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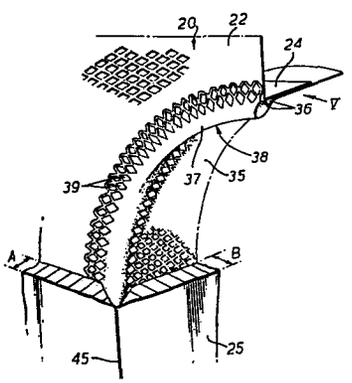
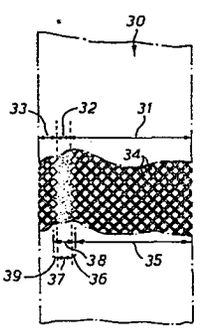
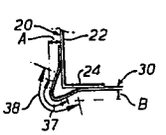
(54) Improvements in or relating to formers.

(57) An arch-frame section (10) comprising a fascia member (20), a soffit member (35), and a bead (38), characterised in that one of the said members (35) is formed integrally with the bead (38) by perforating a metal strip such as to provide first, second and third regions (31, 32, 33) alongside one another, the first region (31) being perforated to provide said one member (35) and a there-adjacent edge portion (36) of the bead (38), the second region (32) being imperforate to provide a smooth surfaced nose portion (37) of the bead (38), and the third region (33) being perforated to provide said bead (38) with an opposite edge portion (39) adjacent the other said member (20).







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IMPROVEMENTS IN OR RELATING TO FORMERS

This invention relates to formers, particularly formers for forming the shape of an arched (or otherwise curved) opening of predetermined curvature, and providing a keying surface for plaster, render or similar material. Such formers are herein called "arch frames".

These arch frames are pre-formed or pre-fabricated, self-supporting units, e.g. composed of 2, 4 or more components or sections, and are usually mounted in a rectangular or irregularly shaped opening so as to form a somewhat "false" wall at least over extensive void regions (e.g. at the upper corners of the rectangular opening) and provide the opening with the desired curvature. They are thus quite different to the customary edge beads that follow the edge contour of an existing arched opening and reinforce the plastered or rendered edge.

Numerous proposals for arch frames have been made over very many years. However such proposals have, until recently, remained no more than that and have not been considered viable commercially a±d/or practical from a manufacturing point of view. Indeed, some of the very early proposals are capable of instant dismissal as being quite impossible to manufacture. Generally speaking, all the arch frames

currently being manufactured and marketed are of expanded metal sheet or strip and comprise:

(a) a fascia having an edge portion following a curved path of the desired predetermined curvature,

(b) a soffit to follow said path with the width of the soffit directed in the depth direction of the opening, and

(c) a bead following substantially said path and disposed to the other side of the soffit to the latter's intersection with the fascia's main plane.

It will be appreciated that the primary function of the bead is to provide a so-called "ground" or "stop" for the plaster or render material, and that where (as is usual) the selfsame bead is to serve both for the material applied to the soffit and for the material applied to the fascia, the bead should preferably be at substantially the same angle of about 135° to each of the fascia and the soffit. Considerable effort has been expended in designing arch frames which can have such a bead following the requisite curved path and which can be economically mass produced. The applicants consider that this aim has not yet been satisfactorily achieved, notwithstanding the widespread (if not universal) current practice of making the bead from expanded metal sheeting which allows for appropriate expansion and contraction of the metal portions respectively radially outwards and radially inwards of the curved bead's

neutral axis (the notional line where the tension and compression forces counterbalance one anoher).

The most popular current solution to these problems is to make the arch-frame section or unit from either two or three separate pieces of expanded metal sheet which are then joined to one another to produce the finished section composed of the three parts (a), (b) and (c) enumerated above.

However, formation of the bead of expanded metal has caused difficulties for the plasterer who has to avoid leaving an indented texture to the plaster surface at the apertured nose or tip of the bead, i.e. at exactly the plaster edge where a smoothly curved line is most wanted.

Other disadvantages arise from the manufacturing methods adopted for construction of the arch-frame section or unit. Where the arch-frame section is composed of two pieces, one of them must "double up" to provide two of the said parts (a), (b) and (c). If the aperture size of the expanded metal is appropriately large to provide for good plastering of the fascia and soffit, then the bead formed from the same sheet of expanded metal as either the fascia or the soffit will have the same large aperture size and be unsuitable for good plastering (and will also emphasise the "indented texture"

disadvantage referred to above). However. if an appropriately small aperture size is adopted for the bead so as obtain a better edge effect, then the fascia or the soffit with which the bead is integral will have the same small size of apertures and be inappropriate for good plastering or rendering.

In order to avoid the problems of "compromise solutions" to this two-piece construction method, most major suppliers of arch frames currently make their arch-frame sections from three pieces of expanded metal, each piece corresponding substantially to one of the three said parts (a), (b) and (c). Examples of such three-piece constructions are disclosed in European Patent No.53456/B1, European Patent Publication No.111603/A1, and UK Patent Publication No.2116599/A. Unfortunately, such three-piece construction still provides the expanded metal bead with apertures that make it difficult for the plasterer to finish the curved plaster edge without indentations. Moreover, the three-piece composition of the arch-frame section necessitates, in general, two separate jointing procedures, e.g. firstly jointing part (c) to part (b), and secondly jointing part (b) to part (a).

Furthermore, if to avoid the plasterer leaving an indented texture to the curved plaster edge, one provided for the

bead as a whole to be left unapertured in manufacture, e.g. to be made from a solid strip, then it would intervene between the plaster layer on the fascia and the plaster layer on the soffit thus preventing proper and thorough interconnection of the two plaster layers which, as a result, could then all too easily crack or break away from adjacent the bead of the arch frame. If to avoid this one attempted to provide a bead from expanded metal with a solid "nose-forming" strip between two expanded metal regions (to provide apertures for plaster that would interconnect the fascia and soffit layers), it is considered likely that such an attempt would not in practice result in an acceptable mass-production arch frame having appropriate tolerances for the accurate curvature of the bead and/or for the position of the "solid" nose within the bead and/or for the size and location of the apertures immediately adjacent the solid nose. The reasons for this are thought likely to derive from the need in a first step to stretch the slit metal in a first direction to expand it on each side of the solid (i.e. unslit) strip - thus effectively stressing the metal in that first direction - and then bending the already stretched and expanded metal in a second direction to form the bead and cause it to follow the desired path, this bending operation effectively attempting to stress further, and in said second direction, material already previously stressed in the first direction.

The present invention aims to overcome some or all of above-mentioned and/or other difficulties of the relevant prior art.

According to one aspect of this invention there is provided an arch-frame section comprising a fascia member, a soffit member, and a bead, characterised in that one of the said members is formed integrally with the bead by perforating a metal strip such as to provide first, second and third regions alongside one another, the first region being perforated to provide said one member and a there-adjacent edge portion of the bead , the second region being imperforate to provide a smooth surfaced nose portion of the bead, and the third region being perforated to provide said bead with an opposite edge portion adjacent the other said member.

The term "perforating" a metal strip implies an operation whereby material is physically removed from the plane of the strip; and the terms "perforated" and "perforations" relate to the result of such a "perforating" operation.

The said one member may be the fascia member. Preferably, however, the said one member is the soffit member.

In either case, the fascia member and the soffit member may be connected to one another directly, or alternatively may be connected to the said opposite edges of the bead so as to be interconnected via the bead.

According to another aspect of this invention there is provided an arch-frame section comprising:

(a) a fascia having a selvedge formed into a flange following a curved path of the desired predetermined curvature,

(b) a soffit attached to the selvedge in overlapping relation with respect thereto,

characterised in that the soffit is formed integrally with a bead by perforating a metal strip such as to provide first, second and third regions alongside one another, the first region being perforated to provide said soffit and a soffit-adjacent edge portion of the bead, the second region being imperforate to provide a smooth surfaced nose portion of the bead, and the third region being perforated to provide said bead with a facsia-adjacent edge portion.

It will be appreciated that the arris between the selvedge and the main area of the facsia defines an edge of the same predetermined curvature.

According to still another aspect of this invention there is provided an arch-frame section comprising a fascia member, a soffit member, and a bead, wherein the bead is provided with side portions extending away from one another as they extend away from the "nose" of the bead, and the soffit member is formed integrally with the bead by perforating a metal strip such as to provide perforations in the soffit and in the side portion of the bead neighbouring the soffit, the said nose being left imperforate to provide a smooth surfaced nose portion of the bead.

Preferably the fascia member is spaced from the other side portion of the bead. Alternatively or additionally, the other side portion of the bead may be perforated. In each case this is to permit plaster or render to enter the void within the bead for reinforcement of the bead and for interconnection of the plaster or render on the fascia member and the soffit member.

According to yet another aspect of this invention there is provided an arch-frame section comprising a fascia member, a soffit member, and a bead, wherein the bead is provided with side portions extending away from one another as they extend away from the "nose" of the bead, and the bead is formed by perforating a metal strip such as to provide perforations in the two side portions of the bead, the said nose being left imperforate to provide a smooth surfaced nose portion of the bead.

Preferably the soffit member is connected to one side portion of the bead and also to the fascia member. Alternatively, the fascia member is connected to one side portion of the bead and the soffit member is connected to the other side portion of the bead. In each case, the soffit member and/or the fascia member may be either of perforated metal strip or of expanded metal.

The present invention also provides for an arch frame comprising a plurality of arch-frame sections according to any of the aforesaid aspects of this invention.

By way of non-limiting example, one embodiment of the present invention will now be described with reference to the accompanying drawings of which:

Figure 1 is a perspective view illustrating the general design of an arch frame composed of four identical "corner" sections or units,

Figure 2 is a schematic perspective view of the upper portion of one of said parts,

Figure 3 is a schematic sectional view of apparatus for forming a flange,

Figure 4 is a plan view of a perforated metal strip for forming a soffit wall of a said part, and

Figure 5 is a schematic end view in the direction of arrow V in Fig.2.

As shown in Fig.1, the arch frame is made up on site from four, similar, pre-formed arch frame corner sections 10. Each section 10 comprises a fascia member 20 and a combined soffit-and-bead member 30.

Each fascia member 20 has a vertical flat wall 22 (see Fig.2) and, at right-angles thereto, an integral flange 24 formed from a selvedge region of the fascia and following a curved path of the desired predetermined curvature for the archway opening 25. The fascia member 20 is formed by appropriately bending or shaping either a perforated metal sheet or an expanded metal sheet (be the latter pre-flattened or not), e.g. having openings from 6 to 20mm (preferably 7.87mm) by from 3 to 8mm (preferably 3.81mm). Conveniently, this shaping is accomplished by clamping two such sheets between a pair of plates 128,129 (Fig.3) with the margins of the sheets projecting beyond surfaces 130,131 of the plates, these surfaces having the desired predetermined curvature. The overlapping margins are then "opened out" and flattened onto the surfaces 130,131 by means of a roller 135 that is passed back and forth to compress the margins 24 against the surfaces 130,131 and cause them to adopt the latters' outline.

The combined soffit-and-bead member 30 is formed by stamping an appropriate array of apertures 34 in a strip of sheet metal to provide first, second and third regions 31,32 and 33 alongside one another, and respectively perforate,

imperforate and perforate (see Fig.4). The first region 31 is perforated and is to provide the soffit 35 and a soffit-adjacent edge portion 36 of the bead 38. The second region 32 is imperforate and is to provide a smooth-surfaced nose portion 37 of the bead 38. The third region 33 is perforated to provide the bead 38 with a facsia-adjacent edge portion 39.

The three-region perforated strip is cut to the desired size and passed through a lock forming machine or other bending machine to effect shaping of the member 30. Such shaping provides bead 38 and the soffit wall 35 with their desired predetermined curvatures, the curvature of the soffit wall 35 conforming to that of the fascia selvedge 24.

The two members 20 and 30 are then brought together with selvedge 24 overlying soffit 38 and with the free upstanding marginal region 33 abutting against the outside of the fascia wall 22. In this position, the two members 20 and 30 are then jointed to one another, e.g. by welding or (as is preferred) by stapling (preferably in a so-called stitching machine). The jointing of the two parts is performed over the abutting surfaces of selvedge 24 and soffit 35. By jointing together the fascia member 20 and the combined soffit-and-bead member 30 directly to one another across the abutting surfaces of the fascia flange 24 and the soffit 35, a particularly strong joint can be achieved all along the curved soffit path. Moreover, because of the continuous

overlapping nature of the flange and soffit, no special accuracy is required in the location of each specific joint (be it a staple, spot-weld, adhesive or other connection), and such joints can be as close to one another as desired.

The stamped-out apertures 34 of the above-described embodiment are all of the same square shape and, in this non-limiting example, have a side length of the order of about 4mm and a metal strand width (between adjacent square-shaped apertures) of the order of about 1.5mm. However, it will be appreciated that the apertures 34 need be neither of the square shape illustrated nor of the dimensions described - they can, for example, be diamond or lozenge-shaped rather than square, and have quite different side length dimensions and/or density (i.e. ratio of metal strands to voids). Moreover, the apertures 34 need not be of the same shape and/or size and/or density (i.e. metal-to-voids ratio) in both regions 31 and 33, and indeed, need not be of the same shape and/or size and/or density throughout the wider soffit-forming region 31.

The four identical, pre-fabricated and self-supporting, arch-frame sections 10 are in use offered up to the opening 40 (Fig.1) provided through a masonry wall, this opening being usually rectangular in front elevation. The four sections 10 are then fixed in position, e.g. using masonry nails, the soffit 35 providing the required curved arch-like opening, and the fascia wall 22 providing a continuous false

front "wall" across the voids left between the soffit and the upper corners of opening 40. Plaster is then applied to the fascia wall 22 and soffit 35 to depths A and B respectively, the bead 38 providing a plaster stop in each direction, i.e. both for the vertical plaster keyed to fascia wall 22 and for the "underneath" plaster keyed to soffit 35. With the bead 38 at an angle of 135° to each of the fascia and the soffit, the depths A and B are substantially equal.

The provision of a smooth, unbroken "nose" 37 for the bead 38 facilitates the job of the plasterer and enables him/her readily to create a smooth fine edge 45 to the plaster of the false arch opening 25 and without that edge being at all rippled or indented. Nevertheless, the bead's perforated regions 36,39 to each side of the smooth nose 37 assist in keying of the plaster to the bead 38 and allow the plaster to enter through the closely-spaced apertures of regions 36,39 and pass wholly into and completely fill the bead interior thereby creating an exceptionally strong, plaster-reinforced bead able to resist most effectively any bead or plaster damage at this most sensitive edge location. Moreover, the plaster filling the bead interior serves to interconnect or "link up" the plaster applied to the fascia and the plaster applied to the soffit, whereby the risk of plaster damage (e.g. cracking) at the fascia and soffit peripheries is reduced.

It will also be noted that the perforated regions 36,39 correspond to the "reverse bends" provided by the bead's laterally curved transitions (a) from the directional plane of the soffit to the curved bead (transition 36), and (b) from the curved bead to the vertical plane of the fascia-abutting free edge of the bead (transition 39). The provision of the perforations 34 in these "reverse bend" transition regions facilitates their formation on the lock forming or other similar bending machine.

CLAIMS

1. An arch-frame section (10) comprising a fascia member (20), a soffit member(35), and a bead (38), characterised in that one of the said members (35) is formed integrally with the bead (38) by perforating a metal strip such as to provide first, second and third regions (31,32,33) alongside one another, the first region (31) being perforated to provide said one member (20 or 35) and a there-adjacent edge portion (36) of the bead (38), the second region (32) being imperforate to provide a smooth surfaced nose portion (37) of the bead (38), and the third region (33) being perforated to provide said bead (38) with an opposite edge portion (39) adjacent the other said member (35 or 20).

2. An arch-frame section according to Claim 1, characterised in that the said one member (20 or 35) is the fascia member (20).

3. An arch-frame section according to Claim 1, characterised in that the said one member (20 or 35) is the soffit member (35).

4. An arch-frame section according to any preceding Claim, characterised in that the fascia member (20) and the soffit member (35) are connected to one another directly.

5. An arch-frame section according to any one of Claims 1 to 3, characterised in that the fascia member (20) and the soffit member (35) are connected to the said opposite edge portions (36,39) of the bead (38) so as to be interconnected via the bead (38).

6. An arch-frame section according to any preceding Claim, characterised in that said two perforated edge portions (36,39) of the bead (38) are spaced apart.

7. An arch-frame section according to any preceding Claim, characterised in that a void is provided within the bead (38), and said void extends between the two perforated edge portions (36,39) of the bead.

8. An arch-frame section according to Claims 6 and 7, characterised in that said void extends to the internal surface of the bead's imperforate nose portion (37) to permit plaster or render to enter the void for reinforcement of the bead (38) and for interconnection of the plaster or render on the fascia member (20) and the soffit member (35).

9. An arch-frame section comprising a fascia member (20), a soffit member (35), and a bead (38), wherein the bead (38) is provided with side portions (36,33) extending away from one another as they extend away from the "nose" (37) of the

bead, and the soffit member (35) is formed integrally with the bead (38) by perforating a metal strip (30) such as to provide perforations (34) in the soffit (35) and in the side portion (36) of the bead neighbouring the soffit (35), the said nose (37) being left imperforate to provide a smooth surfaced nose portion (37) of the bead (38).

10. An arch-frame section according to Claim 9, wherein the fascia member (20) is spaced from the other side portion (33) of the bead (38) to permit plaster or render to enter the void within the bead (38) for reinforcement of the bead and for interconnection of the plaster or render on the fascia member (20) and the soffit member (35).

11. An arch-frame section according to Claim 9 or Claim 10, wherein the other side portion (33) of the bead (38) is perforated to permit plaster or render to enter the void within the bead (38) for reinforcement of the bead and for interconnection of the plaster or render on the fascia member (20) and the soffit member (35).

12. An arch-frame section comprising a fascia member (20), a soffit member (35), and a bead (38), wherein the bead (38) is provided with side portions (36,33) extending away from one another as they extend away from the "nose" (37) of the bead, and the bead (38) is formed by perforating a metal

strip (30) such as to provide perforations (34) in the two side portions (36,33) of the bead, the said nose (37) being left imperforate to provide a smooth surfaced nose portion (37) of the bead (38).

13. An arch frame section according to Claim 12, wherein the fascia member (20) is connected to one side portion (33) of the bead (38) and the soffit member (35) is connected to the other side portion (36) of the bead (38).

14. An arch-frame section comprising:

(a) a fascia (20) having a selvedge (24) formed into a flange (24) following a curved path of the desired predetermined curvature,

(b) a soffit (35) attached to the selvedge (24) in overlapping relation with respect thereto,

characterised in that the soffit (35) is formed integrally with a bead (38) by perforating a metal strip such as to provide first, second and third regions (31,32,33) alongside one another, the first region (31) being perforated to provide said soffit (35) and a soffit-adjacent edge portion (36) of the bead (38), the second region (32) being imperforate to provide a smooth surfaced nose portion (37) of the bead (38), and the third region (33) being perforated to provide said bead with a facsia-adjacent edge portion (39).

15. An arch-frame section according to any preceding Claim, characterised in that the perforations include four-sided apertures (34).

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FIG.3

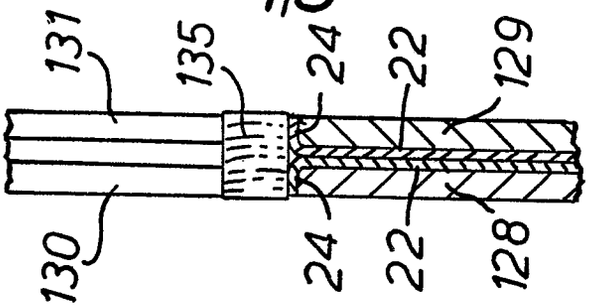

FIG.1

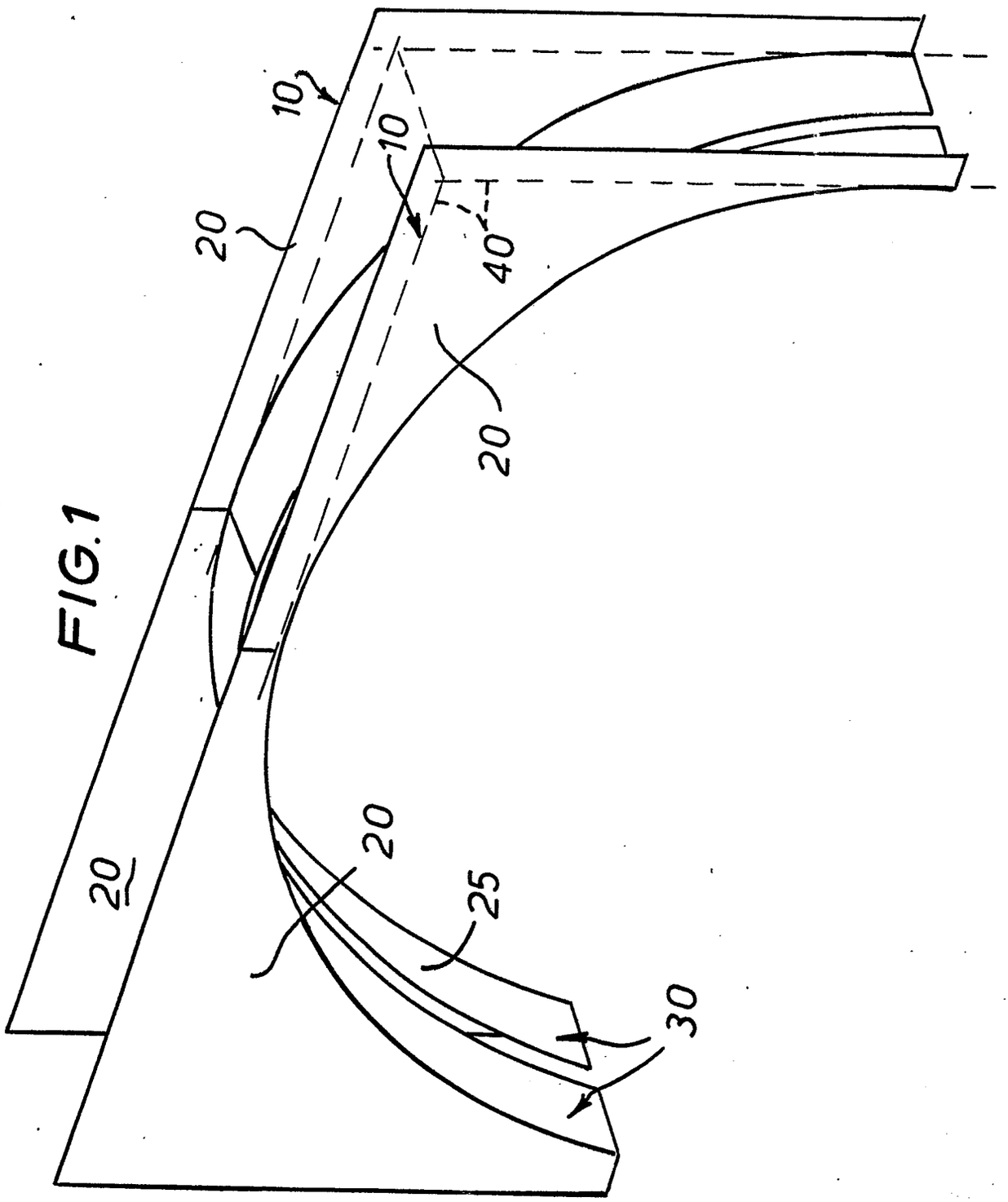

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FIG. 2

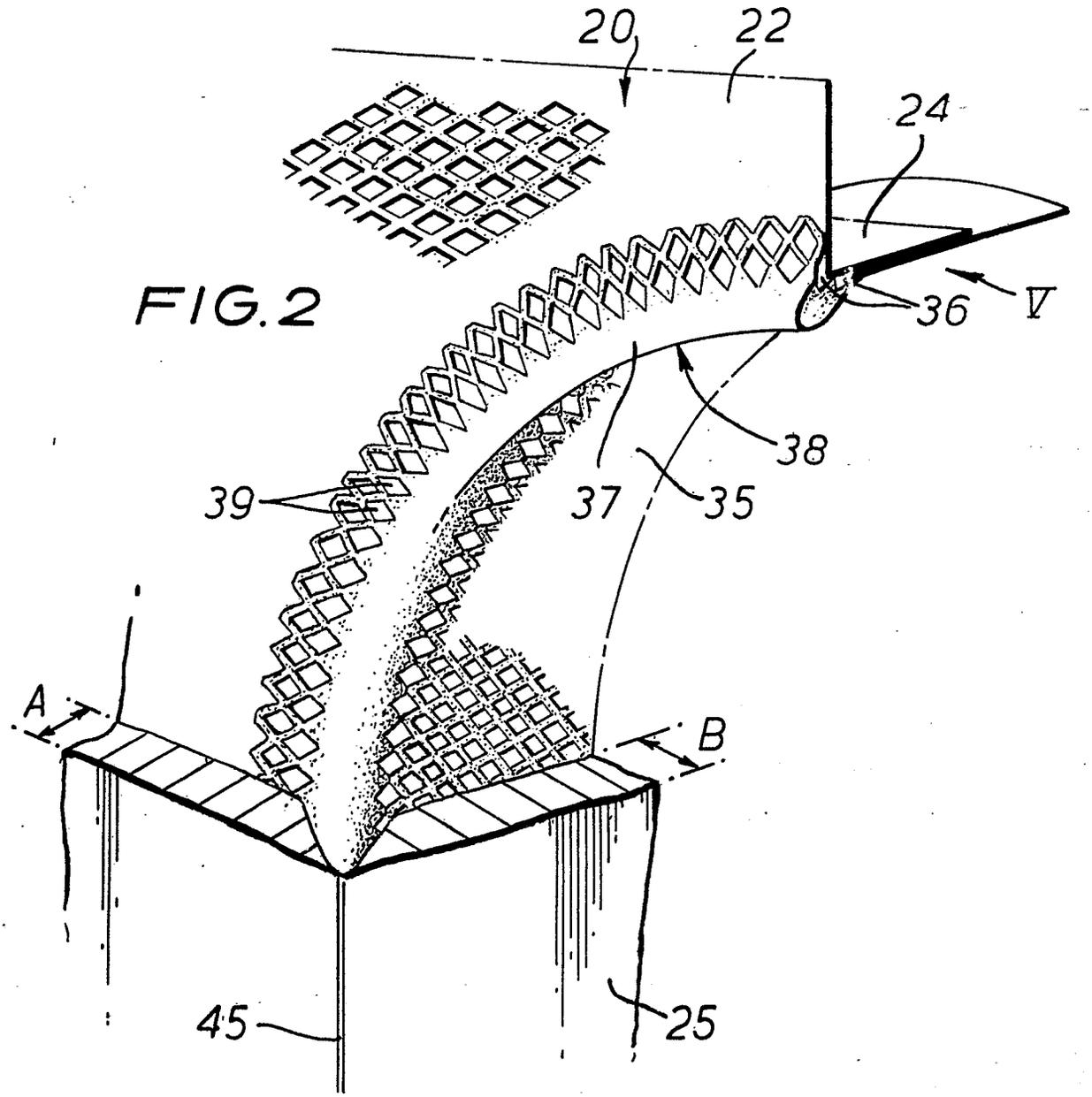

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FIG. 4

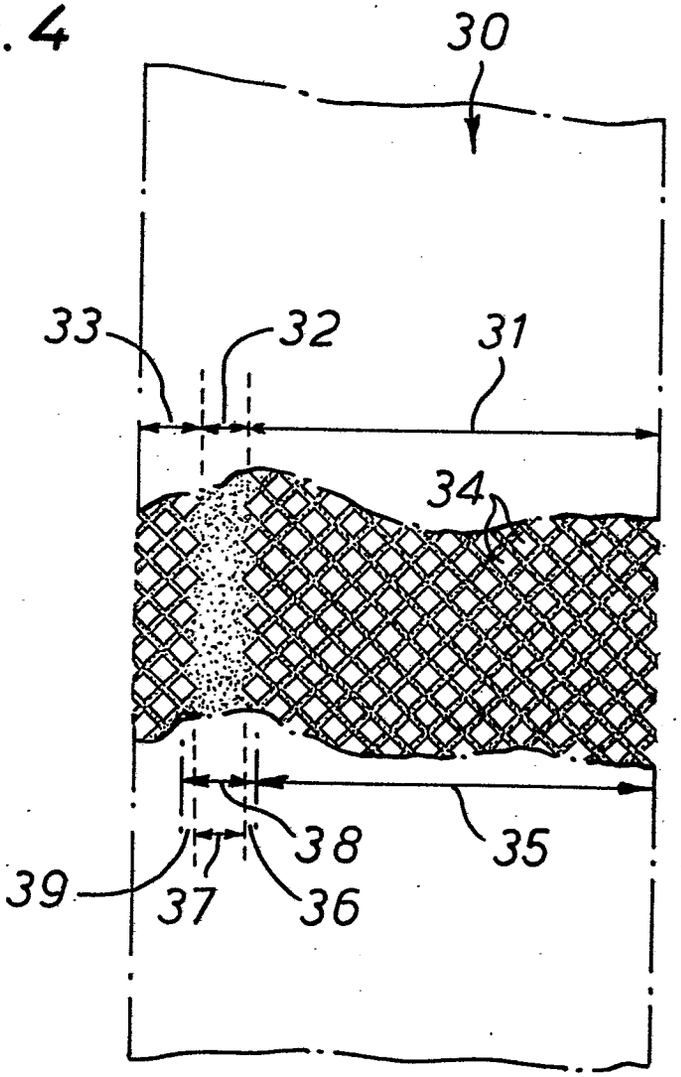

FIG. 5