T. W. VARLEY.

PROCESS OF MAKING EXPANDED ARTICLES.

APPLICATION FILED FEB. 24, 1915.

1,208,241.

Patented Dec. 12, 1916.

2 SHEETS—SHEET 1.

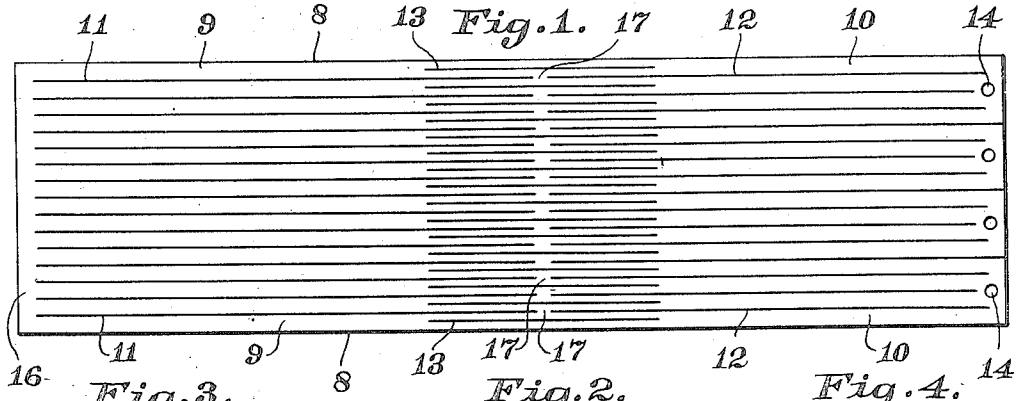


Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.

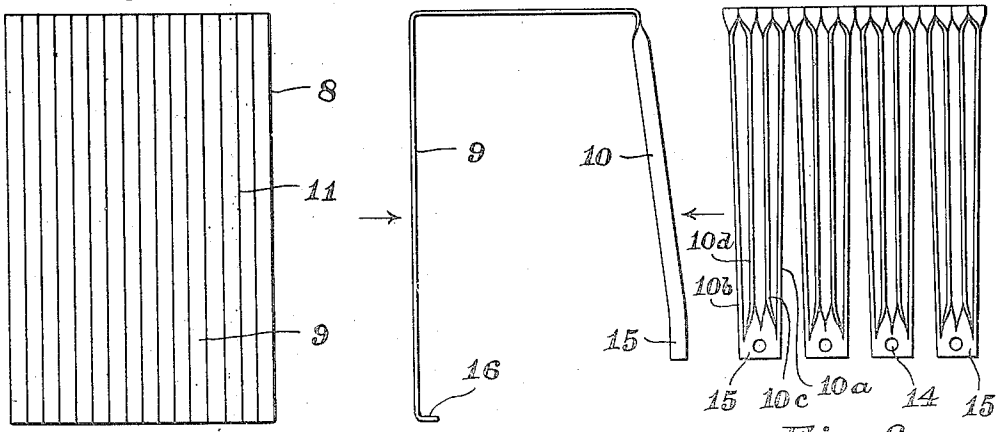


Fig. 6.

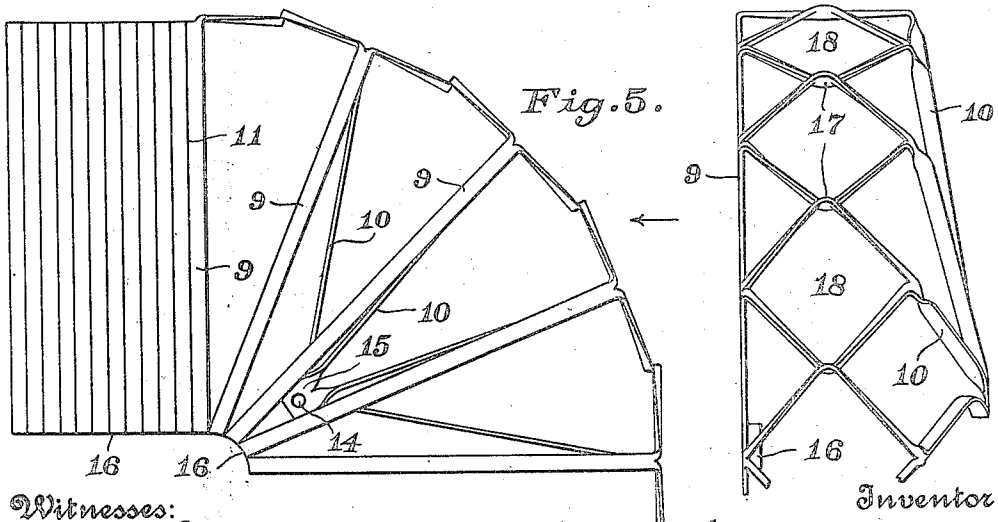


Fig. 5.

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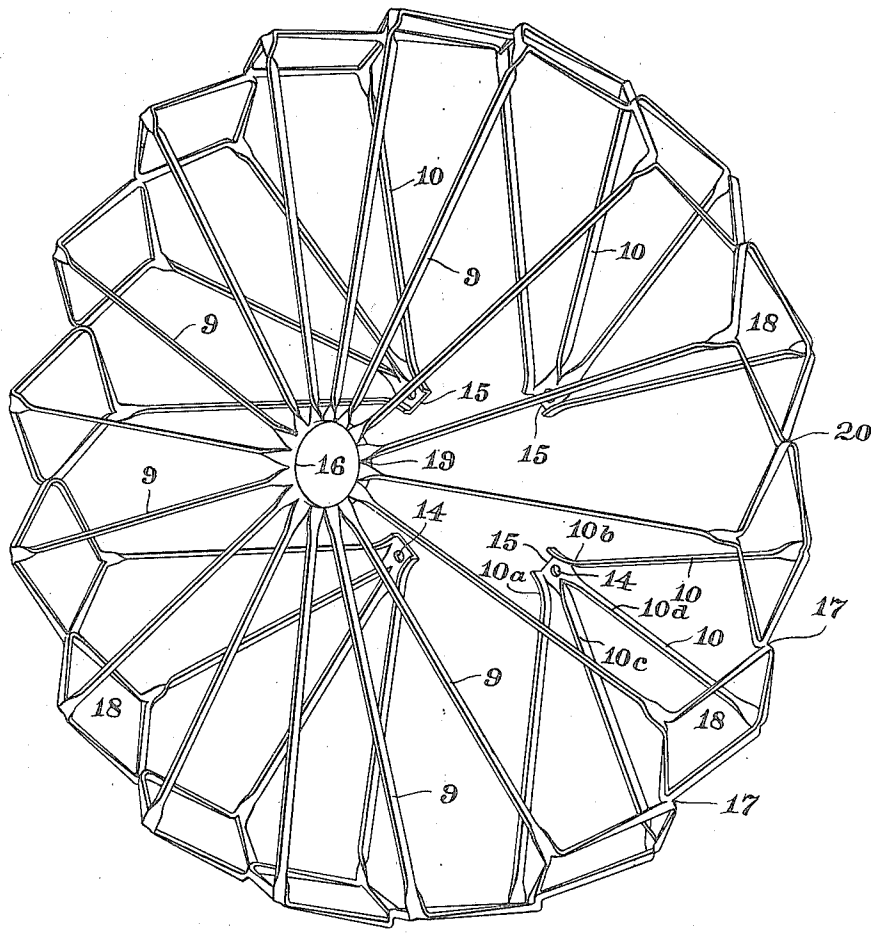
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2 SHEETS—SHEET 2.

Fig. 7.



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PROCESS OF MAKING EXPANDED ARTICLES.

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To all whom it may concern:

Be it known that I, THOMAS W. VARLEY, a citizen of the United States of America, and resident of the borough of Manhattan, city, county, and State of New York, have invented a Process of Making Expanded Articles, of which the following is a specification.

My invention relates to a process of making expanded articles such as fan guards and has particular application in connection with the making of fan guards for electric fans, although the guard produced by the practice of the process may as well be used for the protection of other objects than fans, such as any rotating wheel or like object.

In connection with the accompanying drawings I shall describe one way of practising my process, the features thereof being more particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view of a blank, sheared and perforated as hereinafter described; Fig. 2 is an edge view of the blank shown in Fig. 1 after bending; Fig. 3 is a view, in elevation, of the left-hand side of Fig. 2 looking in the direction of the arrow; Fig. 4 is a view, in elevation, of the righthand side of Fig. 2, looking in the direction of the arrow; Fig. 5 is a view similar to Fig. 3 showing the guard partly expanded from the blank; Fig. 6 is a fragmentary side elevation of the form shown in Fig. 5, looking in the direction of the arrow; Fig. 7 is a perspective view of the completely expanded guard.

Similar numerals of reference indicate similar parts throughout the several views.

8 indicates a blank of suitable material, such as thin steel, cut to give the desired dimensions to the finished guard. The illustrative finished guard as shown in Fig. 7, having sixteen radial arms 9, 9, in front, and a corresponding number of arms, 10, 10 at the back, the blank 8 is sheared at 11,11, to form the stated number of front arms, and at 12, 12 to form the corresponding number of rear arms. Blank 8 is also sheared at 13, 13, intermediate the shearings at 11, 11, and 12, 12, and overlapping the oppositely disposed ends of these latter, as shown, to form, in conjunction with said latter shearings, the expanded circular face of the guard shown in perspective in Fig. 7. Every fourth shearing 12 extends through the end of the blank as shown in Fig. 1, in this case forming the arms 10, 10 in groups of four. Every second shearing 12 of each group is shorter than the first and third shearings of the group to provide space for perforation 14 and to form attachment means 15 for the guard. The shearings 11, 11, end adjacent the end of the blank to form the connecting ring 16 in the front of the guard at the center as shown in Fig. 7. The portions 17, 17 of the blank between the inner ends of shearings 11, 11, and 12, 12, form connecting means in the expanded circular face of the guard as shown in Figs. 6 and 7. The blank 8 having been sheared as described the ends are bent at an angle to the plane of the blank along a line adjacent the ends of shearings 13, 13, as shown in Fig. 2, and the portion to form the ring 16 is bent at an angle to the blank along a line adjacent the outer ends of shearings 11, 11. The rear arms 10, 10, formed by shearings 12, 12 are then twisted or bent as follows (see Fig. 4): In the form shown the arms 10, 10 are in four groups each of which is similar to the others. The outer left and right hand arms, indicated by 10^a and 10^b respectively are bent downward to the left and right respectively to form the corresponding arms in Fig. 7, the illustration in Fig. 4 showing the arms from the rear and the illustration in Fig. 7 showing the arms from the front or from inside the guard looking out. The two inner arms of each group, indicated by 10^c and 10^d respectively are bent upward to the left or clockwise, and to the right or counter-clockwise respectively, as shown. By this process of manipulation the attachment means 15 are formed. The sheared blank, partially formed as described is then expanded as shown in Figs. 5 and 6. The blank is pulled outward to the right, as shown in Fig. 5, or downward from the top in Fig. 2, the continual expanding or pulling, in conjunction with arms 9, 9 and 10, 10, causing the expanded blank to travel in the arc of a circle about a center which lies within the connecting ring 16, which latter is formed by completing the process of expansion as described. In said process of expansion the shearings 13, 13, permit the spreading of the blank to form the expanded circular face of the guard, resulting in the formation of openings 18, the portions 17, 17 tying the edges of these openings together at the center of the circular face of the guard (see Fig. 6). The arms 9, 9 extend radially

from ring 16 to the front angles of the openings 18 and the arms 10, 10 extend radially from the several attachment means 15 to the rear angles of the openings 18. The arms 9, 9 may then be twisted to present their edges to the front. This may be done, for example, by twisting each arm from right to left counter-clockwise beginning say, at the top of Fig. 7. The point of meeting 19 of the guard at the connecting ring 16 and the point of meeting 20 at the beginning and ending of the expanded circular face may then be fastened together by any suitable means, such as spot welding.

For the use of the guard in connection with electric fans it is desirable to offer as little resistance as possible to the flow of air and therefore the radial arms as well as the boundaries of openings 18 should be edgewise to the flow of air. The boundaries of openings 18 automatically assume this position during the process of expansion.

The attachment means 15 may be secured in any suitable way to the fan support. By arranging the arms 10, 10 in four groups, sufficient space is left between the adjacent groups to permit the passing of the guard over the fan in assembling. The manner of bending arms 10, 10 as described, permits the giving of arms 10^a and 10^b a longer reach than arms 10^c and 10^d, while at the same time each group of arms unites at the attachment means 15.

The connecting ring 16 forms a means of tying the arms 9, 9 together at the center.

It is obvious that the process may be practised in connection with the production of other articles than guards and is not limited to the production of guards for electric fans only. It is therefore obvious that the blank from which the finished product is expanded may be of other shape than rectangular, the finished product being correspondingly varied in shape. It is therefore clear that the principle of the invention is applicable in many different ways for the production of many different articles and I do not restrict myself to the details described further than the scope of the appended claims demands.

I claim:

1. The process of making expanded articles consisting in providing a blank of rectangular shape, shearing the same longitudinally from a point adjacent each end toward the middle and leaving a space between the ends of the oppositely disposed shearings, shearing the same longitudinally intermediate the first mentioned shearings and across the space between the ends of said shearings, bending the blank along the ends of the intermediate shearings and expanding the same along the lines of the shearings.

2. The process of making expanded articles consisting in providing a blank of rectangular shape, shearing the same longitudinally from a point adjacent each end toward the middle and leaving a space between the ends of the oppositely disposed shearings, shearing the same longitudinally intermediate the first mentioned shearings and across the space between the ends of said shearings, bending the blank along the ends of the intermediate shearings, bending the blank along the ends of one of the first mentioned shearings and expanding the blank along the lines of the shearings.

3. The process of making expanded articles consisting in providing a blank of rectangular shape, shearing the same longitudinally from a point adjacent one end of said blank toward the middle, shearing said blank longitudinally from a point adjacent the other end of the blank toward the middle in line with said first mentioned shearings but leaving a space between the oppositely disposed ends of said shearings, certain of said latter shearings extending through the end of the blank to divide the resulting strips into groups, shearing the blank longitudinally intermediate the other shearings and across the space between the ends of said other shearings, bending the blank along the ends of the intermediate shearings, bending the blank along the ends of the first mentioned shearings and expanding the blank along the lines of the shearings.

4. The process of making expanded articles consisting in providing a blank of rectangular shape, shearing the same longitudinally from a point adjacent one end of said blank toward the middle, shearing said blank longitudinally from a point adjacent the other end of the blank toward the middle in line with said first mentioned shearings but leaving a space between the oppositely disposed ends of said shearings, certain of said latter shearings extending through the end of the blank to divide the resulting strips into groups, shearing the blank longitudinally intermediate the other shearings and across the space between the ends of said other shearings, bending the blank along the ends of the intermediate shearings, bending the blank along the ends of the first mentioned shearings, bending the strips of each group so that they will permit subsequent expansion, and expanding the blank along the lines of the shearings.

5. The process of making expanded articles consisting in providing a blank of rectangular shape, dividing the blank longitudinally into a plurality of strips joined in the middle, the outer ends of one set of strips being integral with the blank, the other set of strips being divided into a plurality of groups by cutting through the end of the blank at intervals, shearing the blank intermediate said strips and across the portion joining said strips at the middle, bending the blank along the ends of said

intermediate shearings, bending the blank along the ends of the strips integral with the blank to form a rim about which the subsequent expansion takes place, bending the strips of each group of strips so that they will permit the subsequent expansion and expanding the blank along the lines of the shearings.

6. The process of making expanded articles consisting in providing a blank of rectangular shape, shearing the same longitudinally from a point adjacent one end of said blank toward the middle, shearing said blank longitudinally from a point adjacent the other end of the blank toward the middle in line with said first mentioned shearings but leaving a space between the oppositely disposed ends of said shearings, certain of said latter shearings extending through the end of the blank to divide the resulting strips into groups, the intermediate shearings in each group terminating adjacent the end of the blank to leave a space on each group to serve as attachment means, shearing the blank longitudinally intermediate the two sets of first mentioned shearings and across the space between the inner ends of said shearings, bending the blank along the ends of the last mentioned intermediate shearings, bending the blank along the ends of the first mentioned shearings and expanding the blank along the lines of the shearings.

7. The process of making expanded articles consisting in providing a blank of rectangular shape, dividing the blank longitudinally into a plurality of strips joined in the middle, the outer ends of one set of strips being integral with the blank, the other set of strips being divided into a plurality of groups by cutting through the end of the blank at intervals, shearing the blank intermediate said strips and across the portion joining said strips at the middle, bending the blank along the ends of said intermediate shearings, bending the blank along the ends of the strips integral with the blank, bending and twisting the strips of each group of strips so that they will permit the subsequent expansion and will present their edges frontwise, expanding the blank along the lines of the shearings and twisting the strips having their ends integral with the blank so that they will present their edges frontwise.

8. The process of making fan guards and the like consisting in providing a blank of rectangular shape, dividing the blank longitudinally into a plurality of strips joined in the middle, the outer ends of one set of strips being integral with the blank so as to form a rim from which when expanded the strips connected therewith will radiate to form the front face of the guard, the other set of strips being divided into a plurality of groups by cutting through the end of the blank at intervals so as to leave attachment means for each group from which the strips of the group when expanded, will radiate to form the rear face of the guard, shearing the blank intermediate said strips and across the portion joining said strips in the middle so that when expanded the strips formed by said shearings will form, in conjunction with said first mentioned strips, the circular side face of the guard, bending the blank along the ends of the intermediate shearings, bending the blank along the ends of the strips integral with the blank to form said rim, bending the strips of each of said groups of strips so that they will permit subsequent expansion.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS W. VARLEY.

Witnesses:
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S. M. Baeder.