

June 30, 1942.

R. D. B. MOYNAHAN ET AL

2,288,013

METHOD OF MAKING A CONNECTOR

Filed Oct. 27, 1941

2 Sheets-Sheet 1

Fig. 1.

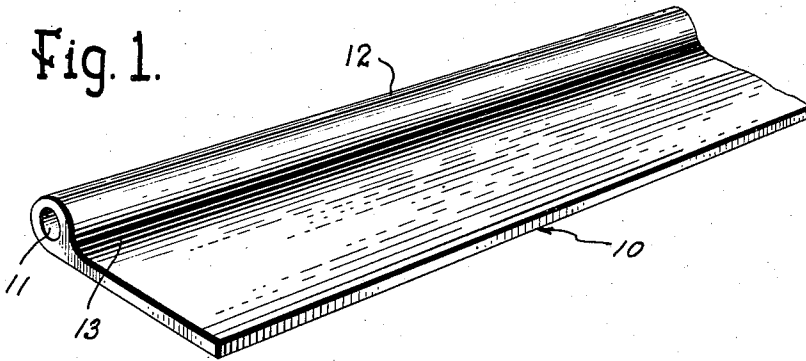


Fig. 2.

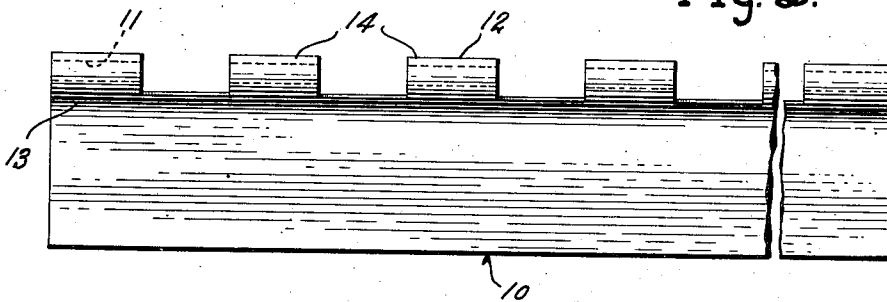
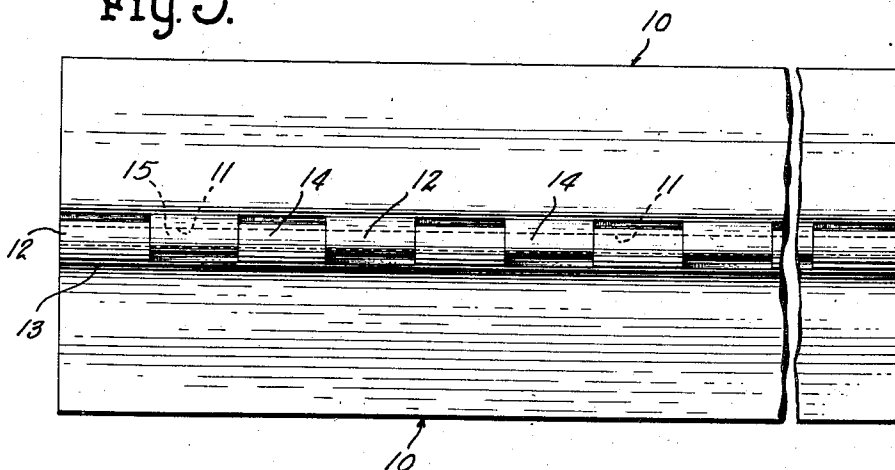


Fig. 3.



INVENTORS:
Roy D. B. Moynahan
Edward K. Pitcher
BY Ramsey, Kent, Chisholm and Lutz
Attorneys.

June 30, 1942.

R. D. B. MOYNAHAN ET AL

2,288,013

METHOD OF MAKING A CONNECTOR

Filed Oct. 27, 1941

2 Sheets-Sheet 2

Fig. 4.

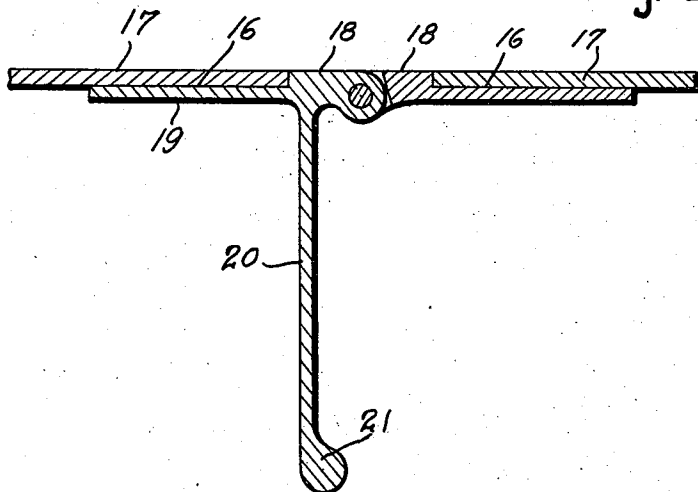


Fig. 5.

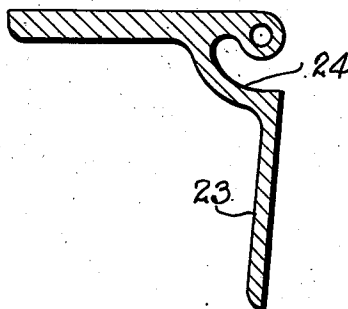
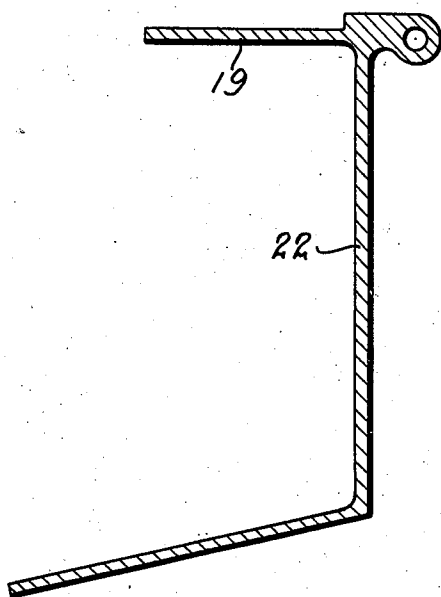


Fig. 6.

INVENTORS
Roy D. B. Moynahan
BY Edward K. Pilcher
Ramsey, Kent, Chisholm & Lutz
Attorneys

UNITED STATES PATENT OFFICE

2,288,013

METHOD OF MAKING CONNECTORS

Roy D. B. Moynahan, Birmingham, and Edward K. Pilcher, Detroit, Mich., assignors to Bohn Aluminum & Brass Corporation, Detroit, Mich., a corporation of Michigan

Application October 27, 1941, Serial No. 416,700

9 Claims. (Cl. 29—11)

This invention relates to a method of making a connector, such as a hinge, and aims to provide an efficient and economical method of constructing such members.

Connectors formed according to the present invention consist of two strips or leaves, each of which has perforated segments which interfit to form a bore receiving a pin. Both of these leaves are cut from a single length of strip which is extruded with a perforation formed near one edge thereof. Preferably the perforation extends through a bead which projects upwardly along one edge of a relatively thin strip. The strip is then cut into suitable lengths and segments are cut out from the perforated edge. Two leaves thus formed are then assembled together with their perforated projections interfitting to form a continuous bore for the reception of the pin.

The connectors may be used as hinges, in which case the pin becomes a hinge pin about which the two leaves rotate, but in other cases the connectors may be used as fastening means to secure parts in fixed relation.

The method of the present invention provides for economical manufacture of connectors in which the perforated projections are homogeneously integral with the leaf members, so that each leaf is a solid piece that resists hinge failure with the full yield strength of the material. The method is particularly advantageous in the producing of relatively long connectors, similar to hinges of the piano type, since the extrusion process can produce a long strip having an accurate perforation that would be impractical to produce by drilling or any other method.

Since the connector leaves are originally formed by an extrusion step, wide variations in shape and design are possible without additional expense, and hence structural formations for reinforcement or other uses may be made integral (i. e., homogeneous) with the leaves. The method is particularly adapted to the formation of the leaves from aluminum, resulting in a hinge that is strong yet light in weight.

These and further objects and advantages of the invention will become apparent as the description proceeds.

While preferred methods of carrying out the invention are disclosed herein, it should be understood that changes may be made in the various steps, or in the arrangement of the steps, without departing from the invention as herein set forth and claimed.

The present application is in part a continua-

tion of our copending application Serial No. 377,534, filed February 5, 1941.

In the drawings:

Fig. 1 is a perspective view of a strip, as extruded, from which one form of connecting members are fabricated.

Fig. 2 is a plan view of a section of a strip after spaced segments have been cut from the perforated edge.

Fig. 3 is a plan view of an assembled connector.

Fig. 4 is a cross-section through a connector illustrating certain modifications.

Figs. 5 and 6 are cross-sections of leaves illustrating additional modifications.

Referring to the drawings more particularly the first step of the method involves the extrusion of a relatively long strip 10 of material having a perforation 11 formed near one edge during the extruding process. This strip may be formed from any extrudable material, such as metals or plastics, a preferred material being a commercial form of aluminum or an alloy of aluminum. The main body 10 of the strip will in most cases be made relatively thin, being thick enough to give the requisite strength while retaining lightness and making economical use of the amount of material used. To carry out these objects, a bead 12 preferably projects upwardly from one face of the strip providing a uniform thickness of material surrounding the perforation 11. Bead 12 merges into the top face of the strip through a curved fillet 13 which provides a strong anchorage for the bead 12 to the plate, and at the same time gives a smooth stream-lined construction having a pleasing appearance and avoiding any crack that might collect dirt.

The next steps in the manufacture of the hinge involve dividing the strip of Fig. 1 into suitable lengths and cutting away segments of the perforated edge, so as to leave perforated projections which may be interfitted with those of a cooperating strip. These steps may be carried out in any preferred manner, as for example by first cutting the strip into lengths and then placing them in a machine which mills out wide slots leaving the perforated projections 14. Obviously these steps may be carried out in any desired order, or they may be done simultaneously by passing the strip of Fig. 1 through a machine designed to divided the strips into lengths and at the same time cut out segments so as to leave the perforated projections 14.

Two of the leaf members or blanks thus prepared are then assembled with their perforated

projections interfitting so as to form a substantially continuous bore, and a pin 15 is inserted in the bore. The pin is formed of a strong material such as steel, preferably of a corrosion-resisting type.

This method is particularly suitable for forming the leaves from aluminum, since the extruding step gives the aluminum a dense, cold-worked structure, and permits using relatively thin sections that are dimensionally accurate within very small limits, which possesses the requisite strength.

The leaves of the hinge thus formed may be attached by any suitable fastening means to the parts that are to be hinged together, and they may rotate about the pin 15 in the well-known manner.

Plano-type hinges made by this process are particularly useful on aircraft, where they may be used for wingflaps, doors, etc., and in some instances they have been found to have from two to four times the strength of hinges previously used.

In other instances the device may be used as a fastener by securing one leaf to one of the parts to be assembled, and the other leaf to another part. The parts are then assembled with the projections 14 of the leaves interfitted, and the pin 15 inserted in the bore, thus fastening the parts together. This use of the device as a fastener is of particular advantage in assembling parts that have been separately fabricated, such as the attachment to airplane wings of front edge sections, where one of the connectors is used at the top of the wing, and another is used at the bottom of the wing, thus holding the parts in fixed relation to each other.

A special benefit of the method is that since the leaves are formed by extruding they may be given practically any desired shape without any appreciable increase in cost. Thus, as shown in Fig. 4, one face of each leaf may be rabbetted as at 16 so that the part 17 to which the leaf is attached may lie flush with the surface 18 of the lead, thus forming a smooth exposed surface.

Additional functional parts, instead of being fabricated separately and then attached to the connector leaves, may be extruded as integral parts of the connector leaves. By way of example Fig. 4 shows the leaf 19 having a flange 20 projecting at right angles thereto and having an enlarged reinforcing rib 21 at its edge, the flange and rib serving as a reinforcement for the part to which the connector leaf is attached.

Fig. 5 shows another arrangement in which a bent flange 22 cooperates with the leaf 19 to form a substantially channel-shaped element, the stiffening characteristics of this shape being well known.

Fig. 6 shows a leaf member 19 to which is attached a flange 23, and a channel 24 for use in attaching other devices.

These examples illustrate in a general way the wide variation of forms that may be extruded integrally with the leaf strips, and those skilled in the art will readily understand that the blanks resulting from the first part of the process can be used in a wide variety of circumstances.

It should be understood that the word "connector" as used in the appended claims comprises hinges as well as members used to secure parts together in fixed relation to each other.

We claim:

1. The method of making a blank for a connector which comprises: extruding a length of

material in the form of a strip having a hollow bead along one edge, and cutting away sections of the hollow bead to form a strip having perforated segments projecting along one edge thereof.

2. The method of making a blank for a connector which comprises: extruding a length of material in the form of a strip having a relatively thin body with a perforated bead formed along one edge thereof; and cutting off portions of the bead at spaced intervals to form a strip having perforated segments projecting along one edge thereof.

3. The method of making a blank for a connector which comprises: extruding a length of material in the form of a body portion having a hollow bead along one edge and a structural member attached to the body portion, and cutting away sections of the hollow bead to form a leaf having perforated segments projecting along one edge thereof.

4. The method of making a connector which comprises: extruding a length of material in the form of a strip having a body with a perforation near one edge thereof; cutting off segments of the perforated edge to leave perforated projections; cutting the strip into lengths forming leaves, assembling the leaves together with their perforated segments interposed; and inserting a pin into the bore formed by the aligned perforations.

5. The method of making a connector which comprises: extruding a length of aluminum material in the form of a strip having a body with a perforation near one edge thereof; cutting off segments of the perforated edge to leave perforated projections; cutting the strip into lengths forming leaves; assembling the leaves together with their perforated segments interposed; and inserting a steel pin into the bore formed by the aligned perforations.

6. The method of making a connector which comprises: extruding a length of material in the form of a strip having a relatively thin body with a perforated bead formed along one edge thereof; cutting off portions of the bead at spaced intervals to leave segments of the bead; cutting the strip into lengths forming leaves; assembling the leaves together with their bead segments interspaced; and inserting a pin into the bore formed by the aligned perforations of the bead segments.

7. The method of making a connector which comprises: extruding a length of aluminum material in the form of a strip having a relatively thin body with a perforated bead formed along one edge thereof; cutting off portions of the bead at spaced intervals to leave segments of the bead; cutting the strip into lengths forming leaves; assembling the leaves together with their bead segments interspaced; and inserting a steel pin into the bore formed by the aligned perforations of the bead segments.

8. The method of making a connector which comprises: extruding a length of aluminum material in the form of a strip having a relatively thin body with a perforated bead formed along one edge thereof and a structural member attached to the body portion; cutting off portions of the bead at spaced intervals to leave segments of the bead; cutting the strip into lengths forming leaves; assembling the leaves together with their bead segments interspaced; and inserting a steel pin into the bore formed by the aligned perforations of the bead segments.

9. The method of making a connector which

comprises: extruding a length of aluminum material in the form of a strip having a relatively thin body with a perforated bead formed along one edge thereof and a structural member extending at an angle from the body portion; 5 cutting off portions of the bead at spaced intervals to leave segments of the bead; cutting the strip into lengths forming leaves; assembling the leaves together with their bead segments interspaced; and inserting a steel pin into the bore formed by the aligned perforations of the bead segments.

ROY D. B. MOYNAHAN.
EDWARD K. PILCHER.