

- [54] **SPRING CLIP FOR FOLDED GARMENTS AND THE LIKE**
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- [73] Assignees: **Theodore Watkin**, Stamford, Conn.; **Maurice Friedman**; **Alfred S. Friedman**, both of Woodmere, N.Y.
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- [52] U.S. Cl. **24/255 GP**, 24/67.9, 24/137 R, D49/1 F
- [51] Int. Cl. **A44b 21/00**
- [58] Field of Search 24/255 BC, 255 GP, 255 P, 24/255 G, 137 R, 138 R, 137 A, 67.9, 259 PF, 259 HC; D49/1 F

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[57] ABSTRACT

A spring clip is provided which is adapted to be placed over the edge of a folded article of wearing apparel in order to retain the same in folded condition. The clip includes a pair of elongated co-extensive arms which are joined by a spring yoke to form an internal chamber in the clip. The clip has an open mouth defined by a pair of lips, with each lip of the mouth being carried by one of the arms. The lips extend transversely beyond the width of the arms. The clip may be thrust directly against the edge of an article, whereupon the lips of its mouth cam the arms open and the article's edge passes into the clip's chamber. The clip is also adapted for automatic mechanical feeding by an appropriate apparatus onto such folded wearing apparel.

13 Claims, 12 Drawing Figures

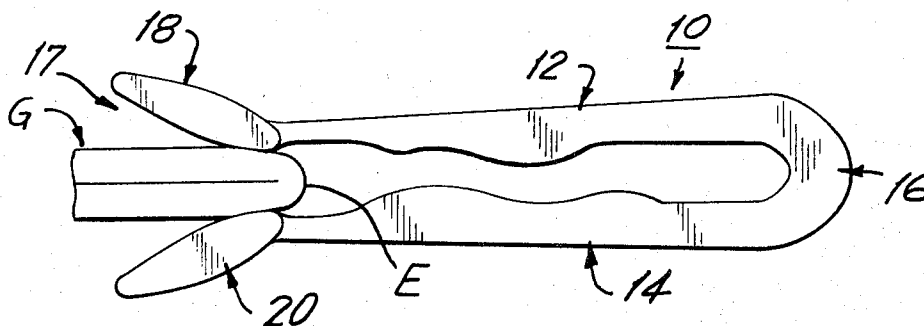


FIG. 1

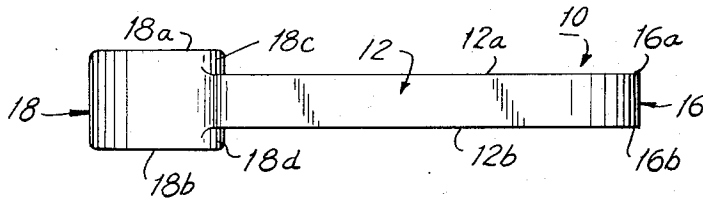


FIG. 2

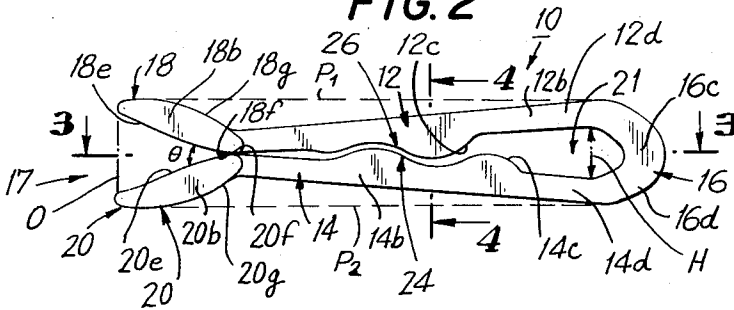


FIG. 3

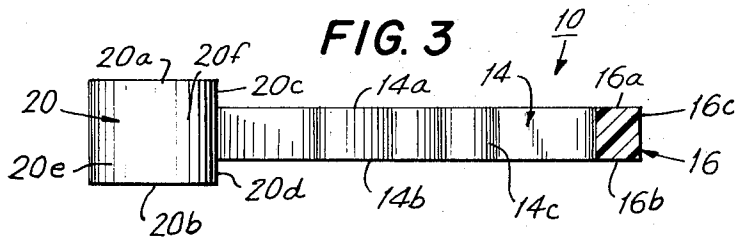
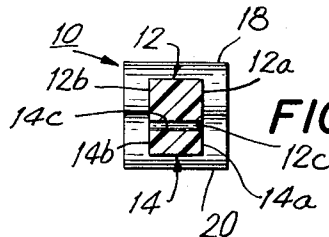


FIG. 4



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FIG. 5

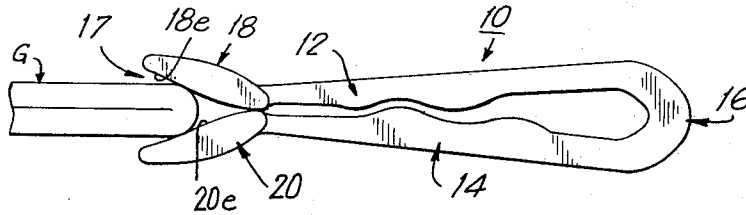


FIG. 6

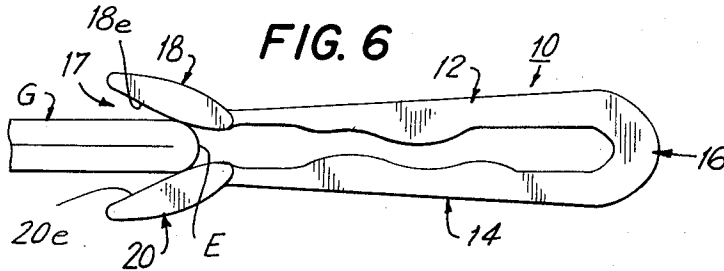


FIG. 7

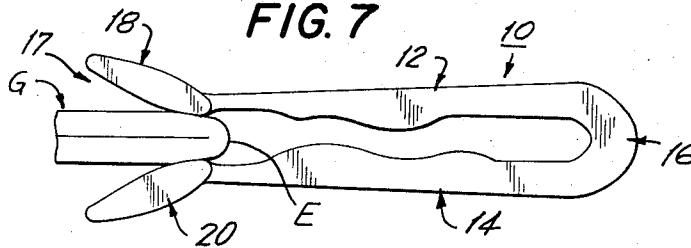
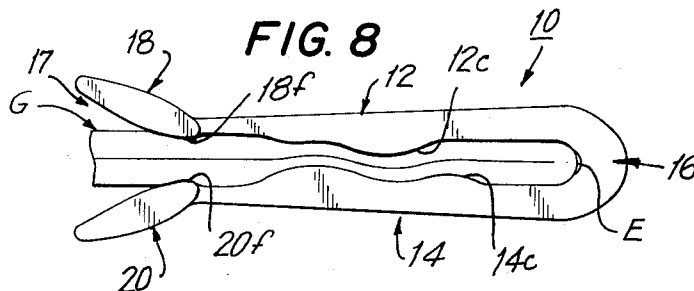


FIG. 8



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FIG. 9

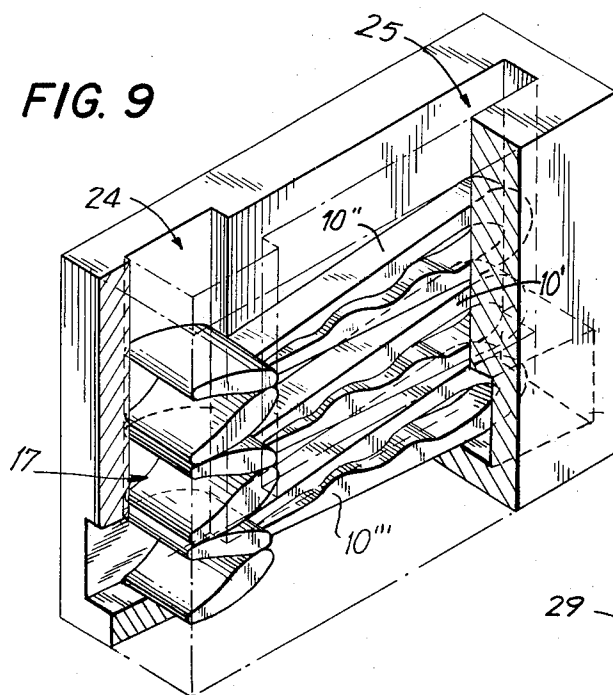


FIG. 10

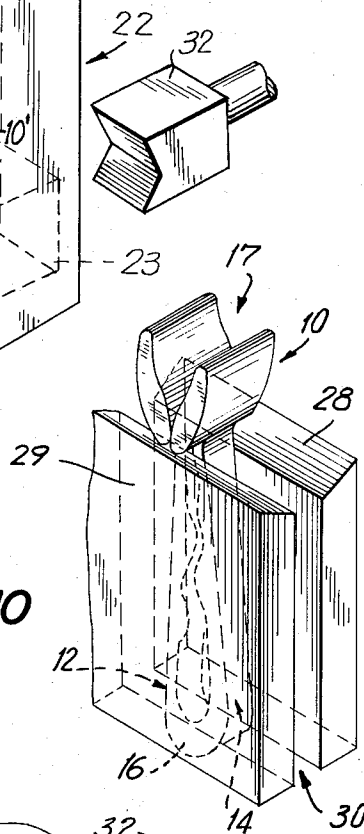


FIG. 11

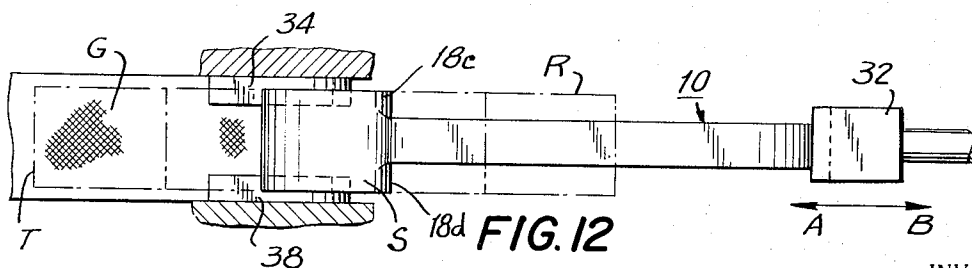
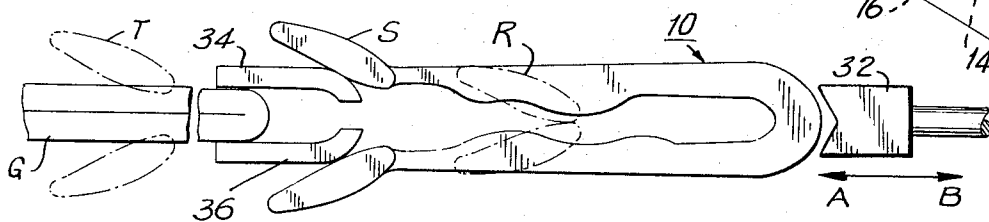


FIG. 12

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SPRING CLIP FOR FOLDED GARMENTS AND THE LIKE

This is a continuation-in-part of my application Ser. No. 53,409 filed July 9, 1970, entitled "Spring Clip."

This invention relates generally to spring clips, and more specifically to spring clips preferably formed of plastic, whose function is to grip and hold folded articles of wearing apparel such as folded shirts, blouses, underwear, and like articles as well as other soft goods in their folded condition.

Spring clips for folded articles of wearing apparel are well known in the prior art and are in wide use throughout the clothing industry. Typical of such prior art is Solomon, U.S. Pat. No. 2,960,742, Merfeld, U.S. Pat. No. 3,119,163, and Froehlich, U.S. Pat. No. 3,462,809. In fact such spring clips are continuing to gain further acceptance among clothing manufacturers, in that they are replacing straight pins which were previously conventionally utilized in retaining higher priced articles of apparel, such as shirts, in folded condition, prior to an initial use by a consumer.

The value of such spring clips is well recognized. They can be quickly and easily applied over the edge of a folded article of apparel to retain it in neatly folded condition in a transparent wrapping. Such clips will not harm the article of apparel and can be readily removed by the consumer in his home with a minimal amount of effort. In the foregoing respects, they are considerably more desirable than straight pins, which due to their sharp points may injure workers at the clothing manufacturer's facility and may also harm consumers in their homes during unwrapping and unfolding of a clothing article. In addition, such straight pins puncture the article of wearing apparel, and upon occasion rust, all of which will harm the article of apparel.

Although the commercially available spring clips carried out the aforesaid functions sufficiently well, the manner in which they were applied to folded articles of clothing was bothersome and relatively slow. As such spring clips continue to gain an increasingly greater share of the folded apparel-fastener market, their ability to be quickly mated with a folded article of clothing becomes increasingly important. The spring clips of the prior art were applied to a folded article of clothing by a "prying-open" motion. Specifically, such spring clips had one leg significantly longer than the other leg. When a worker applied such a prior art spring clip to an article of clothing, he first placed the longer leg of the clip under the folded article, pried the shorter leg of the clip away from the longer leg so that there was a gap between these legs, and then the clip was slid further onto the article and released. As can be readily imagined, this "prying-open" motion was relatively slow, especially in view of the volume of folded articles of clothing to which such clips had to be fixed. Moreover, no apparatus has been heretofore provided in conjunction with such clips for the automatic application of such clips to folded articles.

It is accordingly a primary object of the present invention to provide a spring clip for retaining folded articles of clothing and the like in folded condition, the clip having the capabilities of being able to be thrust toward and slid onto the edge of such an article quickly and easily, being able to hold the article securely without harm to the article itself, and which can be readily removed from the article by a consumer.

It is another important object of the present invention to provide a spring clip of the character described in which the spring clip has a wide-open mouth made up of a pair of camming lips, so that to engage the clip with an article of wearing apparel, the clip need be only thrust directly toward said edge of an article, whereupon the aforesaid lips climb over the edge to spread the arms of the clip, whereupon the clip engages and holds the article of wearing apparel.

It is still another important object of the present invention to provide a spring clip of the character described which is configured so that in conjunction with apparatus, the clips can automatically be placed onto such articles of folded clothing on a mass production basis.

In accordance with the teaching of the present invention, a spring clip is provided which comprises a pair of elongated arms of substantially the same length, connected by a spring yoke. By virtue of said yoke, the ends of the pair of arms adjacent to such yoke are spaced apart, and the other ends of the pair of arms are closely adjacent to one another. The legs and yoke thus define a chamber for receiving the edge of an article. The interior facing portions of the arms carry mating undulating teeth to grip the article. The clip also includes an open mouth which comprises a pair of camming lips. The end of each arm distant from the yoke carries one such lip. The opening of the mouth is greater than the height of the chamber, so that the lips enable the clip to climb over any folded article of clothing edge when the clip is thrust toward such edge by a worker and such edge is snugly received in the chamber. The lips are wider than the width of the arms and thus present broad surfaces to the edge of an article. The maximum vertical dimensions of the clip are located at the ends of the clip and are equal to one another. This characteristic enables the clips to be vertically stacked upon one another in horizontal orientation to make the clips amenable to machine feeding.

In the automated feeding of such clips, the portions of the lips which extend beyond the arms may engage ramps on an automatic loading apparatus for the purpose of spreading the arms apart. In this open state, the clip is machine-placed over the edge of an article, whereupon the lips are released so that the clip can close over the article.

Further objects, features and advantages of the invention will become apparent upon consideration of the following detailed description in conjunction with the drawings, wherein:

FIG. 1 is a top plan view of a spring clip made in accordance with the present invention;

FIG. 2 is a side elevational view of the spring clip;

FIG. 3 is a longitudinal sectional view of the spring clip taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a transverse sectional view of the spring clip taken substantially along the line 4—4 of FIG. 2;

FIG. 5 is a side elevational view showing the initial contact between the spring clip and the edge of a folded article in the course of a clip being engaged with a folded article of clothing;

FIGS. 6 through 8 are views generally similar to FIG. 5, and show, respectively, partial engagement of the spring clip with the edge of a folded article, complete opening of the spring clip, and the final stage of such engagement with the clip in its final location on an article;

FIG. 9 shows a stack of such spring clips, one upon another, in a supply chute;

FIG. 10 shows a spring clip in a slide;

FIG. 11 shows the spring clip engaging a pair of ramps on an automatic loading apparatus; and

FIG. 12 is a top view of the aforesaid engagement shown in FIG. 11.

Referring now to the drawings, and initially FIGS. 1 through 4, a spring clip 10 is provided to grip and hold a folded article of clothing in folded condition. Such articles may include, without limitation, shirts, blouses, underwear, or in fact any soft goods, whether folded or not, and may be utilized wherever a gripping and retaining function is required of a clip. The term "folded article" as hereinafter used will include the entire foregoing definition.

The clip comprises a one-piece molding which includes, as integral elements, a pair of arms, namely an upper arm 12 and a lower arm 14, a spring yoke 16 joining an end of the pair of arms, and an open mouth 17 comprising a pair of camming lips 18, 20. Each of the camming lips 18, 20 is carried by one of the arms 12, 14 at the ends of the pair of arms distant from the yoke 16. The yoke 16 holds the ends of the arms nearest it apart a certain distance, and orients the arms so that their ends, distant from the yoke 16, are closely adjacent one another.

In plan, as seen in FIGS. 1 and 3, the clip has a T-shaped head configuration, with the lips 18, 20 comprising the head of the T and the arms 12, 14 and the spring yoke 16 comprising the upright center arm of the T. In plan, the gripping lips are generally rectangular in shape, with parallel sides 18a and 18b on the lip 18 and parallel sides 20a, 20b on the lip 20. In a similar manner, the upper arm 12 has parallel side edges 12a, 12b and the lower arm 14 has parallel side edges 14a, 14b. The sides 12a and 14a are in alignment (see FIG. 4) and the sides 12b and 14b are also in alignment. The yoke 16 also has parallel sides 16a, 16b, the side 16a being in alignment with the sides 12a, 14a, of the arms 12, 14 and the side 16b of the yoke 16 being in alignment with the sides 12b, 14b of the arms 12, 14.

The mouth 17 comprising the lips 18, 20, is open. To this end, the lip 18 has a flat cam surface 18e while the lip 20 has a flat cam surface 20e, the cam surfaces 18e, 20e facing one another. Further, the lips 18, 20 include parallel touching gripping surfaces, the lip 18 including the gripping surface 18f and the lip 20 including the gripping surface 20f. The surfaces 18f, 20f, are closer to the yoke 16 than are the camming surfaces 18e, 20e. To achieve the wide-open orientation of the mouth 17, the cam surfaces 18e, 20e meet an angle θ in the range of approximately 20° to 70°, and desirably approximately 60°, with each surface being 30° away from a horizontal plane, as the clip is viewed in FIG. 2. The gripping surfaces 18f, 20f desirably lie in contact with one another in the aforesaid horizontal plane. The lips have outer surfaces 18g, 20g, respectively which curve rearwardly toward the yoke toward one another to meet at the aforesaid horizontal plane.

The yoke 16 has a thickness, that is a front to back dimension as seen at 16c in FIG. 2, which is greater than the thickness, that is the top to bottom dimension as seen at 12d or 14d in FIG. 2, of either of the arms 12, 14 at the portions thereof close to said yoke 16.

The arms 12, 14 themselves include and carry gripping surfaces. Specifically, the arm 12 has an undulating

ing surface 12c which comprises gripping teeth 24 and the arm 14 has an undulating surface 14c which comprises gripping teeth 26, these undulated surfaces 12c, 14c being opposed and facing one another. The undulating surfaces comprise waves of increasing amplitude in the direction from the mouth 17 to the yoke 16, and so the teeth 26 of the arm 12 approximately mate with and are complementary to the teeth 24 of the arm 14. These teeth grip the surface of any article of wearing apparel placed therebetween.

As mentioned previously, the lips 18, 20 are substantially wider than the arms 12, 14 to which they are respectively attached, and are wider than the spring yoke 16. The portions of the lips which extend beyond the arms 12, 14 and yoke 16 constitute co-extensive lip extensions, the lip 18 including extensions 18c, 18d, see FIG. 1, and the lip 20 including lip extensions 20c, 20d, see FIG. 3.

Other dimensions of the spring clip 10 are also significant. The maximum distance from outer surface 18g of the lip 18 to the outer surface 20g of the lip 20 is the same as the maximum distance between the outer surfaces of the arms 12, 14, this being the point at which they join the spring yoke 16. Accordingly, a plane P_1 joining the outermost surface of the lip 18 and the corresponding outermost surface of the arm 12 is parallel to a plane P_2 which joins the outermost surface of the lip 20 and the corresponding outermost surface of the arm 14. The spring clip, by virtue of its outermost points, may be said to have a parallel configuration in side elevation.

The aforesaid parallel configuration is especially valuable when one spring clip is to be stacked on top of another. Such stacked formation would be useful in feeding the spring clips one by one to a worker for manual insertion onto a folded article of clothing and would also be useful in feeding the spring clips in the function of an automatic loading machine.

An appropriate supply chute 22 is shown illustratively in FIG. 9 with an internal configuration designed to accommodate a stack of spring clips 10. The chute has a T-shaped groove comprising a head portion 24 and a body portion 25, to receive the head, arms and yoke of the clips. The clips may descend one after the other down the chute and in so doing will maintain a parallel horizontally oriented stacked relationship, because of the described over-all parallel side elevation configuration of the clips. Hence, when the outermost points of the outer surfaces of one clip 10' contact the adjacent outer surfaces of slips 10'' and 10''' directly above and below it, respectively, the clips will be maintained in a parallel, horizontal orientation for horizontal feeding purposes, via ports 23a and 23b in the chute of an automatic loading apparatus. Any slight displacement of one clip to its neighbor, either above or below it, will not cause any substantial displacement from the parallelism of the clips, since at their points of contact, the clip's surfaces are gently curved, that is, of large radius. (See FIGS. 2 and 9).

The lip extensions 18c, 18d of the lip 18 and the extensions 20c, 20d of the lip 20, enable the spring clip 10 to slide down an open slideway. As seen in FIG. 10, a slideway 27 includes a pair of parallel ways 28, 29 which define between them a slot 30. The slot 30 has a width to receive the arms in the width, but the slot is too small to receive the clip sideways, i.e., in its dimension from the outer surface of one arm to the outer sur-

face of another arm. When a clip 10 is placed in the slot, the arms 12, 14 will hang in the slot 30, while the mouth 17, being of larger dimension due to the lip extensions 18c, 18d, 20c, 20d, will not pass into it, but rather will ride on the upper surfaces of said ways 28, 30. If the slideway 27 as a whole is inclined, the spring clip 10 will slide down it, with the mouth 17 riding on the ways 28, 29. The slide can feed clips into the chute in a manner not shown.

Another important aspect of the configuration of the spring clip 10 is that the arms 12, 14 and the spring yoke 16 define an interior cavity 21 having a maximum height indicated by the line H in FIG. 2 at a point where the arms 12, 14 join said spring yoke 16. This distance H is approximately the same as or desirably less than the maximum thickness of the edge of a folded article of wearing apparel. The lips 18, 20 of the mouth 17 have a maximum opening as indicated by the line O in FIG. 2 which is greater than, i.e., no more than 100 percent greater than, the height H of the cavity and which is usually greater than the thickness of the leading portion of the edge of a folded article of wearing apparel.

The purpose of these dimensions is apparent in FIGS. 5 through 8, which shows the entry of a spring clip onto a folded garment G having a leading edge E. In the manual attachment of a clip, a worker takes the spring clip 10 in hand and without any necessity of moving the arm 12 away from the arm 14, gently thrusts the mouth 17 of the spring clip towards the edge E of a folded article G. The camming surfaces 18e, 20e of the lips engage the edge E and as seen in FIGS. 6 and 7, as the spring clip is continued to be pushed towards the folded article G, the lips 18, 20 are continually opened further due to the camming action between the aforesaid camming surfaces 18e, 20e and said edge E. The opening of the lips causes the arms 12, 14 to open to receive the article. It should be noted that the arms 12, 14 bend primarily at the points at which they join the spring yoke 16, these being the portions of the arms and yoke least resistant to bending. Also as previously mentioned, the aforesaid camming surfaces are operative because the distance O (see FIG. 2), the maximum opening of the mouth 17, is usually greater than the thickness of the edge E of the garment G, so the surfaces can override the edge.

Further thrusting of the clip 10 results in the location of the spring clip with its yoke 16 in contact with the edge E, the teeth 24, 26 of the arms gripping the portion of the article G adjacent the edge E, and the flat gripping surfaces 18f, 20f sinking slightly into the body of the article G. The maximum height H of the cavity 21 is such that the cavity is substantially entirely filled with a portion of the article, when the spring clip is in its final location. The sinking action of the gripping surfaces 18f, 20f takes place primarily beyond the edge E, since the edge is somewhat stiffened due to the turn of the article of apparel at its edge. It is apparent that the clip 10 can be withdrawn from the article G by a consumer by the simple action of pulling the clip away from the edge E.

Another advantage of the configuration of the spring clip, and specifically the advantage of the lip extensions 18c, 18d and 20c, 20d, is that this forms comparatively wide lips for the clip. Since the lips are relatively wide, the mouths 17 of the clips do not tend to pass into the cavities 21 of other clips. This is important since such clips may be supplied loosely in bags or containers to

workers, and such interlocking of the clips would require untangling by workers, and again would slow the application of such clips onto articles of clothing. Moreover, the significant width of these lips insures a large area of contact with the edge E of an article, which aids the camming action of the clip.

FIGS. 11 and 12 show schematically a possible use of the clip 10 with an automatic loading apparatus. Each clip 10 in turn is brought from an initial position shown by dot-and-dash lines R in FIGS. 11, 12 to an intermediate position S shown by solid lines in these figures by a plunger 32 which reciprocates in the directions A, B. The plunger passes through the bottom of the supply chute via ports 23a, 23b. As the spring clip is brought from position R to position S, each of the lip extensions 18c, 18d, 20c, 20d, encounters one of a set of ramps 34, 36, 38, and another of which is not shown. The ramp 34 is spaced from ramp 38, and ramp 36 is spaced from its corresponding ramp such that the arms 12, 14 as well as the yoke 16 can pass therebetween, but so that they positively engage the lip extensions 18c, 18d and 20c, 20d. As the spring clip 10 is driven by the plunger 32, out of the chute 22, the lip extensions cam on the ramps 34, 36, 38 causing the lips 18, 20 to separate and to space apart the arms 12, 14. Then the lip extensions 18c, 18d and 20c, 20d at the gripping surfaces 18f, 20f, reach the ends of and pass beyond the ramps, enabling the arms to snap toward one another. An article G is situated within the four ramps in the path of travel of the spring clip 10, so that as the lip extensions 18c, 18d, 20c, 20d, as mentioned pass beyond the ramps and as the clip closes, it does so upon the article G to attain the final position T of FIGS. 11 and 12.

It is of course necessary for the proper construction of the spring clips, that they made of a relatively elastic resilient material, and a plastic material is most desirable for this purpose. Illustrative of the plastic materials suitable are thermoplastics such as general purpose polystyrene, medium impact polystyrene, this being a general purpose polystyrene combined with a high impact polystyrene, and polypropylene.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1. A spring clip for gripping folded articles of wearing apparel, soft goods and the like, the spring clip comprising:

- a. a pair of generally co-extensive arms;
- b. a spring yoke joining and orienting the arms so that the arms are separated from one another at the end of the pair nearest the yoke and are closely adjacent to one another at the remote end of the pair, the yoke and arms defining a chamber in the clip for receiving an edge of the wearing apparel, soft goods and the like, and
- c. a pair of lips defining an open mouth for the clip, each lip being fixed to a different arm at the remote end of the pair, the lips extending transversely beyond the width of the arms and the yoke, the plane containing the outermost points of one lip and its connected arm being parallel to the plane containing the outermost points of the other lip and its

connected arm, the surfaces of the lips and arms at said points being of gently sloping flat configuration whereby when the clips are stacked slight misalignment of one clip to another will not cause substantial displacement from parallelism.

2. A spring clip as set forth in claim 1 wherein the lips have outwardly facing opposed camming surfaces.

3. A spring clip as set forth in claim 2 wherein the lips have flat gripping surfaces adjacent said camming surfaces.

4. A spring clip as set forth in claim 1 wherein each arm carries teeth, the teeth of the arms being of complementary mating configuration.

5. A spring clip as set forth in claim 4 wherein the teeth are of increasing amplitude in a direction approaching the spring yoke.

6. A spring clip as set forth in claim 1 wherein the clip comprises a one-piece integral molding formed of a resilient plastic.

7. A spring clip as set forth in claim 2 wherein the camming surfaces meet at an angle of approximately 60°.

8. A spring clip as set forth in claim 1 wherein the clip is of "T-shaped" configuration in plan.

9. A spring clip as set forth in claim 1 wherein the width of the arms and the yoke is uniform.

10. A spring clip as set forth in claim 1 wherein the maximum opening of the lips is greater than the height of the cavity.

11. A spring clip as set forth in claim 1 wherein the interior and exterior surfaces of the lips are convex.

12. A spring clip as set forth in claim 1 wherein the lips extend equidistantly on each side of the arms and yoke.

13. A spring clip as set forth in claim 12 wherein the lips have aligned rearward edges.

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