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METHOD OF MAKING BURR ELEMENTS OF SEPARABLE FASTENERS

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Fig. 1.

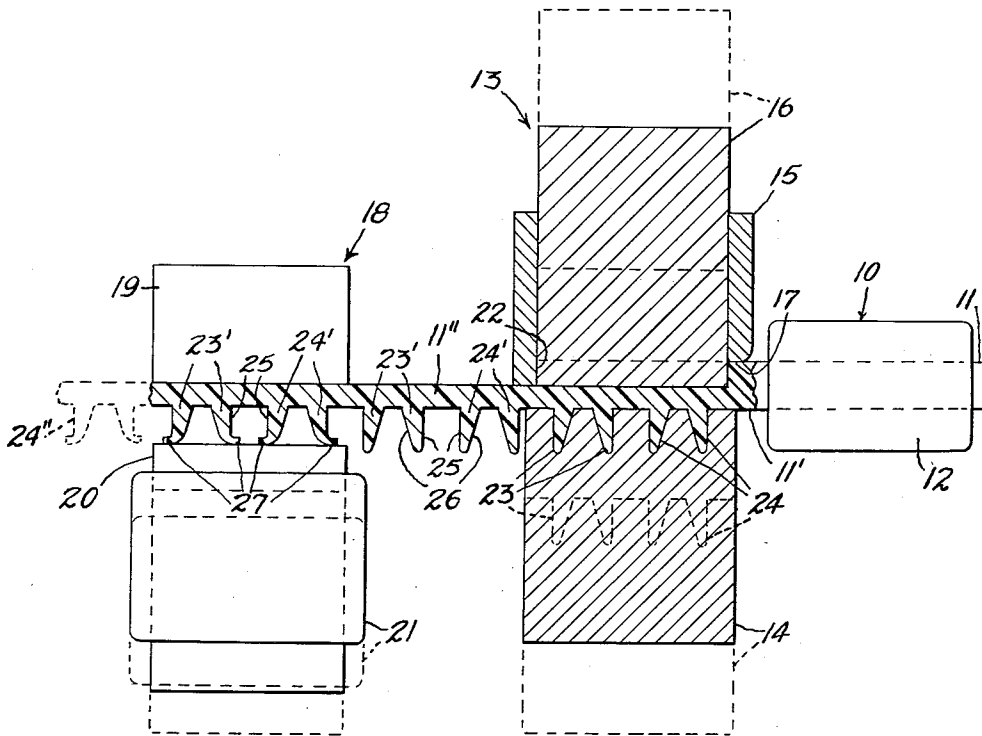
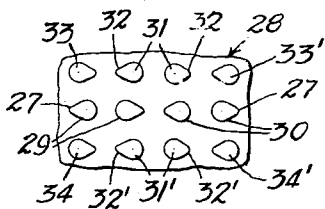


FIG. 2.



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METHOD OF MAKING BURR ELEMENTS OF SEPARABLE FASTENERS

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4 Claims. (Cl. 18—56)

This invention relates to separable fasteners employing burrs as a coupling element, generally of the type and kind disclosed in my application, Serial Number 794,760, filed February 20, 1959. More particularly, the invention deals in a novel method of producing fasteners of the character described from flat plastic strips or sheets, as more fully hereinafter set forth.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a diagrammatic view partially in section showing the successive stations in forming burr fastener elements, with the parts shown in the forming operation in full lines and in the workpiece shifting operation in dotted lines; and

Fig. 2 is a face view of a portion of a finished product illustrating, in part, arrangement of burrs on the surface of the fastener.

In Fig. 1 of the drawing, I have diagrammatically illustrated at 10 the heating station for heating a workpiece strip or sheet of plastic 11 intermittently fed through the heating unit 12 at the station 10. At 13 I have indicated the workpiece forming station, the station 13 comprising a die or forming anvil 14, a sleeve 15 for guiding a pressure punch 16, the intake side of the sleeve 15 having a cutout, as seen at 17, to clear the workpiece 11 in delivery of the same to the station 13.

Spaced with respect to the station 13 is a burr forming station 18, comprising an upper stationary anvil 19 and a lower curling tool or anvil 20, the latter supporting a heating unit 21, so as to heat the tool 20 to facilitate the forming operation performed thereby.

In the feed of the workpiece 11 through the unit 12 and into the forming station 13, the workpiece is of a thickness such as diagrammatically illustrated and passes through the aperture 17 in the sleeve 15 and this feed motion is checked by the workpiece striking the inner surface 22 of the opposed wall of the sleeve. At this time, the die 14 is in the dotted line position and the punch 16 in its raised dotted line position. At the same time, the tool 20 will be in its lowered or dotted line position.

The first step in the operation of the station 13 is to move the die 14 upon the then flat surface 11' of the workpiece and, with the dies supported firmly in this position, the punch 16 is moved downwardly in the sleeve 15, forcing the heated plastic downwardly to extend the plastic into pairs of burr cavities 23, 24 which are arranged in common alinement with respect to the feed of the workpiece 11.

The pairs of cavities 23 and 24 are of such contour as to form on the resulting formed pairs of burr elements 23', 24' perpendicularly straight outer walls 25 and bevelled inner walls 26, as clearly noted on the pairs of burrs disposed to the left of the station 13. This forming opera-

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tion results in forming a thin burr supporting backing 11". In the full line showing of Fig. 1 of the drawing, the burrs are shown as formed in the cavities 23, 24 and, in order to simplify the illustration, three sets of the pairs of burr elements 23', 24' are shown in full lines and part of the pairs of burrs 24 are also indicated at 24" in dotted lines so that, in the present illustration, three successive forming operations have been diagrammatically illustrated in full lines and part of a fourth forming operation in dotted lines.

After the two pairs of burrs have been formed at the station 13, the die 14 is moved downwardly and the punch 16 moved upwardly and the tool 20 moved downwardly; whereupon, the workpiece 11 is again advanced to bring the thick portion of the workpiece into engagement with the surface 22 of the sleeve 15, thus bringing the last formed pairs of burrs into the position between the station 13, with the previously formed pairs of burrs then positioned beneath the anvil 19 at the forming station 18; whereupon, the heated tool is moved upwardly to curl over and form the pointed hook ends 27 on the pairs of burrs, these hook ends extending outwardly in the direction of the straight walls 25 of each burr, as diagrammatically illustrated.

During the aforesaid curling operation of the tool 20, the die 14 has again been brought into engagement with the surface 11' of the advanced workpiece, the punch 16 again operated to form the next successive pairs of burrs or what should be more properly termed "burr forming elements"; whereupon, the above cycle of operation is against repeated and, in the next advancement of the workpiece 11, the curled pairs of burrs formed at the station 18 will be advanced to the dotted line position indicated at the left of the station 18 and the remaining elements advanced, in the manner previously described and, then, another pair of burrs are formed at the station 13. This operation continues in forming strips or sheets of any desired length and these strips or sheets can be cut or otherwise formed into burr fastener devices of any shape or size.

In order to simplify the illustration in Fig. 1 of the drawing, a single line of burrs only have been shown formed on a surface of the workpiece strip or sheet. It will be understood, however, that the size and shape of the die 14, punch 16 and tool 20 and anvil 19 can be such as to form other rows of burrs and, to diagrammatically illustrate this formation, I have shown, in Fig. 2 of the drawing, a small area view of the burr surface of the resulting formed product which will be identified by the reference character 28. 29 and 30 will represent the two pairs of burrs formed by the cavities 23 and 24, respectively, with the curled hook ends 27 extending in directions, as noted, for example, at the station 18 in Fig. 1 of the drawing.

At each side of the pairs of burrs 29, 30 are shown one pair of burrs at 31, 31' which may be said to bridge the burrs 29 and 30, so that their curled hook ends 32, 32' extend in directions opposed to the adjacent burrs of the pairs 29 and 30.

In keeping the forming operation within the width of the die 14 and punch 16, as diagrammatically illustrated in Fig. 1 of the drawing, one additional burr will be formed in alinement with and at each end of the pair of burrs 31, as indicated at 33, 33', and similar burrs will be formed at the ends of the pair of burrs 31', as at 34, 34'.

It will be apparent, from the foregoing, that on the resulting formed product, and in a second casting operation, the formed burrs 33', 34' in combination with the next formed burrs 33, 34 will form a pair of burrs, similar to the pairs 29, 30, 31, 31'. It will also be understood that, on a wide workpiece strip or sheet,

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other rows of the pairs of burrs 29, 30 will be formed adjacent the pairs of burrs 31, 31'. In other words, these will be alternately changed, consistent with the size of workpiece which is desired.

It will also be understood that the shape and angularity of the curled or hook ends of the burrs can be modified throughout the entire surface of the resulting fastener by suitable formation of the cavities or pairs of cavities, such as 23, 24 in the die 14.

It will be understood that the illustration in the drawing is very much enlarged and diagrammatic in illustration of the method of producing fasteners of the kind under consideration.

In my improved method, it will be apparent that, by forming the burr fasteners from an elongated strip or sheet-like workpiece, a definite control of the workpiece is had with respect to the first forming station and, then, the later curling station. It will also be understood that, with my improved method, the thickness of the remainder sheet from which the burr elements extend, can be definitely controlled, so as to provide the desired degree of flexibility in the sheet in the use of the fastener. In this connection, it will be understood that the illustration in the drawing is purely diagrammatic, particularly with respect to sizes of the workpiece and burr elements disclosed.

Further, with my improved method, the temperature of the plastics can be definitely controlled, first, in delivery to the forming station and, then, in re-heating the tip ends of the burr elements in performing the curling operation. In this connection, it will also be apparent that relatively simple dies and forming tools can be utilized in producing the resulting end product.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of producing burr-type fasteners from thin strip-like plastic workpieces, which consists in first heating the workpiece, then feeding the same into a forming station employing a die having cavities to form burr elements and a punch for fashioning the workpiece to extend into the cavities in forming burr elements protruding from one surface of the workpiece, reducing the thickness of the workpiece in said forming operation, then feeding the formed workpiece into posi-

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tion between an anvil and heated curling tool at a burr forming station, actuating the curling tool to curl contracted ends of the burr elements to form substantially hook ends on the resulting burrs, then delivering the burred product from the last named station while simultaneously delivering the workpiece to the first named station, supporting the punch in a sleeve at the first named station, and utilizing said sleeve as a means for controlling feed delivery of the workpiece into the first named station.

2. The method of producing plastic burr fasteners of the character described, which consists in delivering a heated strip-like plastic workpiece into a forming station, first moving a die having burr element forming cavities into engagement with one surface of the workpiece the cavity arrangement in the die such as to form pairs of burr elements placed longitudinally and transversely of the formed workpiece, supporting the die firmly in engagement with said surface, while pressure moving a punch upon the opposed surface of the workpiece to force the material of said workpiece into the cavities of the die to form on the first named surface of the workpiece protruding burr forming elements, then separating the die and punch and feeding the workpiece, including the formed portion thereof, into a burr forming station, moving a heated curling tool into position to engage end portions of the burr elements, while the workpiece is supported at said station to form on the burr elements curled hook ends, then moving the curling tool into inoperative position, and then delivering the finished burred product from the last named station.

3. The method as defined in claim 2, wherein hook ends of adjacent burrs are directed in different directions with respect to each other on the finished product.

4. The method as defined in claim 2, wherein each burr includes a perpendicularly straight wall and a bevelled wall.

References Cited in the file of this patent

UNITED STATES PATENTS

1,122,280	Kempshall	Dec. 29, 1914
1,610,295	Latham	Dec. 14, 1926
2,874,408	Vieli et al.	Feb. 24, 1959
2,883,707	Morin	Apr. 28, 1959