July 7, 1936. E. E. JOHNSON 2,046,458

SCREEN

Filed Nov. 10, 1934 2 Sheets-Sheet 1

Fig. 1

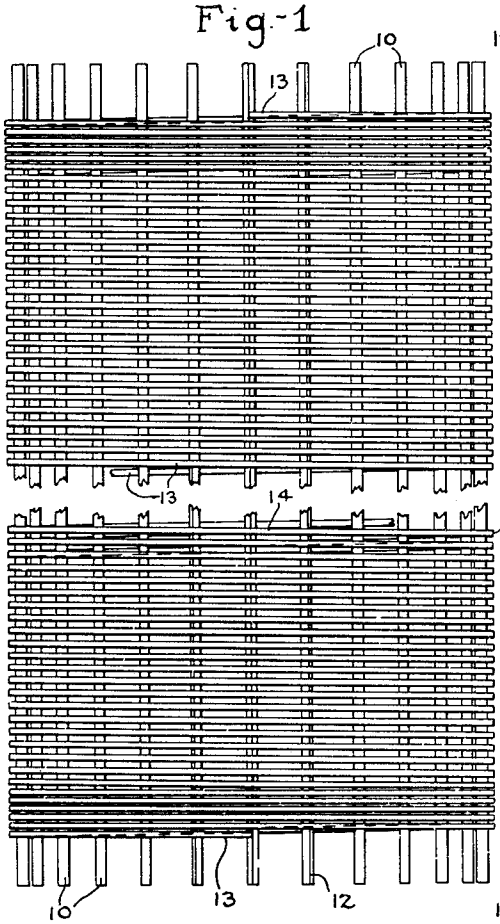
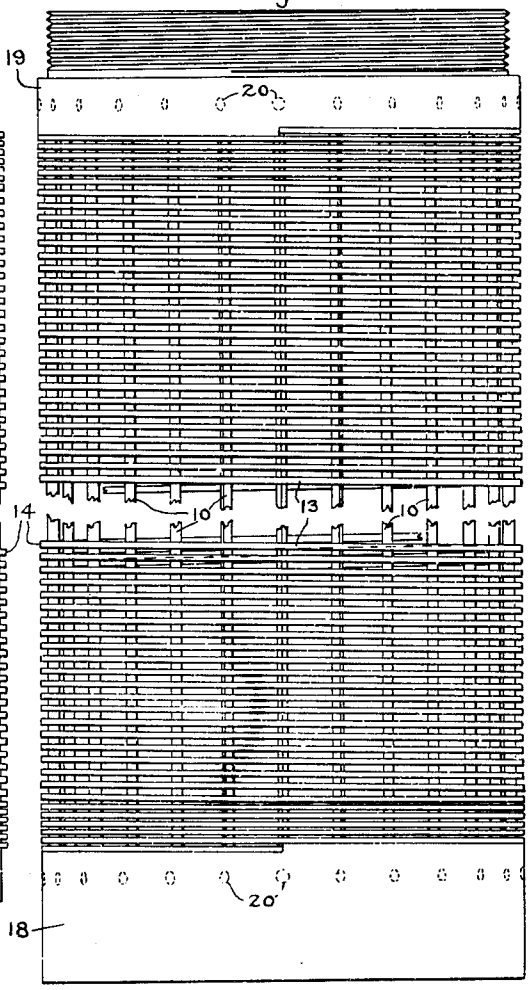


Fig. 2



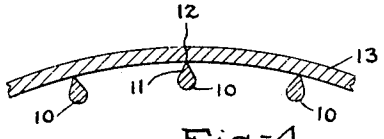


Fig. 4

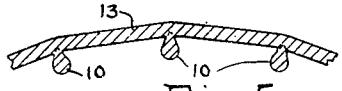


Fig. 5

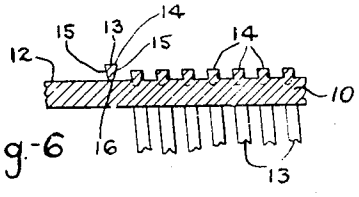


Fig. 6

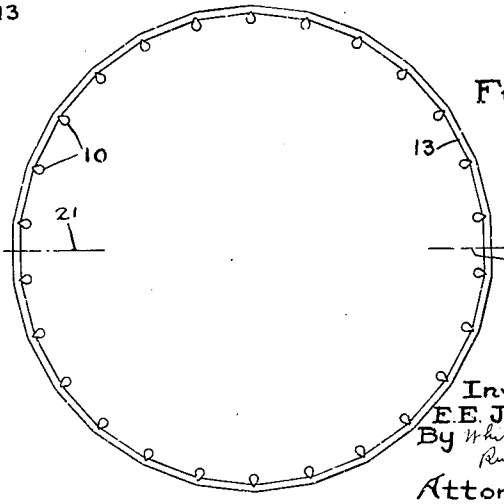


Fig. 3

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SCREEN

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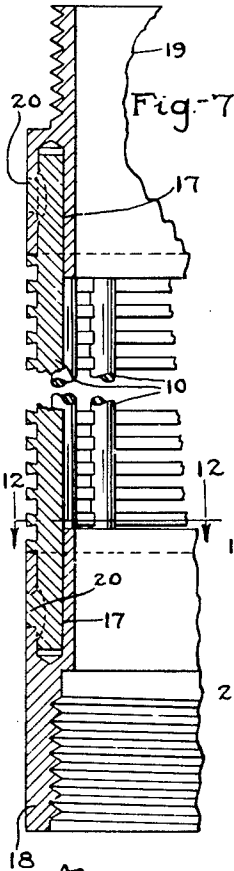

Fig.-7

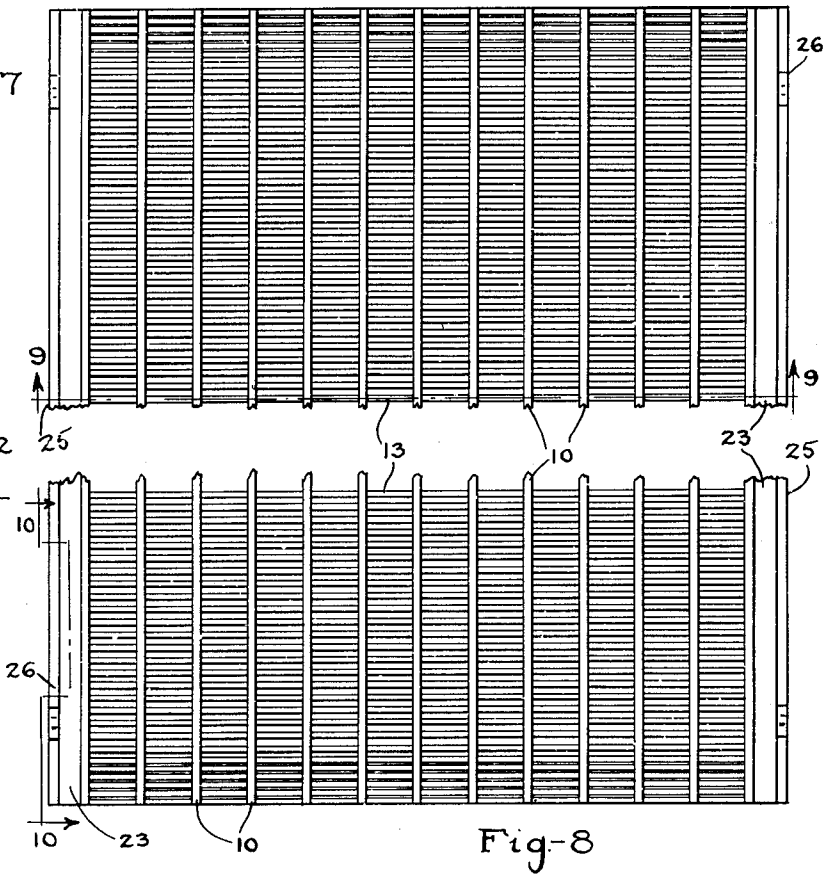

Fig.-8

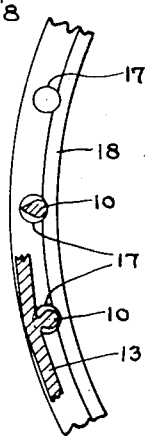

Fig.-12

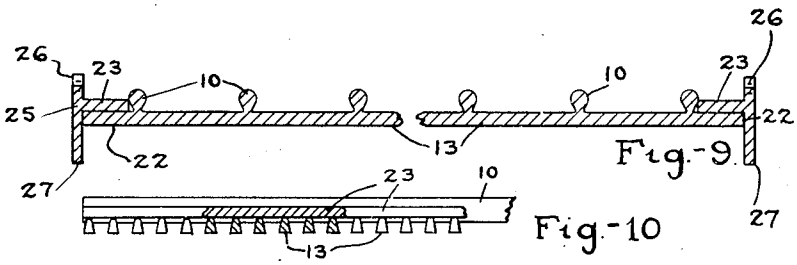

Fig.-9

Fig.-10

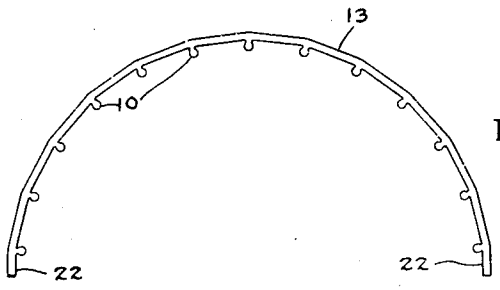

Fig.-11

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Patented July 7, 1936 2,046,458

UNITED STATES PATENT OFFICE

2,046,458

SCREEN

Edward E. Johnson, St. Paul, Minn., assignor to Edward E. Johnson, Incorporated, St. Paul, Minn.

Application November 10, 1934, Serial No. 752,383

4 Claims. (Cl. 166—8)

My invention relates to screens and has for its object to provide a screen wherein two sets of metallic elements each formed with reduced edge portions have said portions contact in substantially right-angled relation, and are united at their crossing points by having said reduced portions sunk a predetermined distance one within the other and metallically integrated and welded together at such points.

For cylindrical screens this arrangement and construction of wires and rods is effected by holding a group of rods with their diminished portions extending outwardly and their edges outlining a cylinder, and then helically winding a wire upon the group of rods so held, the wire being held with its reduced-portion edge successively contacting the reduced portion edges of the rods, and while the wire is being wound simultaneously, causing the diminished portion of wire and rods to merge together predetermined distances and to be fused and welded at the points of merger.

For flat screens the process of fabrication is the same, to-wit, a cylindrical screen of the desired large diameter is formed first in the manner above described, and this cylindrical screen is then divided into halves, and the several halves have the wires thereof straightened and flattened.

The process of fabricating these screens is fully disclosed in my copending application, Serial Number 752,384, November 10, 1934, and that is no part of this application, which is directed to the finished structure as an article. This structure is in effect an integral cellular structure wherein all units of intervening portions of wires and rods between union joints are integrated at such union joints so that the screen is throughout an integral cellular structure formed of such metallically integrated units. This gives a very high measure of strength for the weight of metal employed, and one wherein the surface of the screen will be of the desired smoothness and the slots everywhere are of uniform width, continuous, and widening toward the interior or back of the screen.

Such screens in the cylindrical form may be suitably employed as well screens in deep wells for the production of either water flow or oil flow and may have other uses. The flat screens have a large variety of uses such, for example, as in de-watering coal after it has been washed, in ore separating machines and in many like constructions.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and its novel features are particularly pointed out in the claims.

In the drawings, illustrating an application of my invention in one form,

Fig. 1 is a view of a cylindrical screen having the aforesaid improvements applied thereto without the fittings. Fig. 2 is such a screen after the fittings have been applied. Fig. 3 is an end view of the screen shown in Fig. 1 Fig. 4 is a diagrammatic view showing the relation of the longitudinal and transverse members before they are fused, sunk together and welded. Fig. 5 shows the appearance of the construction after said sinking together and welding. Fig. 6 is a diagrammatic view taken in section through one of the longitudinal members showing the relation of the parts before and after sinking together and welding. Fig. 7 is a sectional view through the fittings showing the manner of their attachment to the cylindrical form of the screen. Fig. 8 is an inside plan view of one of the flat screens. Fig. 9 is a sectional view across the screen and through one of the surface wires, as viewed on line 9—9 of Fig. 8. Fig. 10 is a sectional view across the main screening wires showing the finish of the flat screen as shown in line 10—10 of Fig. 8. Fig. 11 is an end view of a cylindrical screen which is split in half preparatory to flattening to make a flat screen. Fig. 12 is a sectional view on line 12—12 of Fig. 7 in part diagrammatic.

In the screen longitudinal wires, referred to herein for convenience as rods, 10 are of the shape in cross-section clearly shown in Fig. 4, having a reduced portion 11 brought to a substantial edge 12. The wire which is wound upon these rods is indicated in Fig. 6 at 13 and is provided with a flat top surface 14, converging walls 15 and an acutely-rounded lower edge 16. In the fabrication of the screen the wire 13 is wound in a continuous helical coil upon the rods 10. When so wound the edges 12 and 16 of the reduced portions above referred to are caused to contact at substantially right angles to one another, as shown at the right of Fig. 6. In the welding operation these edges are caused to be sunk into one another a predetermined distance so as to bring the surfaces 14 of the wires 13 into common planes as shown in Figs. 3 and 5. The resulting structure will be in effect a cylindrical member, although the lengths of the wire 13 between rods 10 will be bent at their points of union with said rods so as to make a

member of somewhat polygonal cross-section as indicated in Figs. 3 and 5. As shown in Fig. 1, the rods 10 of such a fabricated screen will be projected beyond the windings of wire 13. These projections are inserted in holes 17 in the end fittings 18 and 19 as shown in Figs. 7 and 12. The end fittings are provided with holes 20 opening into and extending at right angles to holes 17, wherein metal is welded to the ends of the rods 10 and in some degree to the body of the fittings about holes 20, thus integrating the fittings 18 and 19 with said rods.

To form the flat screen the cylindrical screen is cut along a diameter extending midway between pairs of rods as on the line 21 of Fig. 3, and the half cylinders of Fig. 11 are straightened to form the flattened member of Fig. 8. Upon the projecting ends 22 of wires 13, resulting from this division of the cylinder into halves, are fittings 24, as clearly shown in Figs. 9 and 10. These fittings 24 may be of any desired shape or extent for adapting the flat screen to whatever use it may be put and are in the flat screen analogous to the fittings 18 and 19 of the cylindrical screen. As shown, these fittings comprise a strip 23 adapted to be laid upon and welded to the projecting ends 22 of wires 13. Integral with the strip 23 and extending at right angles thereto is a flange member 25 which will provide a backwardly-projecting portion 26 to which supports for the screen may be attached, and upwardly-projecting side walls 27. This fitting not only sufficiently strengthens the screen longitudinally so that its surface will remain flat in use, but also provides sides thereto.

The advantages of my invention will be apparent from the foregoing description. Whether in the form of a cylindrical screen or a flat screen, the fabricated structure is the same, to-wit, a cellular structure made up of sets of elements formed with reduced portions, the edges of said reduced portions crossing at substantially right angles and being sunk together predetermined distances at said crossing points and fused and welded together where they are sunk. This structure is one of exceptional rigidity and strength for the amount of material included therein, can be furnished at a relatively moderate cost, and has an exceptionally high degree of efficiency.

I claim:

1. A cylindrical screen comprising two sets of metallic elements, one for forming a screen surface and the other for supporting said first-named set of elements, the supporting elements being parallel and longitudinally spaced and being pear-shaped in cross-section with their substantially acute-angled edges extending radially outwardly from the center of the screen, the screen surface elements being wedge-shaped in cross-section with a flat top and converging side walls to form a substantially acute-angled reduced portion engaging the reduced portions of the supporting elements, said sets of elements being welded together and sunk one within the other at their engaging reduced portions uniform predetermined distances to bring said flat tops in a substantially uniform cylindrical surface with the edges thereof spaced uniform distances apart.

2. A cylindrical screen comprising a multiplicity of longitudinal metallic rods each being formed with a reduced portion coming to an acute-angled edge, said edges being arranged to outline a cylinder, and a second set of metallic elements in a multiplicity of uniformly spaced coils, each having reduced portions engaging the reduced portions of the rods at substantially right angles thereto, said engaging reduced portions being severally welded together and sunk one within the other uniform predetermined distances at each said engaging and crossing point.

3. A cylindrical screen comprising two sets of parallel metallic elements each having a reduced portion, one of said sets extending longitudinally of the screen and the other in a multiplicity of uniformly spaced coils forming the cylindrical body of the screen, the respective sets of elements severally crossing one another with the edges of the reduced portions in engagement, and being severally welded together and sunk one within the other uniform predetermined distances at each said engaging and crossing point.

4. A cylindrical screen comprising a multiplicity of longitudinally-extended rods, a wire helically wound on said rods and welded thereto at every crossing point, the several coils of said wire being equally and uniformly spaced to form a continuous uniform slot, and being positioned upon the rods to leave ends of the rods projecting beyond the coils of wire at each end, fittings at the ends of the cylinders embracing said exposed ends of the rods, and plugs of metal welded to said rod ends and to the outer walls of the fittings whereby said fittings are integrally and permanently united with said rod ends and screen.

EDWARD E. JOHNSON.