims.

In the accompanying drawings,—Figure 1 is an elevation, partly in section, of a well casing provided with a strainer constructed in accordance with my invention in one form. Fig. 2 is a vertical section on a smaller scale of a cased well having one of these strainers attached to the lower end of its casing. Fig. 3 is a perspective view showing the manner of forming the strainer of a spiral winding of wire of appropriate cross section. Fig. 4 is an enlarged fragmentary detail of the surface of the strainer, as viewed from without. Fig. 5 is a sectional detail taken on line 5—5 of Fig. 4 and showing the shape in cross section of the wire which is coiled up to form the strainer and also showing the manner in which the adjacent convolutions of the coil are made to interlock with each other. Fig. 6 is a perspective detail of a fragment of the wire of which the strainer is composed. Fig. 7 is a transverse section, taken on line 7—7 of Fig. 8, showing the manner in which a tubular strainer may be built up of parallel longitudinally extending strands of wire interlocked according to my invention. Fig. 8 is a side elevation partially in section, of this construction of strainer. Fig. 9 is a top plan view of a flat strainer built up of parallel interlocking strands of wire, in accordance with my invention.

The improved strainer thus illustrated as embodying my invention in one form, consists of a spiral winding 1 of wire (usually made of brass or other metal calculated to resist corrosion), between the convolutions of which narrow spaces 2 are left to permit the water to enter the well. These intervening spaces 2 may and preferably will be continuous with each other, or in other words will form a continuous slit or crevice extending spirally around the surface of the strainer from one end to the other of its active or water admitting surface. In order to render such spiral winding 1 permanent in shape and preserve the correct relation of its convolutions, the wire W of which the winding is composed is made of such shape that its adjacent convolutions will interlock with each other, after the manner illustrated, for example, in Fig. 5. It is here shown as provided on its upper outer face with a longitudinal groove 3, which leaves its upper edge to form an outwardly projecting longitudinal flange 4, and as reversely provided on its lower inner face with a longitudinal groove 5, which leaves its lower edge to form an inwardly projecting flange 6. The upper edge flange 4 and the lower inner groove 5 are furthermore so shaped with reference to each other that said flange of one convolution will fit into said groove of the next convolution, and interlock therewith sufficiently to withstand any endwise strain to which the strainer will ordinarily be subjected. To prevent the winding from uncoiling its ends can be made fast at the top and bottom of the strainer, or to form a more perfect interlocking connection, sufficient in itself to resist uncoiling, the intermediate inner edge 7 of the wire just above the groove 5 can be made to project slightly (see Fig. 6, and upper portion of Fig. 6), and this projecting edge rolled or spun down over the upper edge of the subjacent convolution after the flange 4 thereof has entered the groove 5. This forcing or spinning down of the edge 7 is facilitated by rounding over the upper edge of the wire, as shown, and it serves to permanently lock the adjacent convolutions of the wire together and make of the winding a substantially homogeneous cylinder.

As herein shown the water inlet crevice 2 is formed between the convolutions of the wire on its outer face, by making the lower flange 6 of the wire slightly less in depth than the upper groove 3 thereof, so that in the interlocking of the adjacent convolutions, this flange 6 does not quite close the groove but leaves a continuous spiral opening between the lower edge of each superjacent convolution and the outer intermediate corner of the

next subjacent convolution. Communication between this crevice 2 and the interior of the winding is then established, as herein shown, by perforations 9 formed in the thin web 10 of the wire which forms the back of its upper outer groove 3. These perforations 9 can be and are herein shown as equal in depth to the groove 3 and in order to completely uncover them without at the same time increasing the width of the crevice 2, the inner face of the lower flange 6 of the wire is beveled off, as shown. This leaves a triangular groove 11 running around the interior of the winding between the convolutions and forming a communicating channel between the spiral crevice 2 and perforations 9, which channel, since it increases in area towards its inner side, is not likely to be clogged, but will permit the free passage into the well of any sand or sediment which is small enough to enter the crevice 2.

The body of the strainer having been constructed in some such manner as that above set forth, its ends may be formed as desired. As herein shown, these consist of a lower end nipple 12 and an upper end nipple 13, of which the proximate ends are screw threaded, the one exteriorly at 14 and the other interiorly at 15, to correspond with the thread-like winding of the strainer body. Connection is then made between the body of the strainer and the lower end nipple 12 by screwing the lower end of the winding down over the exteriorly threaded upper end of this nipple, while connection is made between the body of the strainer and the upper end nipple by screwing the upper end of the winding up into the interiorly threaded end of this nipple. The joints at the two ends may then be brazed together, if desired, or may be fastened in any other suitable way to render the connection permanent.

The lower nipple 12 will ordinarily be provided with a bail or cross bar 16 beneath which a rod may be hooked to lower the strainer to the bottom of the well casing C or to raise it therefrom. After it is lowered into place, any suitable water tight connection can be made between the upper end of the strainer and the casing. This connection is herein shown as formed by a lead collar 17, the lower end of which is interlocked with the upper nipple 13, in any suitable manner, as at 18, and the upper end of which can be swaged out to fit closely against the inner wall of the casing, as at 20.

The helical body of the improved strainer construction thus described does not require to be kept in stock, but may be readily coiled up as ordered and to the diameter desired, it being an indifferent matter, with this form of construction, whether such diameter is great or small. The wire of which the winding is composed may be rolled or drawn to its finished shape, except for the holes which can be readily punched therein, and since no other machine work is required the stock of which the wire is made may be of the hardest quality, with correspondingly increased resistance to the abrasive action of the sand.

The effective inlet area of the strainer is relatively large, while its "mesh" is relatively small, and its strainer action correspondingly effective with a minimum tendency towards clogging. The strength of the construction, furthermore, is unusual, and renders it little likely to be damaged in handling or in the process of inserting it in the wall or removing it therefrom for replacement or repairs.

It will be understood that while the cylindrical or tubular form of strainer particularly lends itself to purposes of this invention, and to the spiral formation hereinbefore described, the invention may also be embodied in other than tubular or cylindric strainers, as, for example, in the flat strainer surfaces required in the strainer heads of filters and the suction plates of paper makers screens, etc. These can obviously be formed by parallel strips of the overlapping wires W, and particularly by such strips when interlocked and rolled together, in the manner described. It will also be understood that tubular or cylindric strainers and strainers having curved surfaces generally, may be constructed in a similar manner of parallel strips which do not run spirally, but extend either lengthwise or transversely of the cylinder or curved surface and are secured together at their ends by the nipples shown, or by some corresponding terminal strip or framework.

I claim as my invention:

1. A strand or wire adapted to interlock on itself to form a strainer wall, substantially as described.

2. A strainer wall composed of parallel interlocking strands between which the water is admitted, substantially as described.

3. As a new article of manufacture, a strip or wire having longitudinal grooves and flanges constructed to interlock with the flanges and grooves of a corresponding parallel strip or portion to form a strainer wall, substantially as described.

4. As a new article of manufacture, a strip or wire having a series of perforations and longitudinal grooves and flanges constructed to interlock with the flanges and grooves of a corresponding parallel strip or portion to form a strainer wall, substantially as described.

5. A strainer wall composed of adjacent interlocking portions or strips of wire between which the water is admitted, substantially as described.

6. A strainer wall comprising overlapping portions or strips of wire forming in effect

outer and inner walls, a water admitting crevice being provided between the strips in the outer wall, and the inner wall being provided with perforations communicating with said crevice, substantially as described.

7. A well strainer comprising a spiral winding having interlocking convolutions between which the water is admitted, substantially as described.

8. A well strainer comprising a spiral winding having overlapping convolutions forming in effect a cylinder having outer and inner walls, a water admitting crevice being provided between the convolutions in the outer wall, and the inner wall being provided with perforations communicating with said crevice, substantially as described.

9. A well strainer formed of a spiral winding of interconnected convolutions provided with water passages, substantially as and for the purpose set forth.

10. A well strainer comprising a cylinder formed of a spiral winding having overlapping convolutions provided with grooves and flanges interfitting with each other in adjacent convolutions, and inlet apertures extending through the wall of the cylinder, substantially as described.

11. A strainer wall composed of parallel interlocking lengths of wire having longitudinal grooves and flanges constructed to interlock in adjacent lengths, and perforations in said wire forming water passages, substantially as described.

12. A well strainer formed of a spiral winding provided with water passages and having overlapping convolutions provided with grooves and flanges interfitting with each other in adjacent convolutions and spun or rolled together to prevent unwinding, substantially as described.

13. A well strainer comprising a cylindric strainer portion formed of a spiral winding, the coils being interconnected, and end nipples to which the ends of the winding are connected, substantially as described.

14. A well strainer comprising a cylindric strainer portion formed of a spirally wound wire provided with an interlocking longitudinal flange and an interlocking longitudinal groove, and end nipples provided with screw threads engaging the spiral grooves and flanges of the strainer portion, substantially as and for the purpose set forth.

15. A well strainer formed of a spiral winding provided with water passages and having over-lapping convolutions interfitting with each other and spun or rolled together to prevent unwinding, substantially as and for the purpose set forth.

16. A well strainer formed of a spiral winding of overlapping convolutions provided with water passages, the overlapping portions of the convolutions contacting with each other to maintain the cylindric form of the strainer, substantially as and for the purpose set forth.

In testimony, that I claim the foregoing as my invention, I affix my signature in presence of two subscribing witnesses this first day of February, A. D. 1905.

EDWARD E. JOHNSON.

Witnesses:
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C. C. JONES.