This invention relates to apparatus for heat-sealing of zippers in plastic footwear.

In footwear made of plastics, like vinyl chloride, it is desirable to have a thin flexible gusset of similar material under the opening which is closed by the zipper.

It is an object of my invention to provide an improved apparatus for forming or arranging the gusset, holding it in proper position and also holding the zipper centrally located with respect to the opening and with the zipper tapes overlying the edge portions of the gusset.

Generally speaking, the invention resides in a single movable gusset-forming member, preferably hinged at one end to the bottom template die so as to be capable of being lifted up out of the way for placement of the gusset and when swung downwardly, to form and hold the gusset. The same member also has on its top surface, a groove into which the metal chain and slider of a closed zipper may be fitted so as to hold the zipper in proper position during assembly of the overshoe with the zipper and gusset.

Other objects and advantages of the invention will hereinafter more fully appear.

In the accompanying drawings, I have shown two embodiments which the invention may assume in practice.

In the drawings:

Fig. 1 indicates an overshoe for the manufacture of which the apparatus of the invention is intended;

Fig. 2 is a perspective view of the apparatus indicating the position of the parts when the gusset is first placed in position;

Fig. 3 is a perspective view with the gusset-forming and zipper-holding member swung to its bottom position where it has formed the gusset;

Fig. 4 is a plan view of the same indicating a portion of the zipper in position for assembly to the overshoe;

Fig. 5 is an inverted view of the top heat-sealing die;

Fig. 6 is a cross-section through the assembled parts at the final stage of the heat-sealing operation, the view taken along a line corresponding to the line 6—6 of Fig. 5;

Fig. 7 is a side view of the lower die in a suitable support;

Fig. 8 is a perspective view of the lower die and gusset former according to the second embodiment of my invention; and

Fig. 9 is a cross-section of the assembled parts of the second embodiment taken on a line corresponding to line 9—9 of Fig. 8.

The overshoe 11, made of plastic material such as vinyl chloride, is indicated as having a side opening closed by a zipper 12, having a slider 13. As seen in Fig. 7, the boot placed over a rigid projecting arm 14 of the heat-sealing press. Rigidly supported on the projecting arm 14 is the bottom electrode or template die 15 having a central slot 16 which is substantially wider than the metal chain portion 17 of the zipper. The template die consists of a supporting member of metallic conducting material and a U-shaped strip 22 of heat resisting and insulating material, it being understood that the slot 16 extends through both the supporting member and the strip 22. It will be understood that there is also a slot 16a in the arm 14 registering with the slot 16 in the template die.

The gusset-forming and zipper-locating member may be generally described as a triangularly-shaped metal plate 18 hinged at the inner end of the slot 16 to the template die by a hinge pin 18a. The upper portion 19 of the member 18 is wider than the body portion but there is substantial clearance between the edges of the upper portion and the sides of slot 16 so as to accommodate the gusset between the member 18 and the edges of the slot.

The triangularly-shaped gusset is indicated at 20 in the drawings, and after it is placed in position as shown in Fig. 2, member 18 is swung forwardly and downwardly whereupon the member 18 moves the gusset through the slot 16 and holds it in molded position as seen in Figs. 3 and 7. In this folded state, the gusset has a U-shaped edge portion 21 which may be folded down on the upper surface of the template die. It will also be noted that the small strip 23 of similar insulating material is carried by the hinged end portion of the swinging member 18.

The upper surface of the member 18 has a longitudinally-extending central groove 24 which is just wide enough to receive the chain 17 of the zipper and hold it in proper central position during the heat-sealing operation. This groove has a wide portion 25 at the inner end to accommodate the slider 13.

With the gusset 20 and the zipper being thus held in proper position, the overshoe is placed in position over the zipper and gusset and the upper heat-sealing die 26 is moved downwardly to press all the parts firmly together.

The upper metallic die 26 has a cavity 27 so that the electrostatic heat will affect only the desired area which must always be spaced a substantial distance from the metal chain 17 of the zipper.

In the form shown in Figs. 1, 2 and 7, the outer end portion 28 of the member 18 comes to rest on a stop pin 29 when the upper surface of the member 18 is substantially flush with the upper surface of the template die; whereas, in the embodiment shown in Figs. 8 and 9, the stop pin 29 is not needed because a thin flange 30 on each side of the member 18 overlaps the edges of the slot 16. These flanges not only act as a stop but will hold the edge portions of the flexible gusset flat against the top surface of the template die. This form of invention would be preferable in the case of gussets which would be so resilient as to tend not to lie flat when folded into position.

What I claim is:

1. In apparatus of the class described for attaching zippers to plastic footwear having a gusset, a template die consisting of a supporting member of metallic conducting material and a strip of heat-resisting and insulating material attached to the upper surface of said member, said template die having a longitudinally-extending slot through said strip and said supporting member, a triangularly-shaped gusset-former hinged to said supporting member in line with said slot and adapted to be moved downwardly into said slot and simultaneously force the gusset into a folded state through said slot, said gusset-former having a longitudinal groove in its upper surface and widened at one end for receiving and centrally-locating the zipper with the zipper tapes overlapping the edge portions of the gusset, and an upper metallic die member having a pressing surface adapted to press the footwear, gusset and overlapping zipper tapes against said heat-resistant strip in an area along the sides and
around one end of the slot, which area is spaced a substantial distance from the slot.

2. In apparatus of the class described, the combination defined in claim 1 wherein a stop means is provided for limiting the downward-swinging movement of the gusset-former in the template die slot to a position where the upper surface of the gusset-former is substantially flush with the upper surface of the template die.

3. In apparatus of the class described, the combination defined in claim 1 wherein said gusset-former has laterally projecting flanges adapted to overlap the template die on opposite sides of said slot.