July 28, 1936. C. O. BROWN 2,049,246

GAUZE

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Fig. 1.

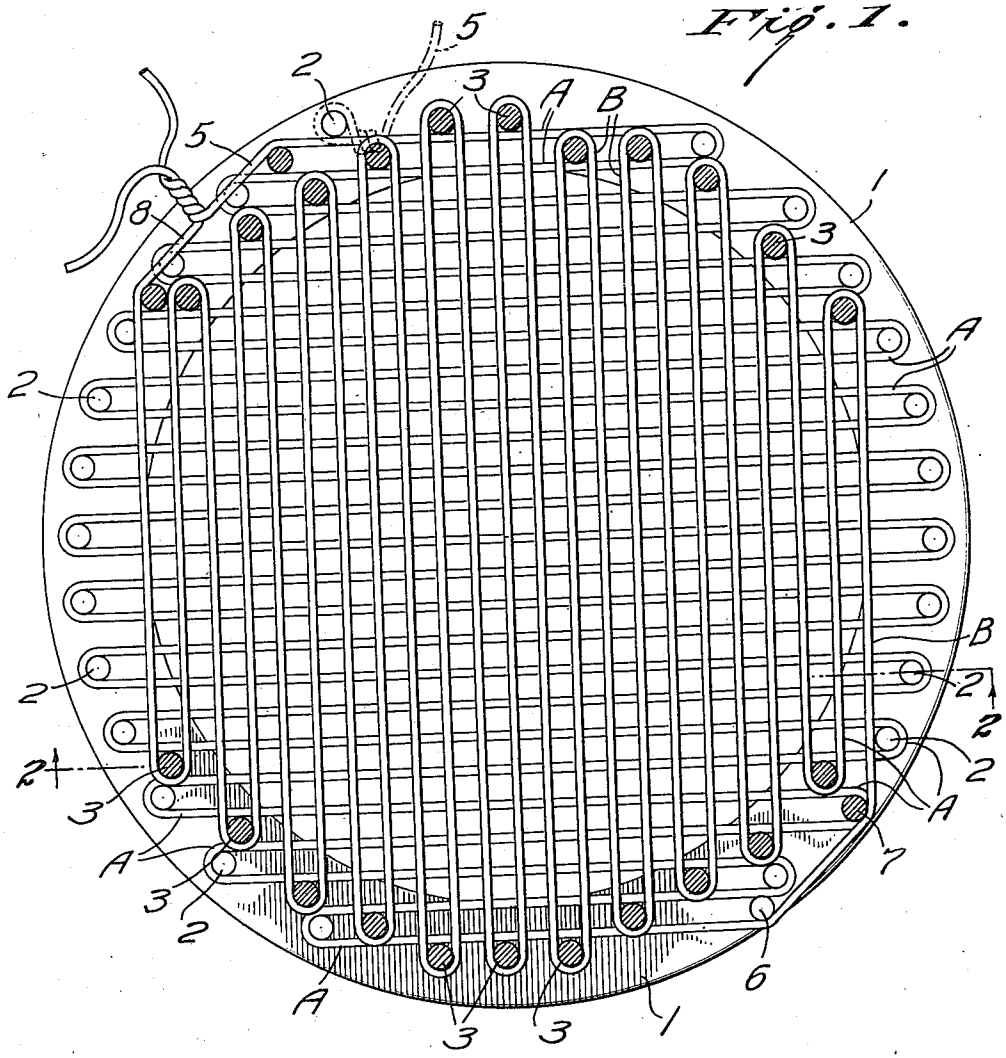
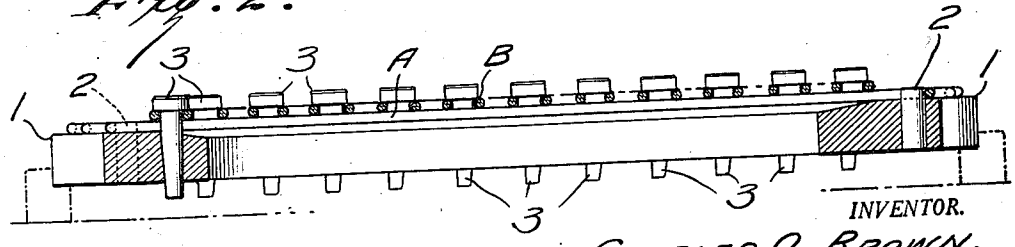


Fig. 2.



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Fig. 3.

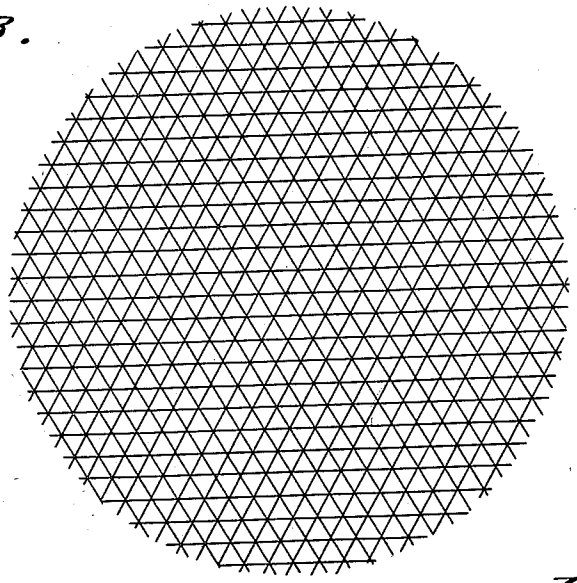


Fig. 6.

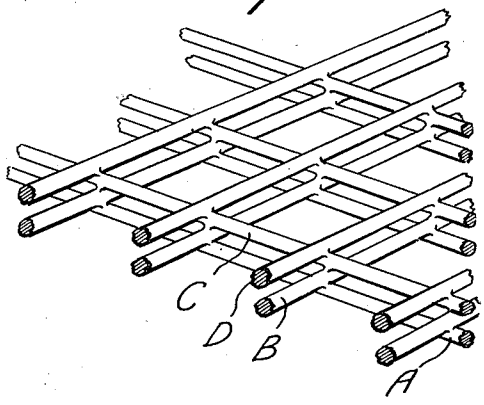


Fig. 4.

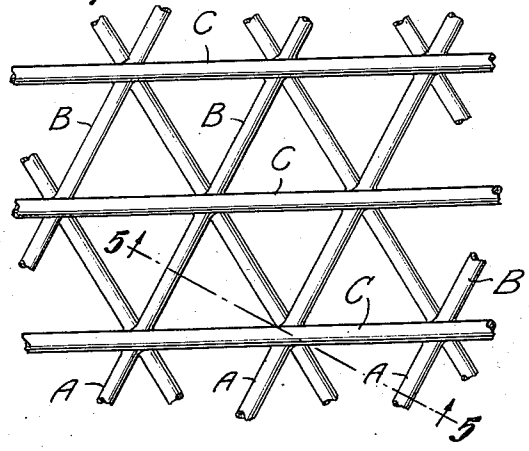
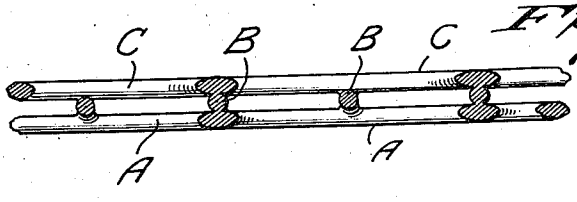


Fig. 5.



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GAUZE

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Application June 23, 1933, Serial No. 677,197

11 Claims. (Cl. 245—2)

The present invention relates to a new fabricated gauze.

While the invention is particularly applicable to the fabrication of platinum gauze for use in the manufacture of nitric acid from ammonia wherein the platinum gauze is used as a catalyst, yet obviously the invention is not to be restricted thereto but is equally applicable to other situations where the same advantageous results are desired.

With reference to the formation of platinum gauzes for use in the nitric acid producing industry, the usual method of fabricating such material has been by weaving the wires of platinum into a cloth on what is known as the square or basket weave principle. In this method, part of the wires are threaded into the loom, each wire spaced a definite distance from each adjoining and parallel wire, and the second part of the wires woven over and under each alternate wire in substantially the same space relation as in the case of the first wires mentioned. This makes a square mesh of warp and weft strands.

Converters for the oxidation of ammonia to nitric acid are usually cylindrical in shape, with the result that the platinum catalyst gauze used is substantially circular in configuration. This meant that a square piece of fabric as above made necessarily had to be trimmed around the edges and into a circular configuration. This entailed not only an unnecessary loss of effort in fabricating that part of the gauze outside of the eventual circle, but the wire thus trimmed was useless for any purpose except scrap. This involved a considerable unnecessary expense.

Another objection to the prior method of fabrication is that due to the fact that the wires are actually woven, they are undulating in extent. Consequently more wire is required for any one reach between two given points than if a perfectly straight wire were used.

Another objection to the use of the prior platinum gauze as used in ammonia oxidation is that due to the fact that the warp and weft strands were not in parallel planes, due to the undulating weaving effect, such meshes between wires offered an unnecessary resistance to gas flow, with consequent undesirable back pressure.

Another objection inherent in strictly woven gauzes has been that there is no positive uniting of wires, that is, mere frictional contact due to the weaving is relied upon to maintain the gauze in its assembled relation. The gauze is, therefore, readily subject to distortion upon accidental contact with other bodies, and in addition if any particular strand breaks, and platinum is particularly subject to cracking and consequent breakage, this strand then becomes loose throughout its entire length from each side of the break, with consequent undesirable results.

It is the principal object of this invention, therefore, to overcome all of the above defects heretofore recognized as such, and to devise ways and means for producing a fabric, particularly a platinum fabric, which would have maximum efficiency and life, and involving minimum expense in the cost of material and fabrication.

To this end a preferred embodiment of the invention includes the provision of an annular ring having a series of removable pins thereon so arranged with relation to each other that an integral strand of wire may be laid down in parallel lengths, reversing its direction around the pins at each side of the ring. All of such parallel lengths are, of course, in a single plane. The end of the last length of wire thus laid down is then extended on top of this first series of wires and at an angle thereto, then reversed around one of a second set of pins and back and forth in the same manner until a second parallel series of wire lengths has been laid down on top of the first series. The two series of wires are, of course, in parallel planes.

By arranging the first series of pins shorter than those of the second series and extending them above the face of the annular ring substantially the thickness of the wire used, they do not interfere with the laying down of the second series of wires. It is desirable that the second series of pins be provided with flanged heads and tapered shanks so that when the pins are pushed down into their sockets, the heads effectively hold the second series of wires rigidly against the first during the subsequent integrating operation.

The fabric thus formed is then subjected to a welding operation, such for instance as the application of heat either from above or below or both, to reach a welding temperature while applying requisite pressure. This causes a fusion or welding at the area of contact of the wires and permanently unites them together.

After the welding operation the headed pins may be removed and the fabric taken off of the ring, the periphery selvaged in any desired manner, and the gauze is ready for use.

It is to be noted that in the above procedure a minimum length of wire is used between any two points, thus cutting down the initial quantity of wire used. The two series of wires are in

parallel planes, which thus insures a uniformity of mesh with consequent elimination of gas back pressure and minimum ease of gas flow through these apertures. It is also to be noted that no after trimming is necessary as the gauze is formed in the eventual shape desired, without loss or further manipulation. The fact that each wire is welded to its neighbor on the area of contact insures rigidity even though a wire becomes cracked and broken at any one place, all of which contributes materially toward the greater desirability of such material.

Where more than two series of wires are desired, the additional wires may be laid down in much the same manner, or two gauzes of two series of wires each may be placed one on the other and the welding operation performed to unite the four layers together.

In some instances a three layer gauze may be prepared by laying down each series of wires at substantially a sixty degree angle to the others. Obviously any combination of the above may be resorted to.

The invention further consists in the novel arrangement, construction and combination of parts more fully hereinafter described and shown in the accompanying drawings.

In the drawings—

Fig. 1 is a plan view of a gauze after having been fabricated and before welding.

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

Fig. 3 is a diagrammatic plan view of a three strand gauze.

Fig. 4 is a partial enlarged plan view of the gauze of Fig. 3, showing the welded areas.

Fig. 5 is a sectional view along the line 5—5 of Fig. 4.

Fig. 6 is a partial perspective view of a four series gauze fabricated according to this invention.

Referring now with particularity to an embodiment illustrated, an annular ring is shown at 1 having a series of short pins 2 and long pins 3 located in sockets therein. It is preferable that these pins be removable, although a snug fit is highly desirable. The pins 3 are provided with tapered shanks and a flanged head for a purpose more fully described hereinafter.

In carrying out a preferred method of manufacture, the pins 2 are placed in their sockets, which are so arranged as to give the proper spacing of wires for the particular use desired. In platinum gauze used for ammonia oxidation, wire with a diameter of .003 inch is usually used and such wire is woven with eightly meshes to the inch, that is, a spacing of .009 inch between wires.

The proper spacing of pins having been accomplished, one end 5 of the wire may be suitably wrapped around a pin 2 to temporarily anchor the same and a series of parallel lengths of wires laid down by reversing the wire back and forth around pins 2 at opposite sides of the ring, the lengths of this first series of wires being designated by the letter A.

As shown in Fig. 2, the tops of the pins 2 extend above the face of the ring 1 approximately to the level of the top of the wire lengths A. They therefore do not interfere with the laying down of the second series of wires.

The last length of the series A is extended around the terminal pin 6 and what may be designated as the starting pin 7 for the second series of wires, and then extended back and forth on top of the wires of the series A to form a second series B at a right angle to those of series A, utilizing the pins 3. The end 8 of the wire may then be suitably joined as by twisting or the like to the initial or starting end 5, which thus secures the fabric in place and prevents the same from unraveling until the welding operation is complete.

It is to be noted that due to the fact that the series of wires A underlies those of the series B and that the headed pins 3 overlie the series of wires B, the parts are securely held together in their proper relationship until they may be more permanently united as by welding.

In securing the wires together permanently, the thus formed fabric on the ring 1 may be subjected to a welding heat through the annulus, with requisite pressure to fuse the wires at their area of contact and thus insure permanence of the fabric. It is a well known and valuable property of platinum that it welds together under heat and sligfiht pressure. In applying pressure to the platinum during this welding operation, which pressure may be secured and applied in any desired manner, the wires are squeezed together at their area of contact to make a slight enlargement, as is clearly shown in Figs. 4, 5 and 6. This more gen- erous contact is of value in the catalytic reaction because it exposes a larger area to the gases undergoing treatment. At the same time it has a tendency toward smoothing over the joints between wires, which contributes materally toward the ease of flow of gas through the meshes without turbulence and without causing undue back pressure.

If a fabric is desired having more than two series of wires, obviously additional series may be laid down on top of the series B to whatever extent is indicated, by the use of additional series of pins, the welding operation securing together all of the series. On the other hand, a plurality of two series of gauzes may be thus produced and the individual gauzes welded together in much the same manner as above described.

Where a triangular mesh is desired as is shown in Figs. 3 and 4, three series of wires may be laid down, each at an angle of sixty degrees to the other, and this may be readily accomplished by arranging the series of pins in the proper relationship in the ring frame.

After the fabric has thus been assembled and welded together, the pins are removed and the fabric taken from the frame. If desired, a selvage may be produced on the periphery of the mesh by welding the ends of the wires together, or by securing thereto a thin sheet or a plate as the case may be.

In Figs. 3, 4 and 5 the gauze is shown made of three series of parallel lengths of wires indicated as A, B and C, fabricated in the manner described for the fabric of Fig. 1. It is to be noted that the mesh of this modified form of gauze takes the form of an equilateral triangle, which is desirable in some instances.

In Fig. 6 there is shown two layers of fabric forming series of strands A, B, C and D. While in some cases it may be found desirable to lay down the four series of wires on the ring frame and then weld the series together at their area of contact, yet in most cases it is more satisfactory to weld two series only at a time and then weld together these completed fabrics. This prevents any tendency at distortion or misalignment of the wires.

It has been found that fabric formed as above described is much more efficient than fabric woven from the same number of strands of the

same size wire by a strictly weaving process. For instance, it has been found that a four series gauze such as shown in Fig. 6 is more efficient than the use of two layers of woven cloth of the heretofore accepted type. This is in spite of the fact that the gauze of Fig. 6 will actually contain less platinum than the same effective area of the woven type.

It will be obvious, of course, that this present fabric is more desirable than that of the ordinarily accepted type in that a considerably less amount of platinum is required, and the labor of weaving is replaced by a much simpler process of threading the wires on the frame and then welding them together, with mass welding over a relatively large area in a single operation, all of which is highly desirable.

I claim:

1. A wire gauze comprising a plurality of superimposed series of parallel lengths of wire, one series being at an angle to the other, said wires being in parallel planes, the wires being welded together at their area of contact in which the several series of wires are a continuous and integral strand.

2. A wire gauze comprising a plurality of superimposed series of parallel lengths of wire, one series being at an angle to the other, said wires being in parallel planes, the wires being welded together at their area of contact in which the series are three in number, the wires of each series being at an angle of substantially sixty degrees to the wires of the next series.

3. A catalyst gauze comprising a series of parallel lengths of platinum wire, a second series of parallel lengths of platinum wire superimposed thereon at an angle to the first series of less than 90°, the wires of each series being welded at their area of contact.

4. A catalyst gauze comprising three superimposed series of parallel lengths of platinum wire, the wires of each series being substantially at an angle of sixty degrees to those of the others, the wires being welded together at their area of contact.

5. A frame for making wire gauze comprising an annular ring member, a plurality of series of pins carried by said member, the pins of one series being shorter than those of the other.

6. The device of claim 5, the longer pins being headed and having tapered shanks.

7. A wire gauze comprising a plurality of superimposed series of parallel lengths of wire, the wires of one series being at an angle to the wires of another series of less than 90°, the wires of each series being in parallel planes, the wires being welded together at their area of contact in which the wires of each series are continuations of the wires of the other series.

8. The catalyst gauze of claim 3 in which the wires of the second series are continuations of the wires of the first series.

9. The catalyst gauze of claim 4 in which all three series of wires are continuous.

10. A wire gauze having three superimposed series of parallel lengths of wires, one series being at an angle to the other of less than 90°, said wires being in parallel planes, the wires being welded together at their area of contact.

11. A wire gauze having four superimposed series of parallel lengths of wires, one series being at an angle to the other of less than 90°, said wires being in parallel planes, the wires being welded together at their area of contact.

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