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Greco et al.

(54) **ADDING MASS TO SLIDER END STOMPS WITH ULTRASONICS IN A RECLOSABLE PACKAGE**

(75) Inventors: **Charles Greco**, Bardonia, NY (US); **David Keith**, Shelbyville, IN (US); **Glyn Russell**, New City, NY (US); **Eric P. Plourde**, Frankfort, IL (US); **Kenny E. McCracken**, Dacula, GA (US); **Lars Wihlborg**, Stratford, CT (US)

(73) Assignee: **ILLINOIS TOOL WORKS INC.**, Glenview, IL (US)

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(52) **U.S. Cl.** **53/420**

(57) **ABSTRACT**

The disclosure relates to a method and apparatus wherein extra mass is added to a profile of a slider zipper prior to the ultrasonic or thermal forming of the end stomps. This results in an end stomp of increased size and height, thereby providing a greater resistance to the slider being pulled from the ends of the zipper.

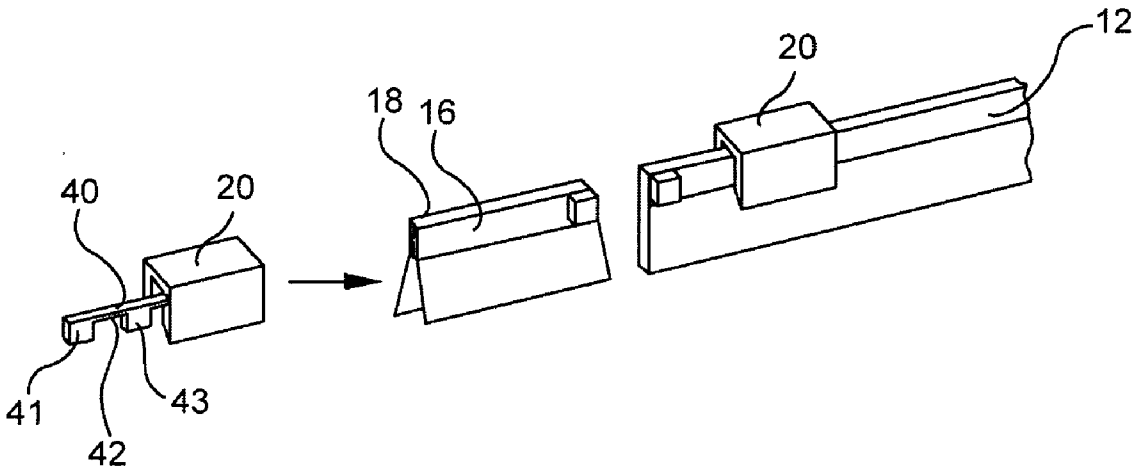
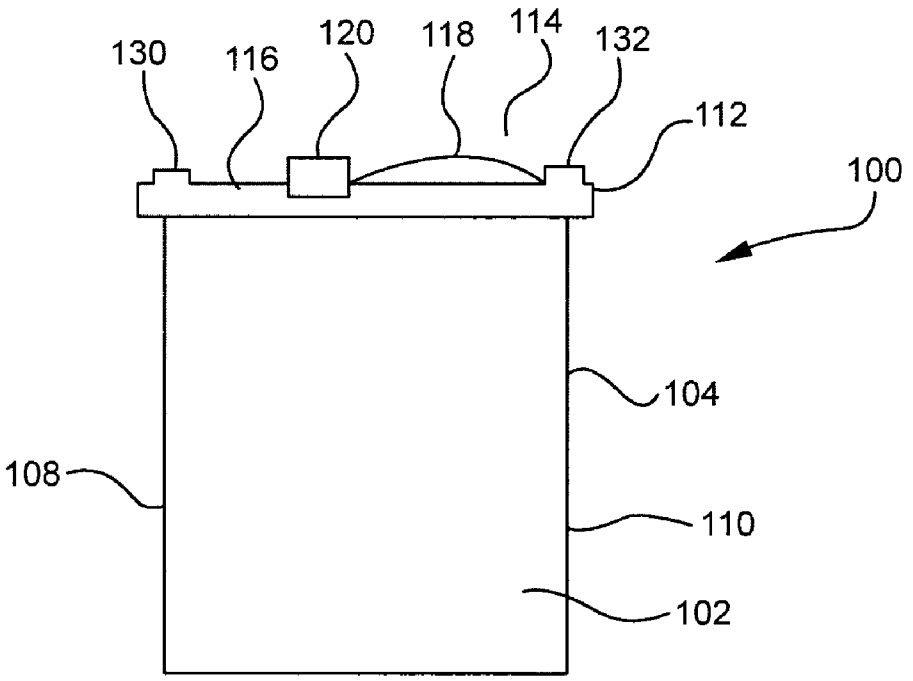


FIG. 1 Prior Art



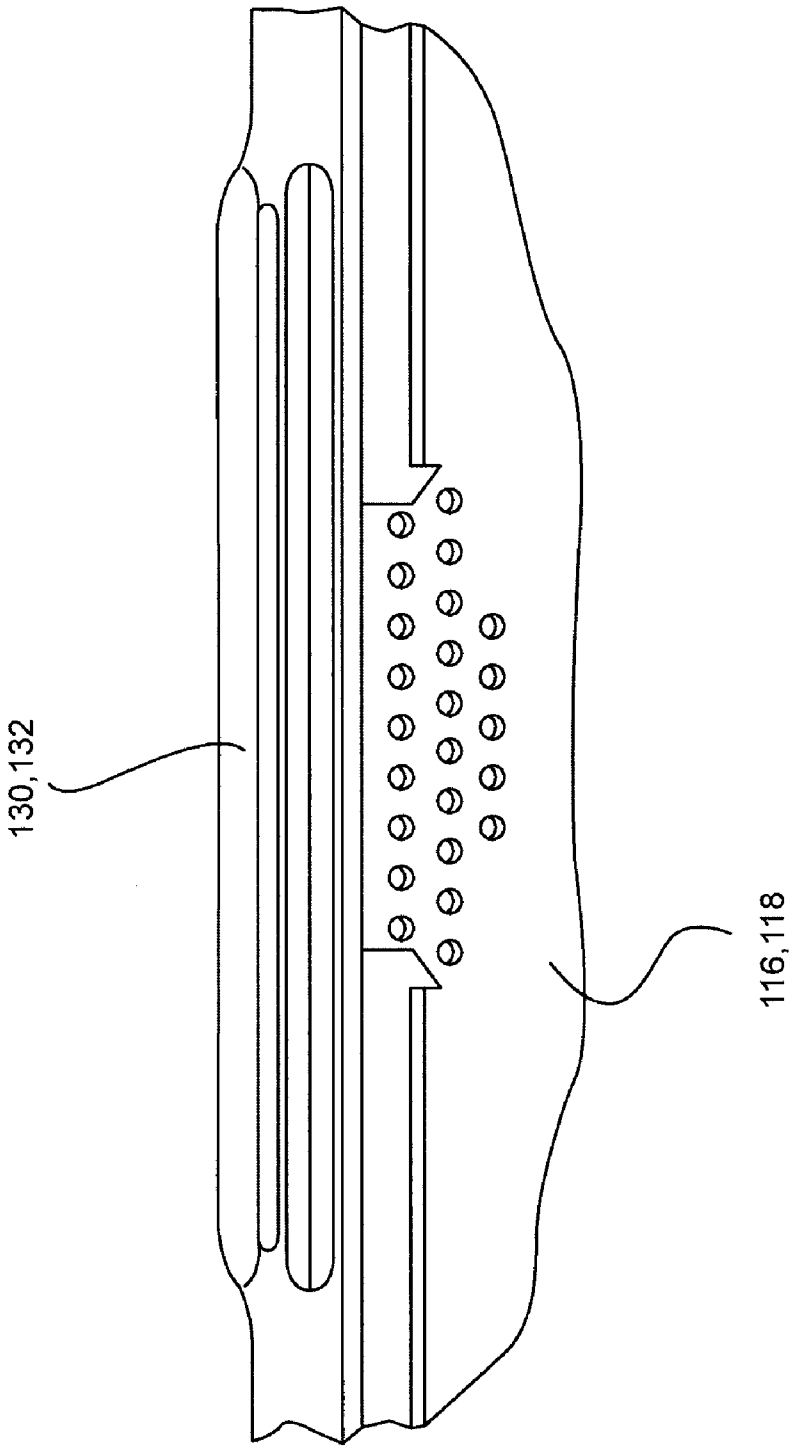


FIG. 2 Prior Art

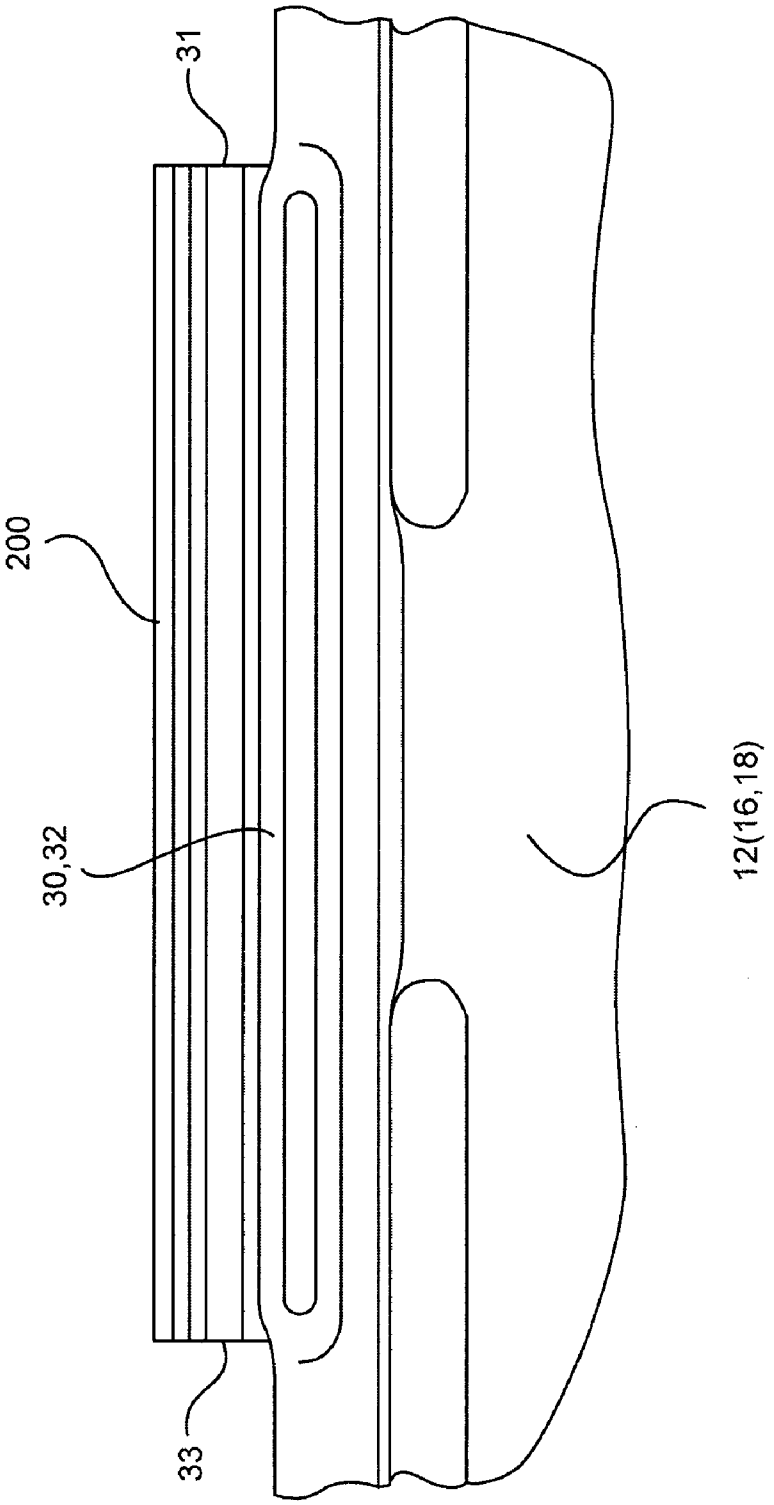
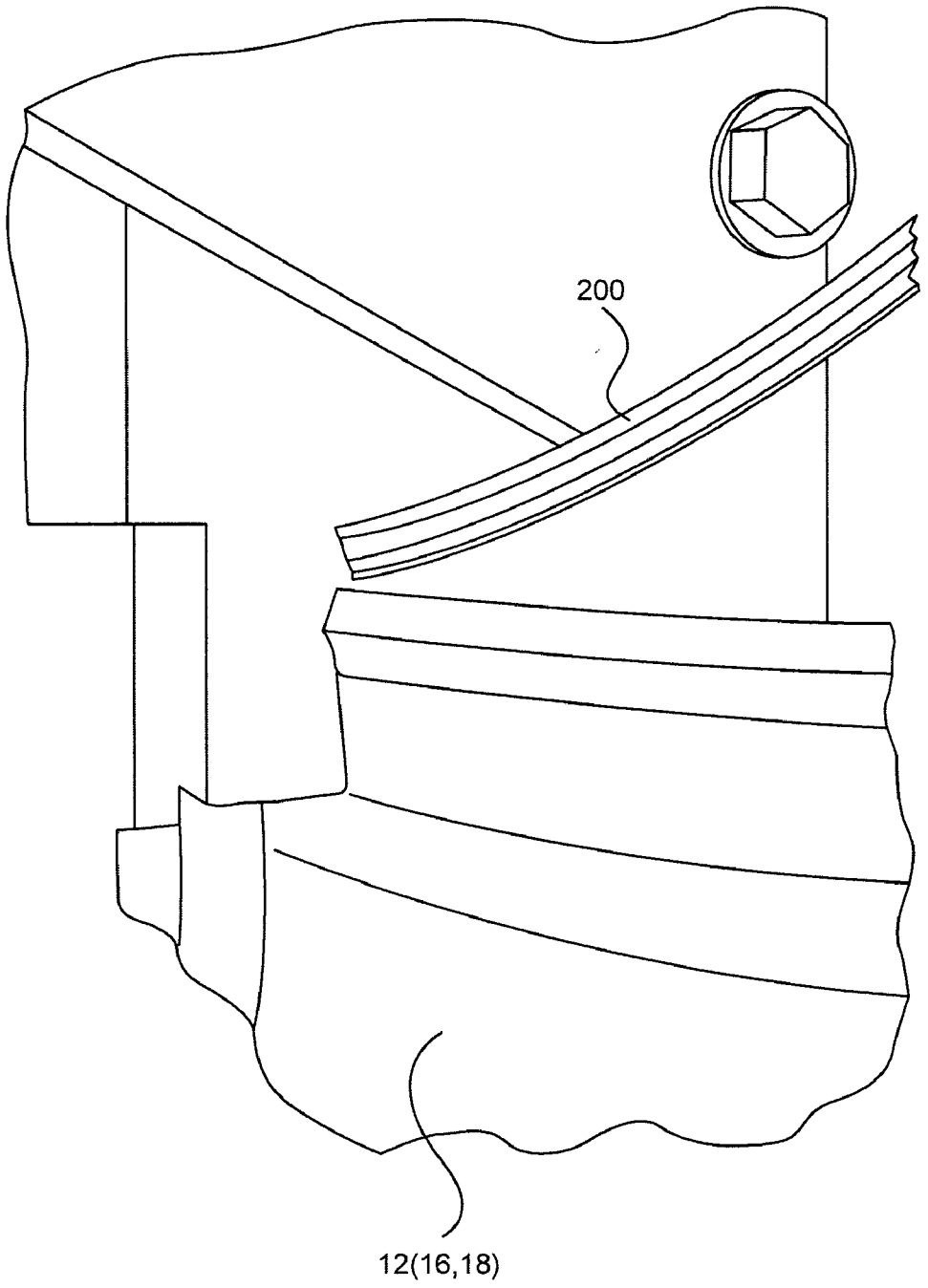


FIG. 3

FIG. 4



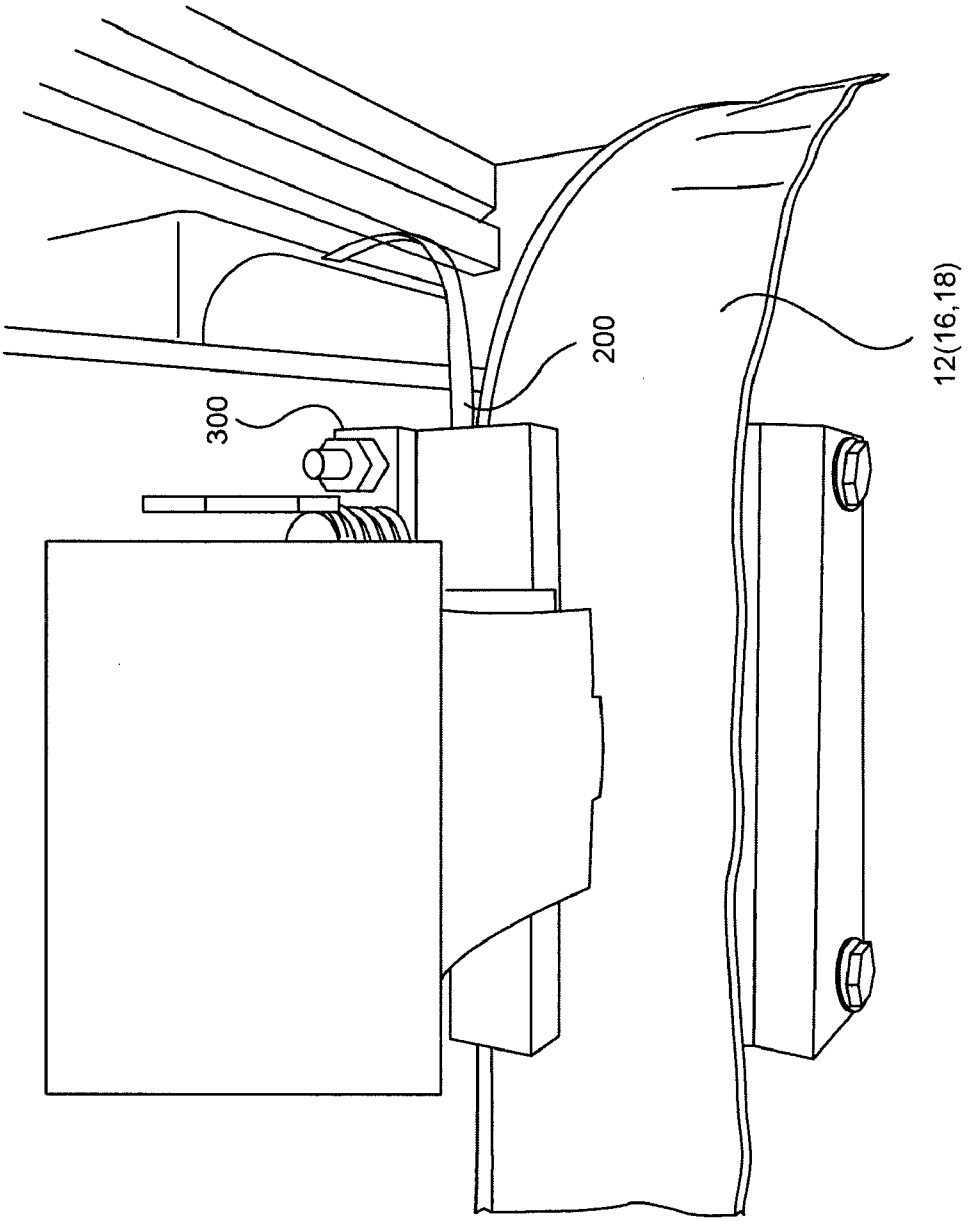


FIG. 5

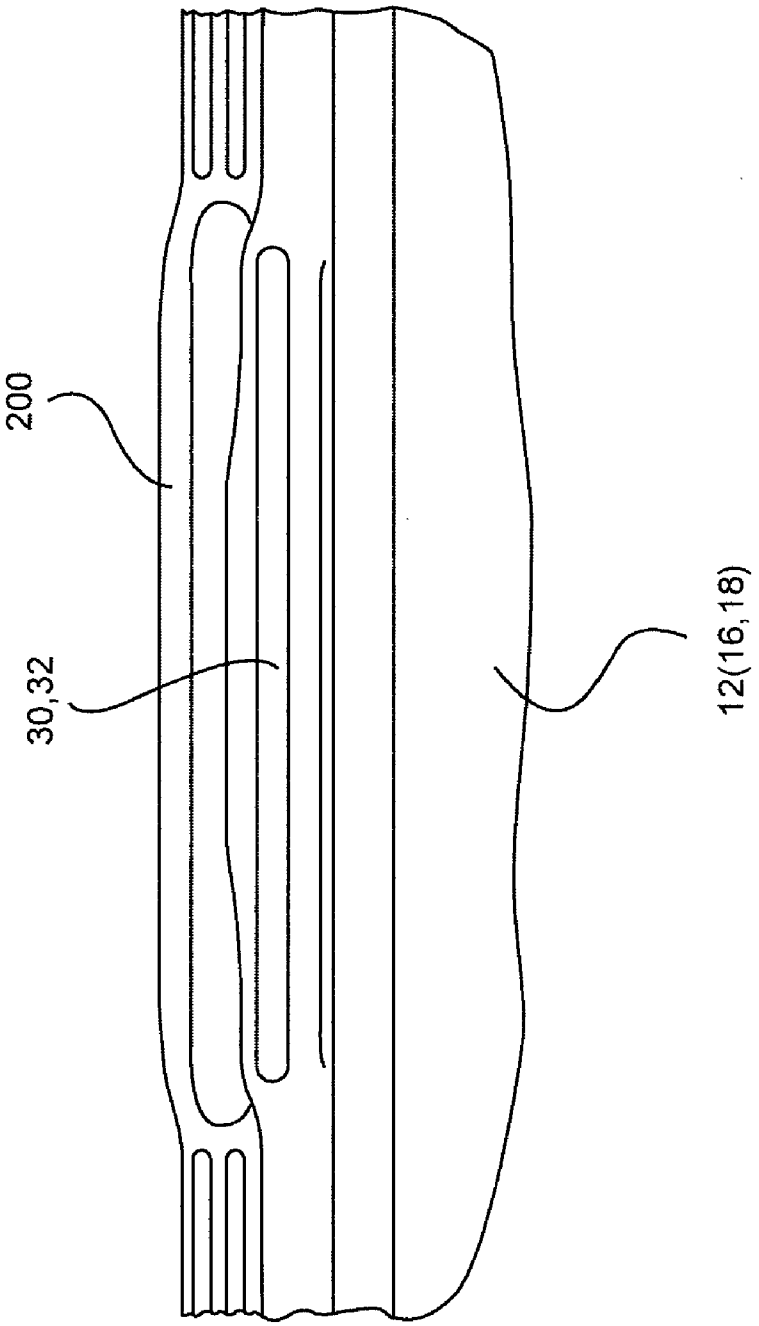


FIG. 6

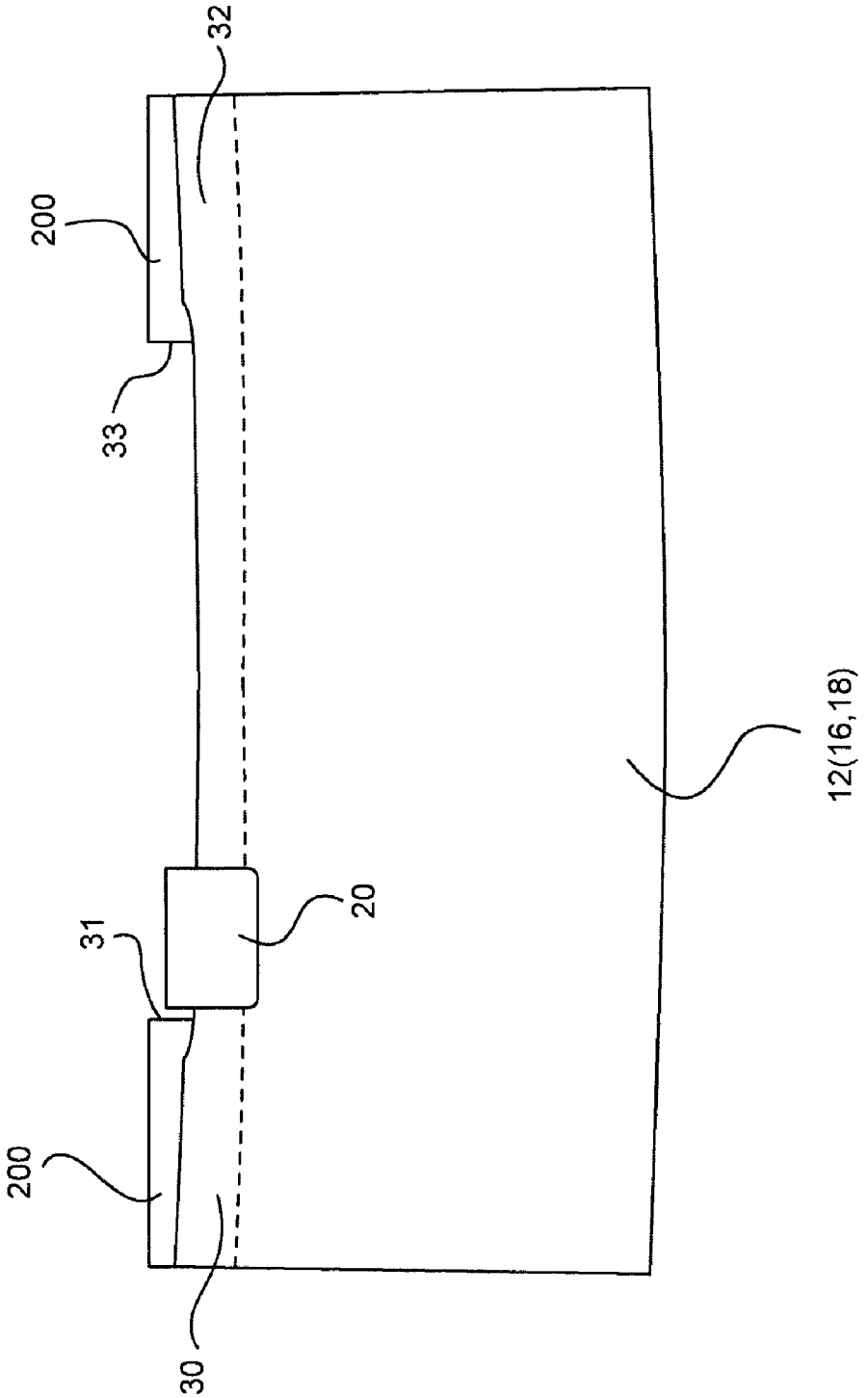


FIG. 7

FIG. 8

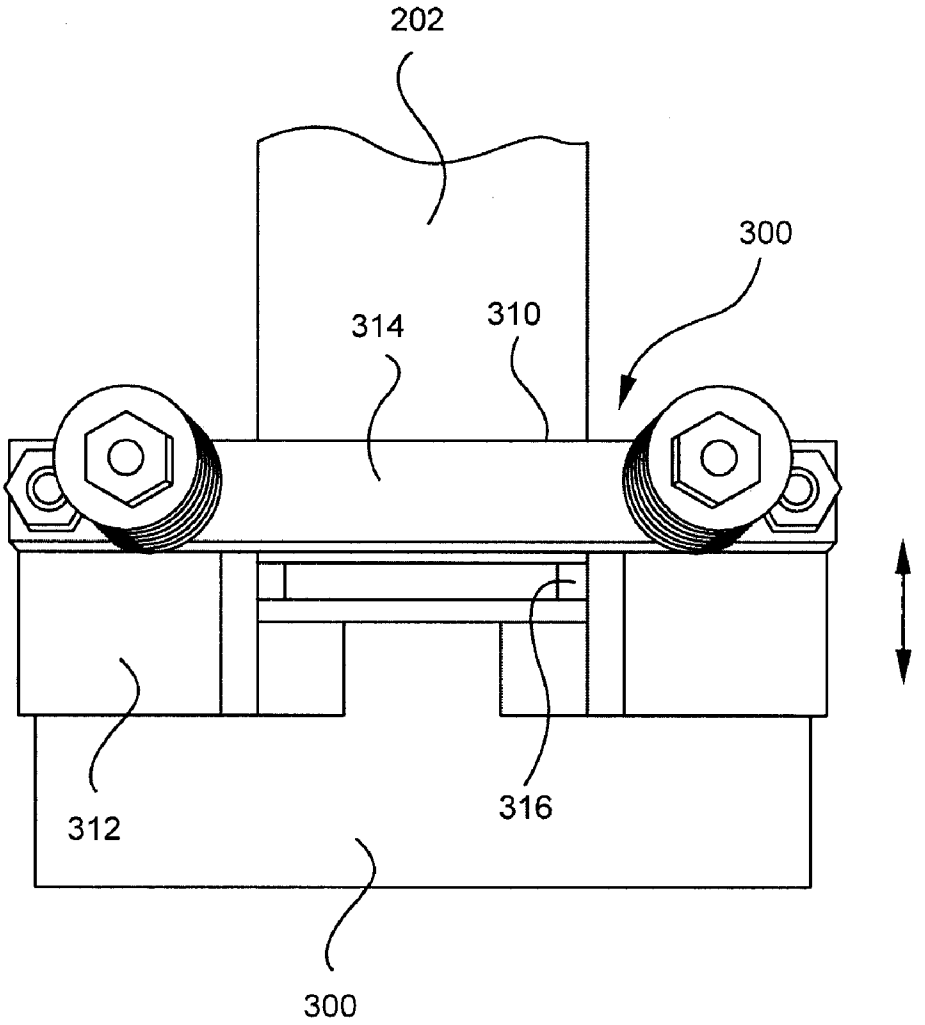


FIG. 9

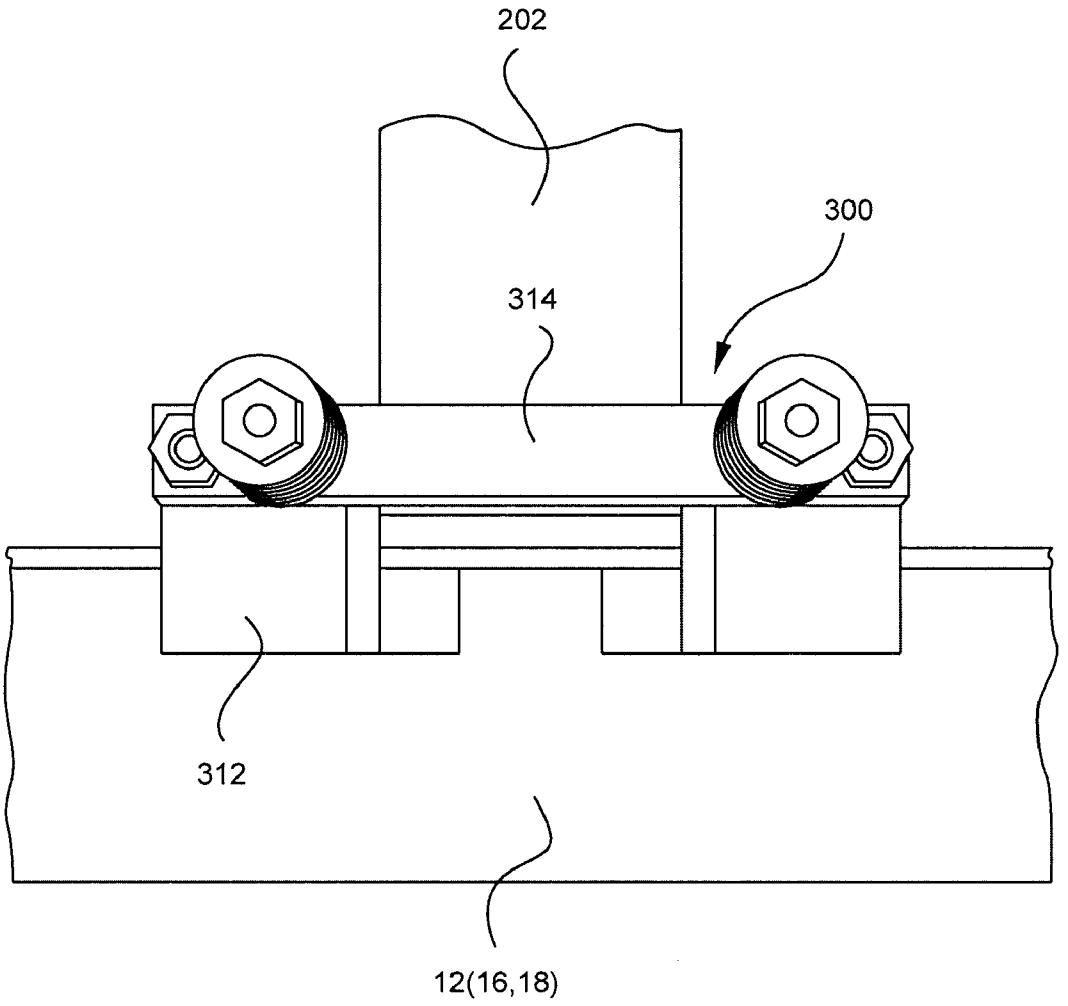


FIG. 10

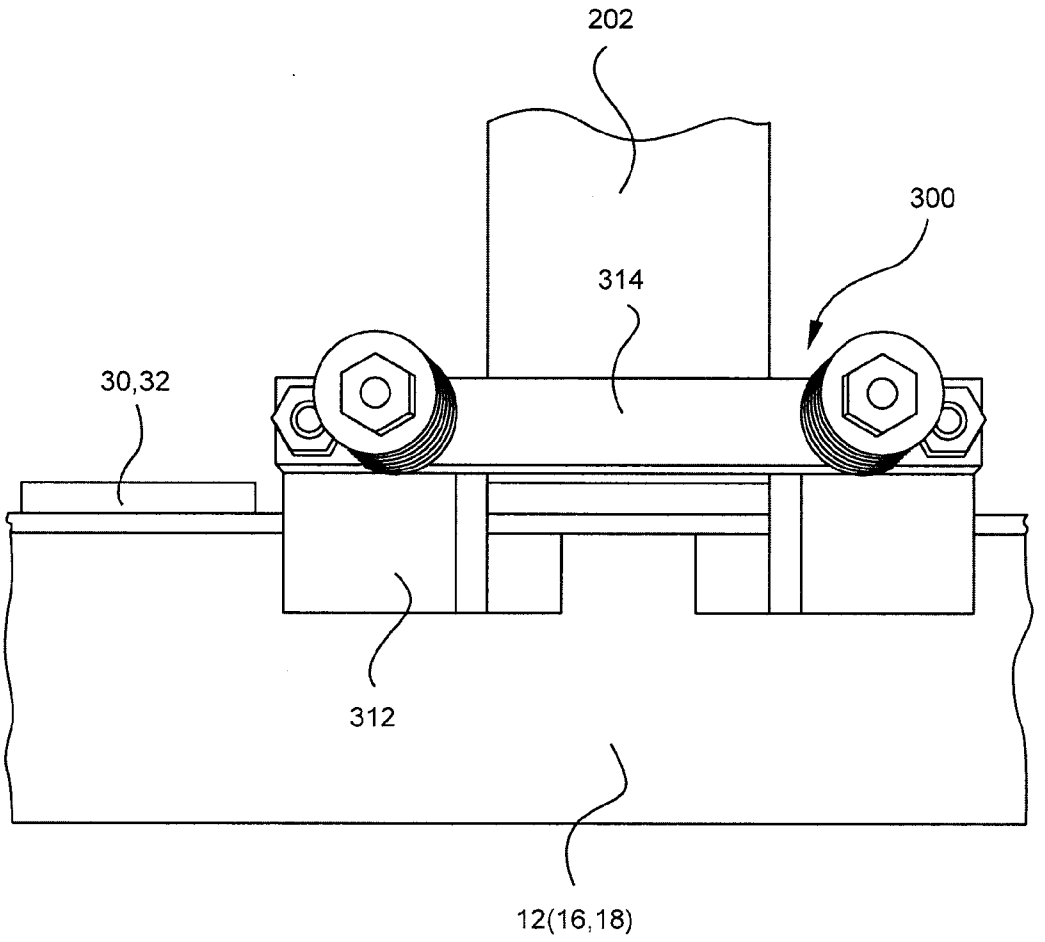


FIG. 11

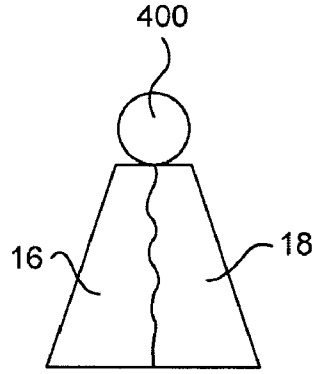


FIG. 12

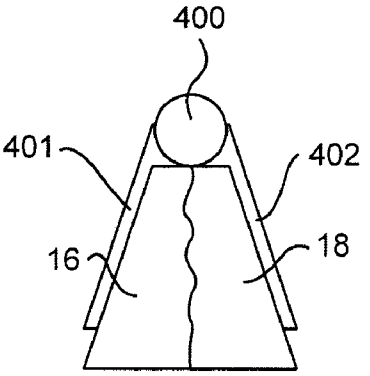


FIG. 13

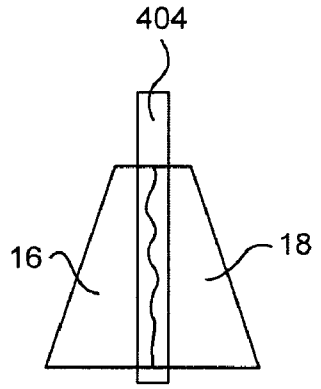


FIG. 14

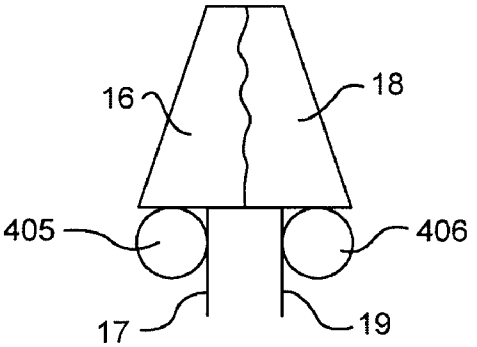


FIG. 15

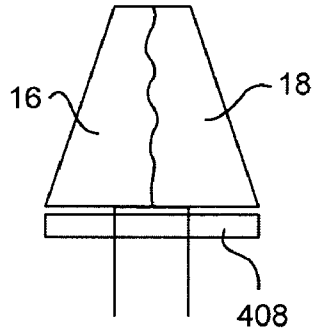


FIG. 16

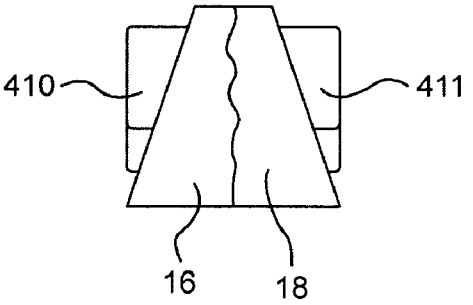


FIG. 17

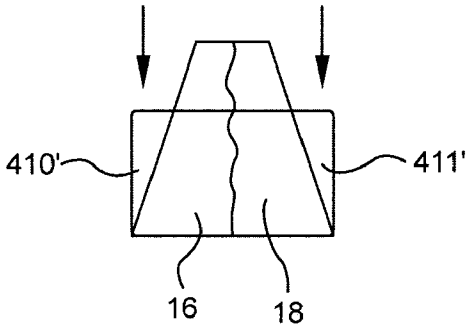


FIG. 18

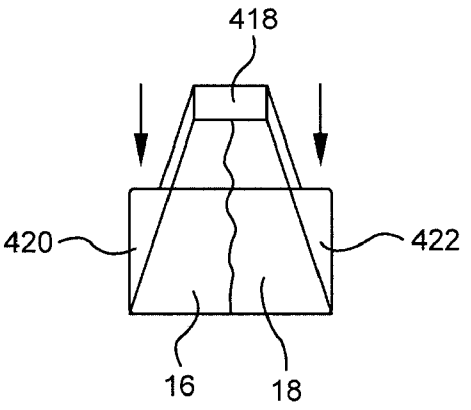


FIG. 19

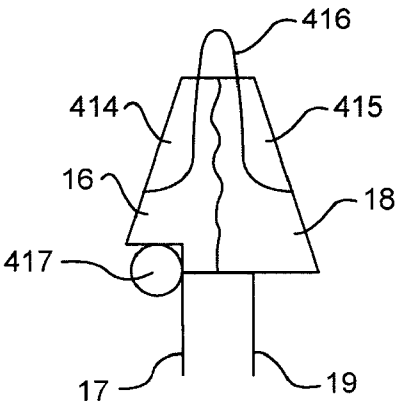


FIG. 20

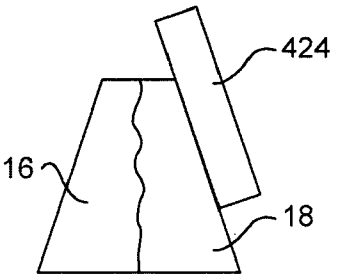


FIG. 21A

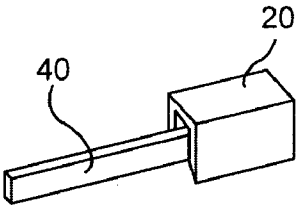


FIG. 21B

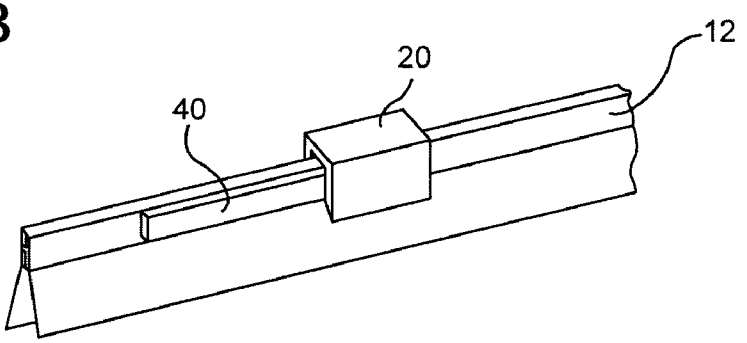


FIG. 21C

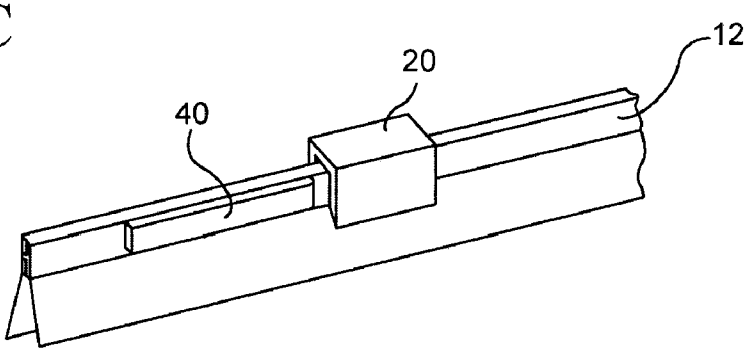


FIG. 21D

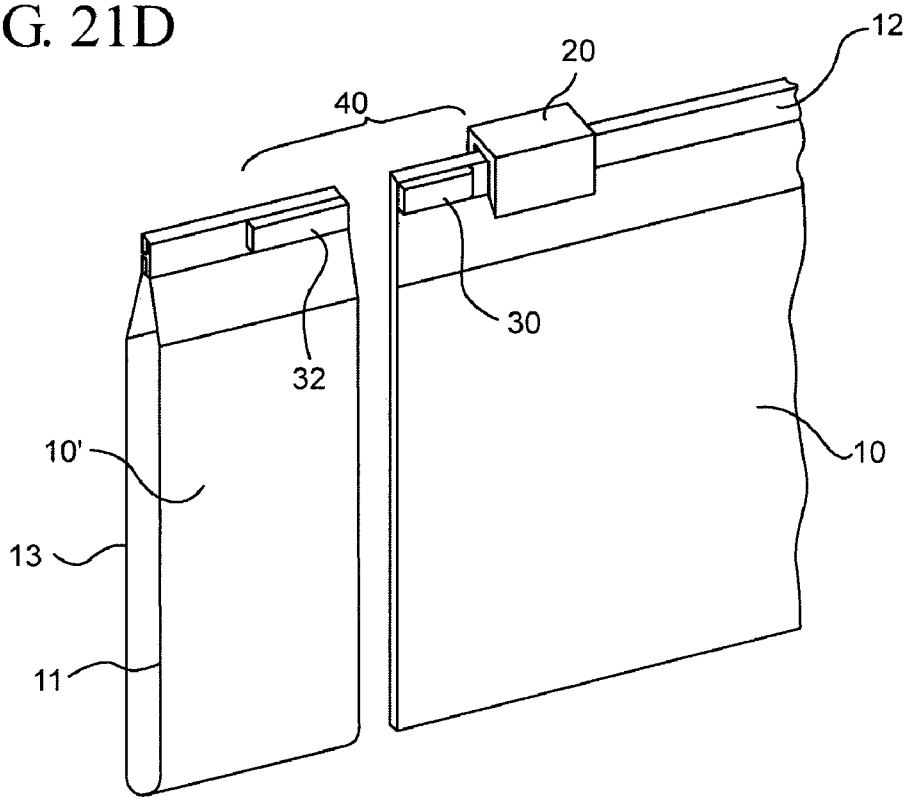


FIG. 22A

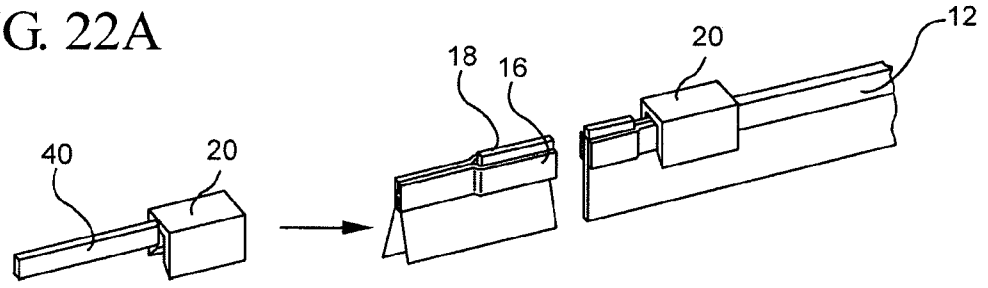


FIG. 22B

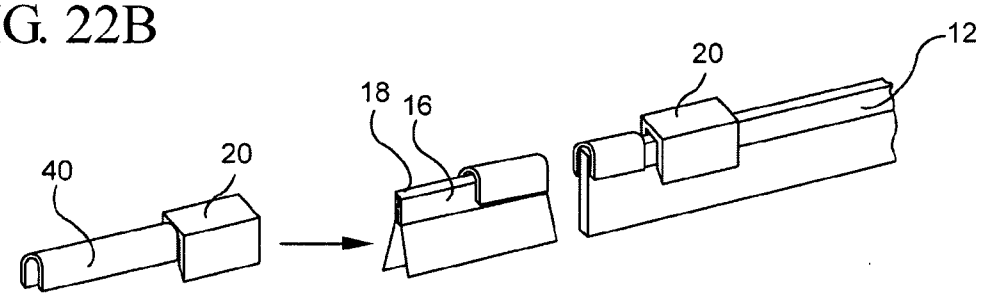


FIG. 22C

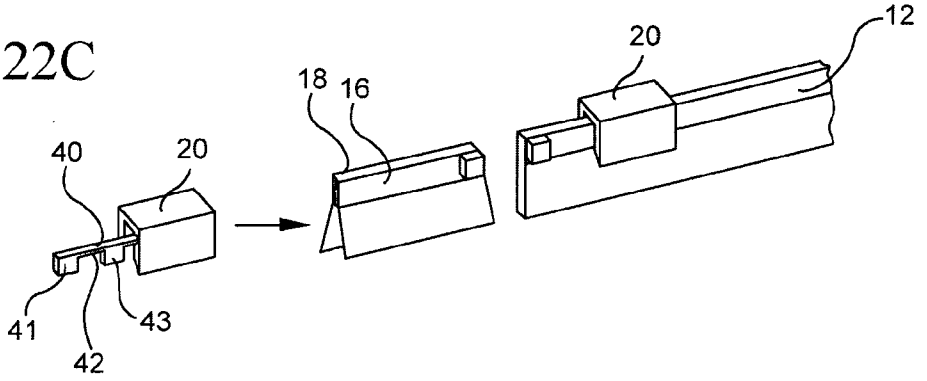


FIG. 23

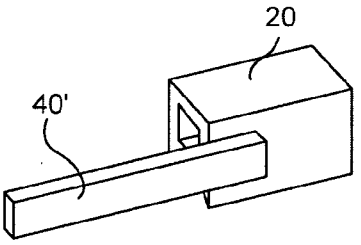
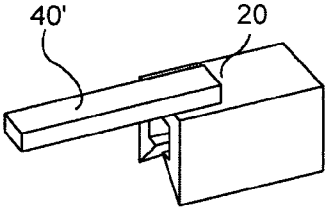


FIG. 24



ADDING MASS TO SLIDER END STOMPS WITH ULTRASONICS IN A RECLOSABLE PACKAGE

[0001] This application claims priority under 35 U.S.C. §119(e) of provisional patent application Ser. No. 61/249,812, filed on Oct. 8, 2009, the contents of which are incorporated by reference.

BACKGROUND OF THE DISCLOSURE

[0002] 1. Field of the Disclosure

[0003] The present disclosure relates to a method and apparatus for adding mass to the slider zipper profile during the ultrasonic crush cycle in order to provide a rise in the slider zipper profile, thereby resulting in increased slider pull-off forces.

[0004] 2. Description of the Prior Art

[0005] In the prior art, it is well known to form slider end stomps on the profiles of a slider zipper by ultrasonically crushing the profile, typically near the end seals of the zipper, thereby forcing mass upward and providing a "stop" to limit the travel of the slider during opening or closing of the zipper. However, sometimes a stop of increased strength is required, particularly with larger bags, to further assure that the slider does not travel beyond the ends of the zipper.

[0006] Prior art includes U.S. Pat. No. 7,470,061 entitled "Method for Making Slider End Stops on Zippers for Reclosable Packaging" issued on Dec. 30, 2008 to Plourde et al.

SUMMARY AND OBJECTS OF THE DISCLOSURE

[0007] It is therefore an object of the present disclosure to provide a method and apparatus for increasing the strength of a slider end stop or slider end stomp, whereby greater resistance is provided to pulling the slider from the ends of the zipper.

[0008] This and other objects are attained by the present disclosure by introducing an additional polyethylene mass, typically configured as a string, strip, strap or similar structure, butted atop the zipper profile at the ultrasonic (stomp-forming) station, thereby increasing the upwards mass height or rise of the resulting end stomp. The additional polyethylene mass is introduced, welded and cut at the ultrasonic station. In some applications, this may achieve a zipper pull-off force (i.e., the force required to pull a slider from an end of the zipper) of 15 pounds or more.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Further objects and advantages of the disclosure will become apparent from the following description and from the accompanying drawings, wherein:

[0010] FIG. **1** is a diagram of a prior art reclosable package, showing the typical location of end stomps.

[0011] FIG. **2** is a diagram of a prior art end stomp.

[0012] FIG. **3** is a plan view of the additional polyethylene string mass on a zipper profile, prior to ultrasonic forming.

[0013] FIG. **4** is a perspective view showing a length of the additional polyethylene string mass being added or joined to a length of zipper material.

[0014] FIG. **5** is a perspective view of the ultrasonic forming of the end stomps.

[0015] FIG. **6** is a plan view of the length of zipper material and the length of additional polyethylene string mass after ultrasonic welding but prior to the cutting of the string mass.

[0016] FIG. **7** is a plan view showing the final zipper, including end stomps of both ends.

[0017] FIG. **8** is a plan view of an embodiment of the method and apparatus wherein the additional material held in place by an anvil guide plate so that it may be applied perpendicularly to the length of zipper material.

[0018] FIG. **9** is a plan view of the embodiment of the method and apparatus of FIG. **8** wherein the length of zipper material is running through the guide plate.

[0019] FIG. **10** is a plan view of the embodiment of the method and apparatus of FIG. **8**, illustrating the formation of an end stomp of the length of zipper material.

[0020] FIGS. **11-20** illustrate additional possible locations for the insertion of additional mass on a zipper profile.

[0021] FIGS. **21**A-**21**D illustrate a slider initially provided with the additional mass for the zipper profile, and the sequence of steps for the installation thereof.

[0022] FIGS. **22**A-**22**C illustrate alternative embodiments to the slider illustrated in FIGS. **21**A-**21**D.

[0023] FIGS. **23** and **24** illustrate further alternative embodiments of the slider illustrated in FIGS. **21**A-**21**D and **22**A-**22**C, these alternatives illustrating that the material for the end stops or end stomps could be initially provided as separate pieces and attached to the slider.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] Referring now to the drawings in detail wherein like numerals indicate like elements throughout the several views, one sees that FIG. **1** is a diagram of a prior art reclosable package **100**. Reclosable package **100** includes co-extensive front and rear panels **102**, **104**, typically made of polymeric material and sealed at the bottom edge **106** and the two side edges **108**, **110**. Zipper **112** is attached to the resulting mouth **114** to make the package reclosable. Zipper **112** typically includes first and second interlocking profiles **116**, **118** which are selectively opened by the slider **120** moving in a first direction (left in the illustration) thereby separating the first and second interlocking profiles **116**, **118** and are selectively closed by the slider **120** moving in a second direction (right in the illustration) thereby interlocking the first and second interlocking profiles **116**, **118**.

[0025] First and second end stomps **130**, **132** are formed adjacent to the opposing ends of the zipper **112** in order to prevent the slider **120** from traveling (or being pulled) off of the ends of the zipper **112**. As shown in FIG. **2**, first and second end stomps **130**, **132** are typically formed by applying ultrasonic energy (or heat) to the zipper profiles **116**, **118** thereby forcing material from the profiles **116**, **118** upwardly. The material cools in place thereby forming the first and second end stomps **130**, **132**. While this method, apparatus and product are all well-developed and suitable for many applications, there are also applications in which increased resistance to slider pull-off is required. In other words, it is desired that the slider pull-off force be increased thereby preventing the slider from running up and partly over the end stomps **130**, **132**.

[0026] As shown in FIGS. **3-7**, increased resistance to slider pull-off may be achieved by adding additional material, such as a string of additional mass **200** onto the top of first and second zipper profiles **16**, **18** and ultrasonically forming end

stomps **30**, **32** from the material of both the zipper profiles **16**, **18** and the string of additional mass **200**. Prior to the addition of the string of additional mass **200** (or other additional mass), first and second zipper profiles **16**, **18** are similar to first and second zipper profiles **116**, **118**. The string of additional mass **200** is typically polymeric material (such as, but not limited to, polyethylene) which is similar to the material of the zipper profiles **16**, **18**, in order to provide for the at least partial intermixing of the profile material and the additional mass during ultrasonic welding. Additionally, the string of additional mass **200** may be composed of recycled "regrind" of scrap material of the appropriate composition, such as polyethylene. As shown in FIG. **4**, the string of additional mass **200** is fed to a length of zipper material **12** (comprising first and second zipper profiles **16**, **18**) so that the string of additional mass **200** and the length of zipper material **12** are parallel. After the operation of ultrasonic welder **300** as shown in FIG. **5**, the string of additional material **200** is incorporated into end stomps **30**, **32**, with unwelded excess material from string **200** running along the top of zipper material **12** as shown in FIG. **6**, each stomp forming an end stomp for a separate zipper bag. As shown in FIG. **3**, the excess material from string **200** is cut away, thereby leaving the end stomps **30**, **32** with a flat surface **31** or **33** for the slider **20** to strike against. The zipper **12** is then formed as shown in FIG. **7** with the slider **20** confined to the zipper by end stomps **30**, **32** of increased height and strength/

[0027] FIGS. **8-10** illustrate a method wherein band of additional mass **202** (formed of a material similar to that of the length of zipper **12**, such as, but not limited to, polyethylene) is provided perpendicularly to the direction of travel of the length of zipper **12** and attached to the side of the length of zipper **12**. Band of additional mass **202** enters a passageway **310** formed between the anvil guide plate **312** of ultrasonic (or thermal) welder **300** and a clamp **314**. A cutter **316** is positioned below clamp **314**. As shown in FIG. **9**, the zipper **12** travels perpendicularly to the direction of travel of band of additional mass **202**. The band of additional mass **202** is engaged by clamp **314** and periodically moved above or below the profile in a piston-like motion to be positioned for cutting and ultrasonic welding so as to produce the spaced end stomps **30**, **32** as shown in FIG. **10**. Then the clamp **314** will return to its original position (typically by upwardly vertical movement in the orientation of the figures). It is envisioned that this configuration may provide end stomps **30**, **32** with as much as a fifteen pound pull-off force (i.e., the force required to move the slider **20** past the end stomps **30**, **32**). It is further envisioned that even greater pull-off forces could be achieved in some applications.

[0028] FIGS. **11-19** illustrate various possible placement of the additional material above the first and second zipper profiles **16**, **18**, shown in cross-section. FIG. **11** illustrates the additional material configured as a cylindrical mass **400**, positioned at the top of first and second zipper profiles **16**, **18**, similar to the configuration of string of additional mass **200** as illustrated in FIGS. **3-7**. FIG. **12** additionally illustrates polymer sheets **401**, **402** extending from cylindrical mass **400** over the exterior faces of first and second zipper profiles **16**, **18**, to aid in the positioning of cylindrical mass **400** and further providing additional material. Polymer sheets **401**, **402** may further provide an improved visual appearance if there is a difference in color or other visual characteristics between the material of the zipper profiles **16**, **18** and the polymer sheets **401**, **402**. FIG. **13** illustrates a polymer sheet **404** being placed between the interlocking elements of first and second zipper profiles **16**, **18**. FIG. **14** illustrates first and second cylindrical masses **405**, **406** (thereby typically requiring a second or additional length of additional material) being placed below zipper profiles **16**, **18**, positioned outwardly from respective first and second flanges **17**, **19**. FIG. **15** illustrates a slab of additional material, positioned below first and second zipper profiles **16**, **18**. FIG. **16** illustrates additional masses **410**, **411** being placed flush to the exterior faces of first and second zipper profiles **16**, **18**, while FIG. **17** illustrates the downward crushing, typically in combination with the application of heat or ultrasonic energy of the configuration of FIG. **18** thereby resulting in additional masses **410'**, **411'** forming part of an end stomp. FIG. **18** is similar to FIG. **17**, except that additional mass **418** is added to the top of first and second zipper profiles **16**, **18**, while additional masses **420**, **422** form part of an end stomp. FIG. **19** illustrates a configuration wherein a single cylindrical mass **417** is placed under first zipper profile **16** and ultrasonic or thermal energy is applied to first and second zipper profiles **16**, **18**, so as to cause indentations **414**, **415** and further causing material to be pushed upward into extrusion **416**. FIG. **20** illustrates a configuration wherein a planar or slab-like mass **424** is placed to the side of second zipper profile **18** and extends thereabove.

[0029] FIG. **21**A illustrates a slider **20** with end stomp material extension **40** extending therefrom. End stomp material extension **40** provides the additional material for an end stomp, and is typically initially provided as an integral part of slider **20** and may, for example, be molded therewith. However, as illustrated in FIGS. **23** and **24**, end stomp material extension **40'** may be provided as a separate piece and subsequently sealed, glued, welded or otherwise to the top or side of slider **20**. As shown in FIG. **21**B, the slider **20** with end stomp material extension **40** (or **40'**) is inserted onto zipper **12**. The end stomp material extension **40** (or **40'**) is sealed, glued, welded or otherwise attached to the zipper **12** in a position so as to span the position of two adjacent reclosable packages **10**, **10'** (recalling that a typical reclosable slider package may include one slider **20** but requires two end stomps **30**, **32**). As shown in FIG. **21**C, the end stomp material extension **40** (or **40'**) is separated from the slider **20**, typically by cutting. As shown in FIG. **21**D, after the material to form the front and rear panels **11**, **13** has been attached to the zipper **20** (which may be done before or after the insertion of the slider **20** onto the zipper **12**) the cross cuts are formed to separate the adjacent reclosable packages **10**, **10'** and to divide the end stomp material extension **40** into end stomp **30** on reclosable package **10** and end stomp **32** on adjacent package **10'**.

[0030] FIG. **22**A illustrates an embodiment wherein end stomp material extension **40** extends from a central portion of slider **20** between the first and second zipper profiles **16**, **18**. FIG. **22**B illustrates an embodiment wherein the end stomp material extension **40** has an inverted U-shaped cross section to wrap around the first and second zipper profiles **16**, **18**. FIG. **22**C illustrates an embodiment wherein end stop material extension **40** includes discrete end stomp elements **41**, **43** attached by bridge **42** to form a key-type shape. As mentioned above, FIGS. **23** and **24** illustrate that the end stomp material extension **40'** can be initially provided as separate material, and then sealed, glued, welded, or otherwise attached to the top or side of slider **20**.

[0031] Thus the several aforementioned objects and advantages are most effectively attained. Although preferred

embodiments of the invention have been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

What is claimed is:

1. The process of:

providing a length of zipper material for a reclosable package;

providing a length of additional material adjacent to the length zipper material;

forming end stomps on the length of zipper material from a portion of the length of zipper material and a portion of the length of additional material.

2. The process of claim **1** wherein the step of forming end stomps is performed by ultrasonic or thermal welding.

3. The process of claim **2** wherein the length of zipper material is formed from polyethylene and the length of additional material is formed from polyethylene.

4. The process of claim **3** wherein the length of additional material is provided on a top of the length of zipper profile.

5. The process of claim **3** wherein the length of additional material is provided at a top of the length of zipper material, the length of additional material further including sheets which extend over sides of the length of zipper material.

6. The process of claim **3** wherein the length of additional material is provided at a first side of the length of zipper material.

7. The process of claim **6** further wherein the length of additional material is provided at a second side of the length of zipper material.

8. The process of claim **3** wherein the length of additional material is provided adjacent to and above the length of zipper material.

9. The process of claim **3** wherein the length of additional material is provided below the length of zipper material.

10. The process of claim **3** wherein the length of additional material is fed to be parallel to the length of zipper material.

11. The process of claim **3** further including the step of cutting away the length of additional material in locations where an end stomp is not formed.

12. The process of claim **3** wherein the end stomps rise above the length of zipper material.

13. The process of

providing a length of zipper material for a reclosable package;

inserting a slider onto the length of zipper material, the slider including an extension of additional material extending therefrom;

forming end stomps on the length of zipper material from at least a portion of the extension of addition material.

14. The process of claim **13** wherein the extension of additional material is inserted on a side of the length of zipper material.

15. The process of claim **14** wherein the length of zipper material includes first and second profiles and wherein the extension of additional material is inserted between the first and second profiles of the length of zipper material.

16. The process of:

providing a length of zipper profile for a reclosable package;

providing a length of additional material perpendicular to the length of zipper profile;

forming end stomps on the length of zipper material from a portion of the length of zipper material and a portion of the length of additional material.

17. The process of claim **16** wherein the length of additional material travels through a clamp device which periodically positions the length of additional material against the length of zipper material.

18. The process of claim **17** wherein the clamp device positions the length of additional material perpendicularly with respect to the length of zipper material.

19. The process of claim **18** wherein the clamp device further includes a cutting device for periodically cutting the length of additional material.

20. The process of claim **19** wherein the step of forming the end stomps is performed by an ultrasonic or thermal device configured with the clamp device.

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