Nov. 30, 1948. F. R. HIGLEY 2,455,306

THERMALLY RESPONSIVE UNIT

Filed March 29, 1944

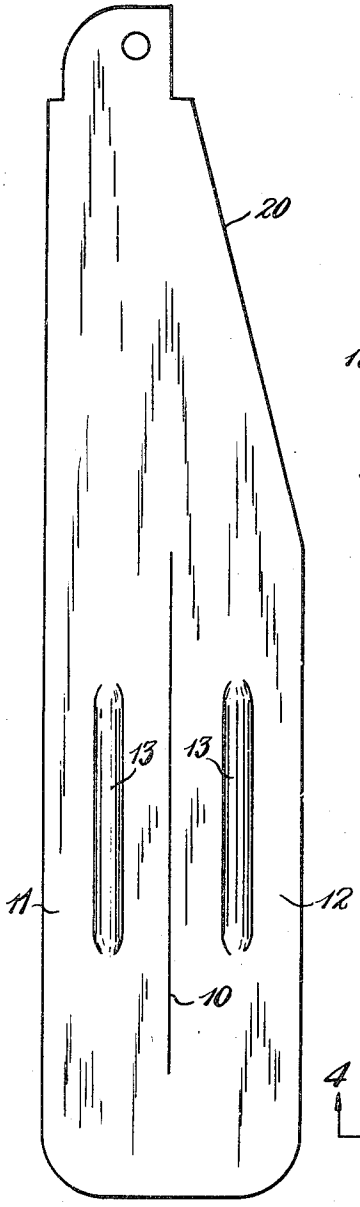


FIG. 1

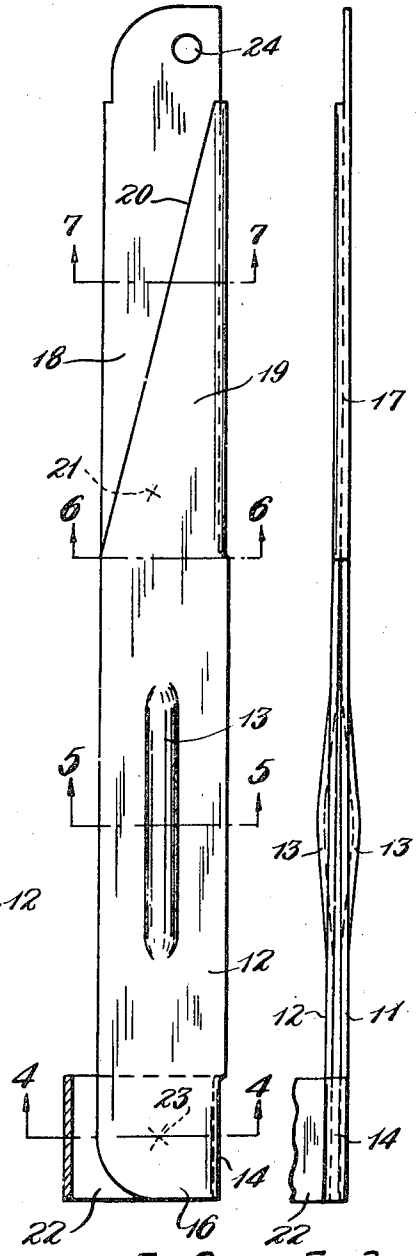


FIG. 2

FIG. 3

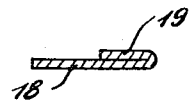


FIG. 7

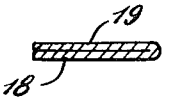


FIG. 6

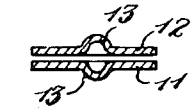


FIG. 5

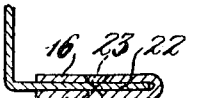


FIG. 4

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2,455,306

THERMALLY RESPONSIVE UNIT

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Application March 29, 1944, Serial No. 528,548

1 Claim. (Cl. 297—11)

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This invention relates to improvements in thermally responsive units of the monometallic laterally moving compensated type. The embodiment of the invention herein disclosed is a one piece, sheet metal stamping which when formed as hereinafter described, functions like a unit built up from separate hot and cold members or legs. The fact that the invention is constructed as an integral unit the accuracy of which depends upon the accuracy of the dies used in forming it rather than upon the skill of workmen in assembling it from separate members, contributes materially to its success. Furthermore, since the hot and cold members are integral parts of a single stamping they cannot become displaced relative to each other as may occur in an assembled device.

One of the objects of the invention, therefore, is the provision of thermally responsive units of the character stated having great uniformity in structure and operation.

Another object is the provision of a unit of low cost due to its integrality.

A further object is the provision of a unit having a high strength, mass ratio.

Still another object is the provision of a unit of the character stated in which the proportions may be easily modified to meet varying operating requirements, particularly as to the length of stroke.

Other objects and features of novelty will appear as I proceed with the description of those embodiments of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view on an enlarged scale of a sheet metal blank representing one stage of the method employed in forming my improved unit.

Fig. 2 is a plan view of the completed unit.

Fig. 3 is an edge view of the same.

Figures 4 to 7, inclusive, are detail sectional views taken respectively on the lines 4—4, 5—5, 6—6, and 7—7 of Figure 2.

In the illustrated embodiment the unit is constructed of sheet metal having the proper qualities for long life under high temperature conditions, as for example, in the control of an oven burner in a gas range. The unit embodies a mounting portion in which two spaced members are integrally joined along a longitudinal edge or edges, a thermally responsive portion in which the two members are separated and face each other, and a motion transmitting portion in which the two members are again joined together along the same longitudinal edge or edges. In the thermally responsive portion the two members constitute legs which are insulated from each other

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by an air space, so that transfer of heat from the hot leg to the cold leg is impeded. These legs at their ends are straight and parallel in transverse section in order to promote flexibility, while intermediate their ends the legs may be deformed to provide reenforcement against buckling.

Referring now to the drawings Fig. 1 shows a sheet metal strip blank which has been lanced or slit or otherwise longitudinally perforated part way of its length midway between its side edges, as indicated at 10. The slit 10, which is located in that portion of the blank which corresponds with the thermally responsive portion of the unit, divides that portion of the blank into two legs 11 and 12. Along the intermediate portion of one or both of these legs I may provide deformations, the purpose of which is to reenforce the legs against buckling and yet leave their ends flat and therefore relatively flexible. The deformations illustrated consist of ribs 13 which are pressed into the blank before or after the slit 10 is formed or simultaneously with the formation of the slit. Preferably, these ribs taper from their median points toward their ends, as shown particularly in Fig. 3.

After the blank has been provided with the slit 10 and the ribs 13, or their equivalent, it is bent over a short radius, as by means of forming dies, throughout its length along the line of the slit 10 to bring the two legs 11 and 12 into position facing each other, when they become the hot and cold, or compression and tension, members respectively of the unit as will be appreciated. As a result of the bending operation there is produced a longitudinally extending integral edge part 14 joining the two spaced members 15 and 16 of the mounting portion of the unit. At the opposite end of the unit the bending operation produces a longitudinally extending integral edge part 17, joining the two members 18 and 19 of the motion transmitting portion of the unit. In the bending operation the members 18 and 19 are spaced apart the same distance as the members 15 and 16. I prefer to press the members 18 and 19 together as shown in the drawing, and when this is done the space between legs 11 and 12 of the thermally responsive portion of the unit is caused to taper as shown in Fig. 3. When the bending is done the legs 11 and 12, being entirely separated by the slit 10, are not bent at all, but the slit opens outwardly and the members consequently may project laterally a slight distance beyond the edge parts 14 and 17, as shown in Fig. 2.

The blank may be of the same width through-

out its length, or, in the motion transmitting portion it may be reduced in width toward its free end, as by an inclined edge 20. The consequent reduction in section is permissible since the mounted unit serves as a cantilever and its stress decreases toward the free end. In case the parts 18 and 19 are pressed together so as to function approximately like one thickness of metal, they may be positively connected at one or more points, as by a spot weld or welds 21.

The unit may be mounted in various ways. As shown herein the spaced members 15 and 16 at the mounting end are caused to receive one leg of an angle mounting bracket 22 which projects between members 15 and 16 and thereby serves to gage their spacing. A spot weld 23 through the three thicknesses of metal fixes the unit upon the bracket. At the free end of the unit provision may be made for connecting it with a control, such provision in the illustrated case consisting merely of a perforation 24 adapted to receive a suitable connection.

Having thus described my invention, I claim:

A monometallic thermally-responsive unit of elongated form adapted for lateral deflection, comprising a piece of sheet metal having a longitudinally extending bend providing a pair of elongated members generally of strip form, disposed alongside each other in slightly spaced facing relation, said piece being perforate along a portion of said bend intermediate the ends thereof, said members having integral interconnection along said bend, longitudinally beyond each end

of said perforate portion, adjacent one pair only of their edges, said unit including mounting means adjacent one end of said members to provide lateral deflection at the other end responsive to temperature differential between said members intermediate their ends.

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