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A. E. SCHAAF ET AL

2,190,886

FILTER MEANS AND METHOD OF MAKING SAME

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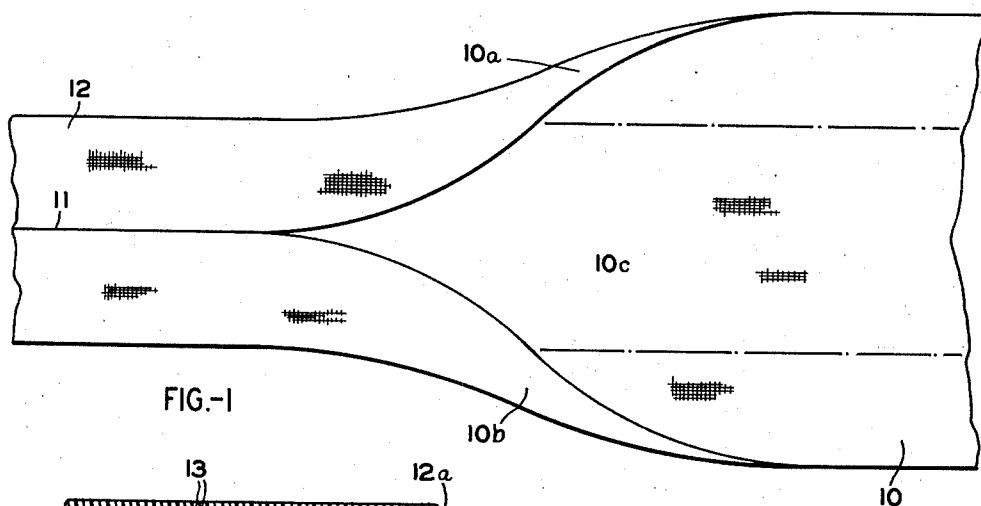


FIG.-1

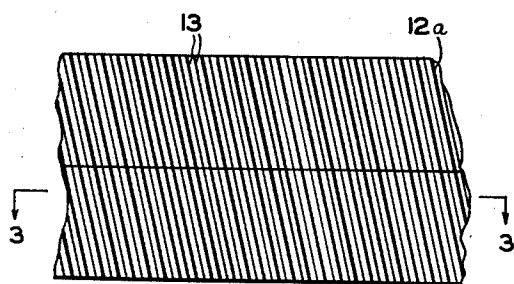


FIG.-2

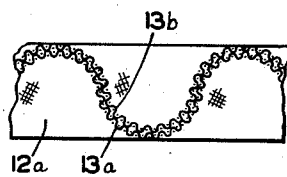


FIG.-3

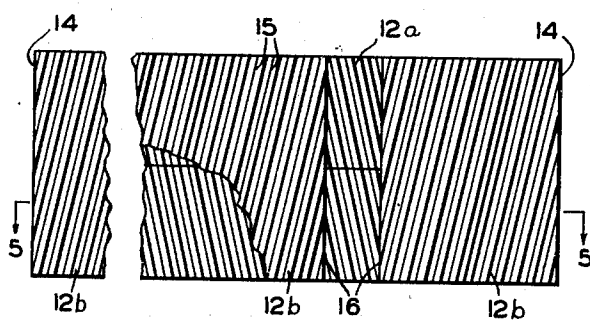


FIG.-4

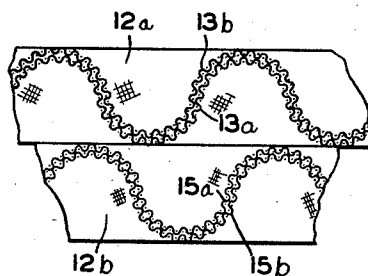


FIG.-5

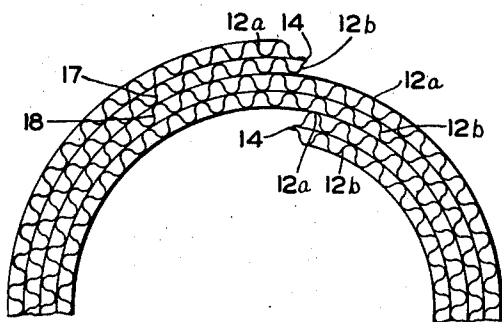


FIG.-6

ALBERT E. SCHAAF INVENTORS
GEORGE M. WALTON &
CLARENCE J. GLANZER
BY

Hyde, Higley & Meyer
ATTORNEYS

UNITED STATES PATENT OFFICE

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FILTER MEANS AND METHOD OF MAKING SAME

Albert E. Schaaf, Chagrin Falls, George M. Walton, Cleveland Heights, and Clarence J. Glanzer, Lakewood, Ohio, assignors to Air-Maze Corporation, Cleveland, Ohio, a corporation of Delaware

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4 Claims. (Cl. 183—71)

This invention relates to improvements in filter means and a method of making the same.

An object of the present invention is to provide a filter element of screen material wherein special attention is paid to masking the raw edges of the screen. It will be appreciated by those who have handled this type of filter element that the raw edges of the screen make these elements very difficult to handle for processing purposes or for assembly in proper mountings or for a rolling operation to make an annular filter element.

Another object of the present invention is to provide a novel screen element of several thicknesses of screen material wherein certain of the layers have nesting corrugations and other layers are held apart by non-nesting corrugations.

Another object of the present invention is to provide a novel method for constructing a filter element of the type above described as will more clearly appear from the accompanying drawing and description.

In the drawing, Fig. 1 is a plan view showing the first step in forming a piece of screen material into the novel filter element; Fig. 2 shows a portion of the folded strip of Fig. 1 corrugated along parallel lines; Fig. 3 is an enlarged fragmental sectional view taken in the position of the line 3—3 of Fig. 2; Fig. 4 is a plan view of a strip similar to Fig. 2 folded over upon itself lengthwise and illustrating the crossing of the corrugations between adjacent strips of double thickness; Fig. 5 is an enlarged fragmental sectional view taken along the line 5—5 of Fig. 4; while Fig. 6 is an end view illustrating how the strip of Fig. 4 may be rolled to form an annular filter element.

This invention is in the nature of an improvement over our copending application Serial No. 133,428, filed March 27, 1937.

Our improved filter element will be best understood by a description of the successive steps necessary or desirable in forming it. In Fig. 1 we have shown a piece 10 substantially rectangular in shape of a flat wire screen material. This is run through forming rolls which fold the side edge portions 10a and 10b inwardly upon the intermediate portion 10c of the piece of screen material preferably so that the edges meet as indicated at 11 giving an elongated strip of screen material of double thickness. Such a strip appears at the left end of Fig. 1 and is marked 12. This double strip is then run through a pair of crimping rolls to provide parallel corrugations 13 extending at an angle to the side edges of the

strip other than normal, as indicated in Fig. 2 where the corrugated strip is marked 12a. As more clearly indicated in Fig. 3 the result at this point is a strip of double thickness having nesting corrugations 13a and 13b.

The next step is to fold the strip 12a endwise along one or more lines 14 which extend normal to the longitudinal side edges of the strip 12a. Thus the portions 12b are folded over on top of the lower portion 12a and as shown in Fig. 4 this places the corrugations 15 of the upper layer at an angle to the corrugations 13 in the lower layer so that each double thickness is separated from the other because of the non-nesting corrugations.

The above described effect of non-nesting layers of screen is obtained by a single fold 14 but preferably I provide such a fold at each end of the strip as indicated in Fig. 4 so as to leave no raw edges at the ends of the strip. It will be noted that in the form of Fig. 4 there are no raw edges of the screen either at the sides or ends of the strip.

To more clearly indicate the character of the strip of Fig. 4 having four layers of wire screen, we have shown an enlarged detail in Fig. 5. Here the layers 13a and 13b have nesting corrugations as shown in Fig. 3. The layer 12b has the nesting corrugations here indicated as 15a and 15b for clearness of description although it will be understood that these are the same corrugations as in the layer 12a and simply folded over upon the same. In Fig. 5 then we have on one side of of the strip the nesting layers 13a and 13b and on the other side the nesting layers 15a and 15b, but the two layers are separated in a non-nesting manner, that is to say, the corrugations 13a and 15a do not nest because they lie at an angle one to the other as indicated in Fig. 4.

The strip of Fig. 4 may be utilized in any desired fashion either straight, curved or otherwise folded, but a common manner of using the same is to roll it into an annular filter element, a partial view of which is shown in Fig. 6. For this purpose the ends 16 of the layer 12b in Fig. 4 do not quite meet as this is the radially innermost layer of the annular screen and when the screen is rolled to the form of Fig. 6 the ends 16 meet approximately so as to give an annular element having four layers of screen at all points.

It will be realized by those skilled in this art that when the strip of Fig. 4 is rolled in the form of Fig. 6 then the adjacent layers, as for instance those contiguous at 17 and 18, are non-nesting as to the corrugations because in the

rolling the corrugations run at an angle to each other in contiguous layers at this point.

It will be recognized by those skilled in this art that we have here disclosed an improvement over the above mentioned copending application because it gives a more compact unit which is more easily and cheaply formed by automatic machinery. Also the non-nesting relationship of adjacent layers indicated in Fig. 4 is formed much more conveniently by the short cross folds 14 rather than by the extremely long longitudinally extending folds utilized to provide this non-nesting relationship in the device of the copending application. Furthermore the article here formed gives a screen of greater density because of the crimping of the double layers, and the masking of all of the raw edges of the wire screen material is very advantageous in the handling of the finished product and in the rolling of the strip of Fig. 4 to the annular form of Fig. 6.

What we claim is:

1. A filter unit comprising an elongated strip of screen material having its side edges folded along parallel lines inwardly over a central portion of the strip forming a strip of double thickness, said double strip having parallel nesting corrugations at an angle other than normal to the side edges of the strip, and said strip being bent transversely to fold one portion of said double strip lengthwise over another portion thereof, whereby the last named folded over portion does not nest on the underlying portion because of crossing corrugations.
2. A filter unit comprising an elongated strip of screen material having its side edges folded along parallel lines inwardly over a central portion of the strip in such a manner that the said side edges lie between the edges of the folded strip and forming a strip of double thickness, said double strip having parallel nesting corrugations at an angle other than normal to the side edges of the strip, said double strip having its end edges folded along lines normal to the side

edges of the strip inwardly over a central portion of the double strip in such a manner that the said end edges of the double strip lie between the end edges of the completed folded strip and forming a strip of four thicknesses whereby no raw screen edges are exposed along either the sides or ends of said unit.

3. The method of making a filter element comprising folding two side portions of a rectangular piece of screen material along lines parallel to opposite sides of said rectangle inwardly upon a central portion of the piece in a manner to provide an elongated strip of double thickness, corrugating said double strip along parallel lines other than normal to the side edges of said double strip, and folding said double strip endwise along a line normal to its side edges, whereby to form a strip of four screen layers wherein two pairs of layers have nesting corrugations and the pairs are separated from each other by non-nesting corrugations.

4. The method of making a filter element comprising folding two side portions of a rectangular piece of screen material along lines parallel to opposite sides of said rectangle inwardly upon a central portion of the piece in a manner to provide an elongated strip of double thickness, corrugating said double strip along parallel lines other than normal to the side edges of said double strip, and folding each end of said double strip endwise over upon the central portion of said double strip, said last named folds being along lines normal to the side edges of said double strip, whereby to form a strip of four screen layers wherein two pairs of layers have nesting corrugations and the pairs are held apart by non-nesting corrugations and there are no raw edges at the sides or ends of said unit so that it is easily handled as for instance for rolling into an annular element.

ALBERT E. SCHAAF.
GEORGE M. WALTON.
CLARENCE J. GLANZER.