Oct. 19, 1948. A. W. FRANKLIN 2,451,725

METHOD OF MAKING A STRUCTURAL UNIT

Original Filed March 24, 1945

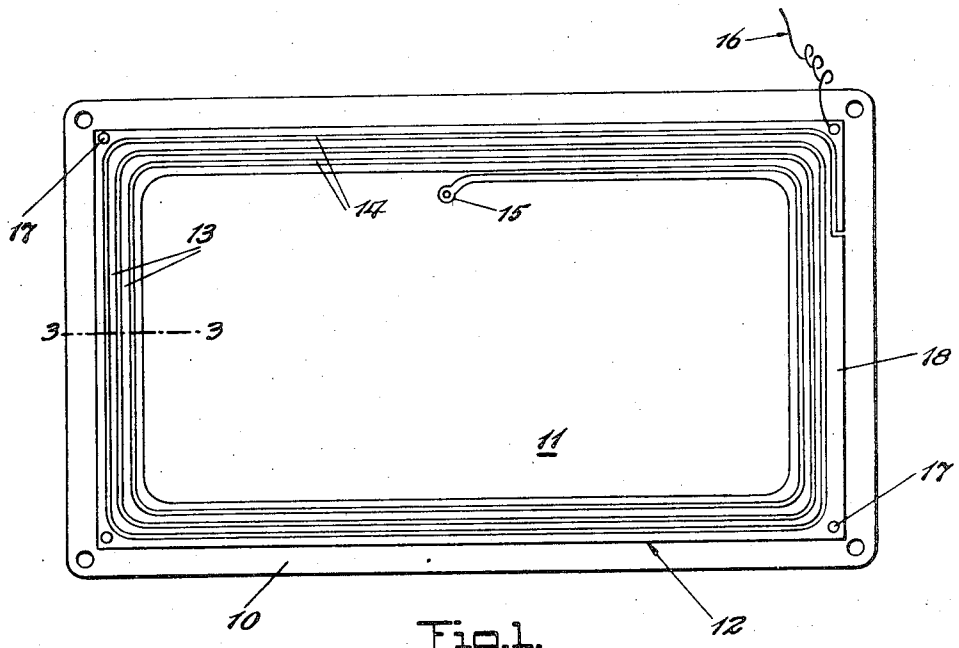


Fig. 1.

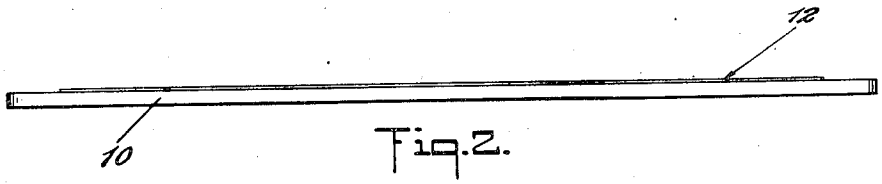


Fig. 2.

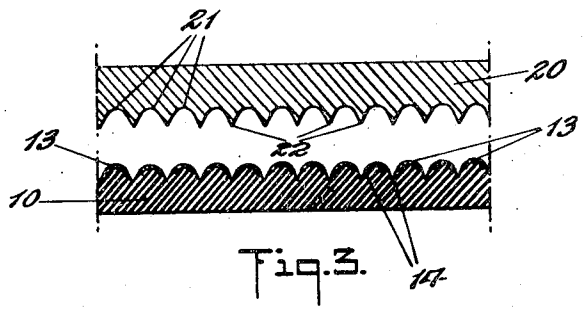


Fig. 3.

INVENTOR
ALBERT W. FRANKLIN
BY Darby & Darby
ATTORNEYS

Patented Oct. 19, 1948 2,451,725

UNITED STATES PATENT OFFICE

2,451,725

METHOD OF MAKING A STRUCTURAL UNIT

Albert W. Franklin, New York, N. Y., assignor of one-half to Jacob Poster, Brightwaters, N. Y.

Original application March 24, 1945, Serial No. 584,523. Divided and this application July 28, 1945, Serial No. 607,605

1 Claim. (Cl. 29—155.5)

1

This invention relates to a novel method of simultaneously forming sheet metal into a desired configuration and attaching it to a support therefor.

This invention more specifically relates to a novel method of forming an antenna for a radio receiving apparatus and attaching it to a suitable support; of forming electrical commutators comprising an insulating support and a plurality of segments attached thereto; of forming various types of structural units comprising a support and a metallic design attached thereto during the operation of forming, as for example, decorative designs, nameplates, and the like; and of forming as a matter of fact sheet metal into any geometrical configuration and simultaneously attaching it to a support.

A specific object of the invention is to provide a novel method of forming a radio receiving antenna and support therefor.

This application is a division of my copending application Serial No. 584,523, filed March 24, 1945, issued as Patent No. 2,401,472 on June 4, 1946.

This invention resides substantially in the steps and series of steps as will be described hereinafter in full detail in connection with the attached drawings.

In the accompanying drawings—

Figure 1 is a plan view of a combined radio receiving set back or closure and antenna unit;

Figure 2 is an edge elevational view of the unit; and

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2 and including a diagrammatic illustration of a portion of the stamping die by means of which the antenna is formed.

In modern radio receiving sets, particularly of the type used for broadcast reception, the electrical components are contained within a decorative housing or cabinet. Such cabinets are usually constructed with a removable back or closure to facilitate access to the interior for repair and replacement of parts.

It is also common in the present day manufacture of such sets to include a built in antenna usually in the form of a loop antenna of such particular configuration as to make it physically compatible with the space provided therefor. These antennas as now made are usually in the form of wound, single layer, open coils supported by some form of spider structure to hold the turns in spaced relation. Without going into detail, it will be apparent, particularly from the following disclosure of this invention, that the manufacture

2

of such wound coils is relatively expensive particularly because of the labor item which is the largest item of cost in the manufacture of these and similar devices.

In accordance with this invention the labor factor is reduced, it is believed, to an absolute minimum with the result that the cost of manufacture of the unit has been greatly reduced.

As illustrated in the drawings, a panel 10 is of some suitable insulating material of which there is a wide range and variety of products commercially available on the market. For example, it may be made of pressed fiber board, plastic and thermosetting materials, wood and the like. Specific examples of suitable commercial products are "Bakelite," "Masonite," "Vulcanite" and the like. The panel 10 will, of course, be made of suitable configuration to fit on or in the back of the cabinet of the radio receiving set of which it is to become a part and, as illustrated, will usually consist of a simple rectangular sheet of the material of the proper thickness. Secured in any suitable manner on what will be the inner face of the panel 10 is a thin sheet 12 of some suitable conducting material such as copper, aluminum, and the like. The sheet 12 will serve its intended purpose if it has a thickness of the order of a few thousandths of an inch and it may be attached to the panel 10 in any suitable manner as, for example, by means of rivets or bolts 17 or, if desired, the parts 10 and 12 can be attached together by means of an adhesive. In the practice of this invention, it is probable that the parts 10 and 12 permanently bonded together will be available as a commercial product.

In accordance with the embodiment illustrated in the drawings, the sheet 12 of metal is processed in one operation to form it into a continuous band in the form of convolutions of gradually decreasing diameter and of any suitable and practical configuration. As illustrated in the drawings, the metal sheet 12 has been cut into concentric convolutions 13 of generally rectangular form. In the process of cutting the sheet, the convolutions are spaced from each other by an air gap 14. The inner terminal end is provided with any suitable form of circuit connecting means such as the integral tab 15. In the form illustrated, the convolutions are enclosed within a terminal portion 18 of the sheet 12 which, as shown, is exteriorly of rectangular shape, that is, the original shape of the metal sheet 12. The other terminal connection to the antenna can be made, for example, by means of the pigtail 16. As clearly illustrated in Figure 1, the central portion of the

sheet 12 is cut out so that the convolutions 13 terminate at their inner end at the tab 15. This forms a true loop antenna in accordance with well known principles in the art of radio communications. In this connection it will be apparent that in providing the unit composed of the insulating panel 10 and the attached metal sheet 12 that the metal sheet can originally be in the form of a hollow configuration so that the central area is open eliminating the necessity of removing the central portion of the sheet not cut into convolutions. This modification is a matter of economy in material and labor costs.

This physical structure is capable of manufacture by means of a simple operation which may be assigned to an automatic machine such as a punch press. The back panel 10 with the attached metal sheet 12 is laid on a platen with the metal sheet facing upwardly, for example, and positioned with respect to a vertical reciprocable die 20, a sectional view of a portion of which is shown in Figure 3. The die will consist of a block of suitable material such as is commonly used for such dies, such as steel, having formed on the end face thereof a continuous groove 21 forming a continuous helical cutting edge which appears at 22 in this figure. When this die is forced against the metal sheet 12 under sufficient pressure, it will be seen that in one stroke it will cut the thin metal sheet 12 into the structure previously described. The convolutions 13 will, in cross-sectional shape, be of arcuate form as is clearly illustrated in Figure 3. The cutting edges 22 will bite into the panel 10 to form the acutely angled grooves 14 and by this same action separate the severed edges of the adjacent convolutions 13 to provide an air gap between them. An automatically operating punch press when fed with units comprising the panel 10 and attached metal sheet 12 can cut the sheet into a loop antenna with one blow. The crimping, bending or deforming of the convolutions 13 as they are formed by this cutting operation will serve to further clinch them to the panel 10 and hold them in place.

It will be seen that by this simple procedure a combined back and antenna for a radio receiving set can be inexpensively produced on a high production rate basis with a very minimum of hand labor required.

As alternative methods of proceeding by means of which the resulting article would come within the scope of the claims hereof, it is contemplated that the convolutions comprising the antenna

either in the form illustrated herein or equivalent forms can be applied to the insulating sheet 10 by electroplating or by application under pressure by what might be termed "branding." It is also within the scope of this invention to form the convolutions from a sheet of metal by cutting methods to form the spaces 14 by various well known metal cutting machines.

From the above description of one application of the method of this invention it will be apparent that the method itself is not limited to the formation of a loop antenna and support therefor but may be practiced in the formation of all conceivable geometrical forms into which a sheet of metal or similar material can be cut and by the cutting operation simultaneously attached to a support.

It will be apparent to those skilled in the art that the details of the subject matter herein disclosed are capable of considerable variation without departure from the novel subject matter thereof and I do not, therefore, desire to be strictly limited to the specific embodiment disclosed herein for illustrative purposes but rather to the scope of the claim granted me.

What is claimed is:

A method of producing an article of manufacture from a non-metallic base sheet and a sheet of metal superimposed thereon consisting of the single operational step of applying a force to shear the metal sheet along a plurality of parallel lines to form a plurality of parallel strips, the shearing action cutting into the base sheet, and sequentially to the completion of the shearing action to bend the strips to form them into non-planar cross sectional shape whereby they are spaced, the planar width of said strips being equal to the distance between the center lines of any adjacent pair of strips.

ALBERT W. FRANKLIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,563,731	Ducas	Dec. 1, 1925
1,837,678	Ryder	Dec. 22, 1931
2,401,472	Franklin	June 4, 1946

FOREIGN PATENTS

Number	Country	Date
687,094	France	Apr. 22, 1930