Dec. 20, 1966 V. J. ESPOSITO, JR 3,292,223

INTEGRAL SNAP-ACTION CLIPS

Filed March 11, 1965

Fig. 1.

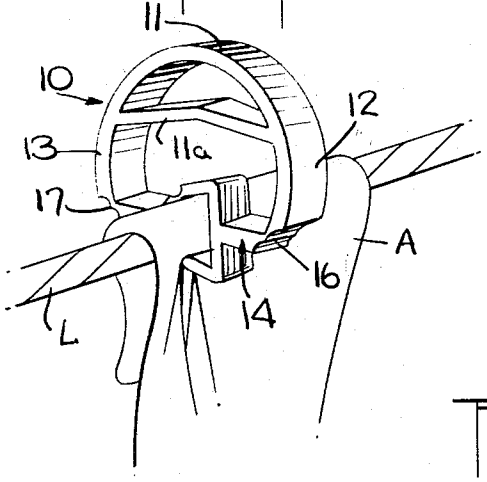


Fig. 3.

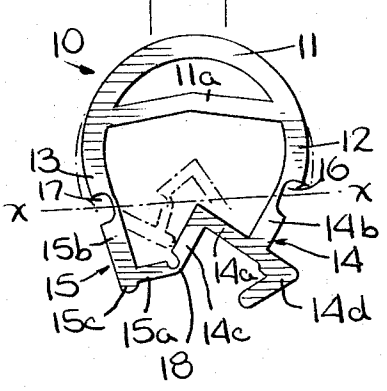


Fig. 2.

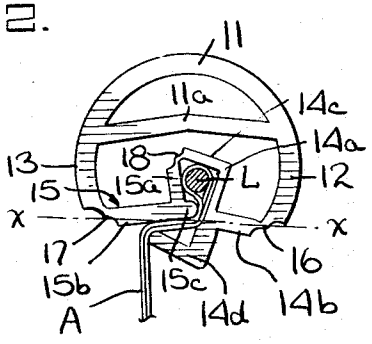


Fig. 4.

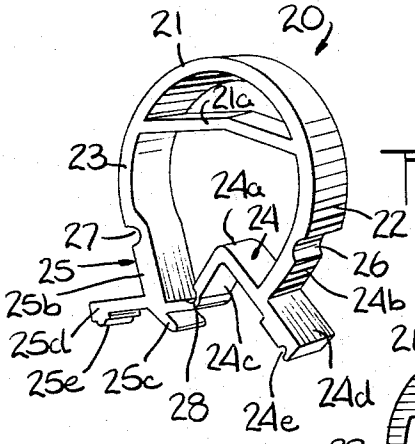


Fig. 5.

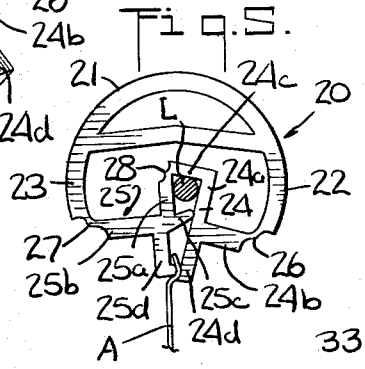


Fig. 6.

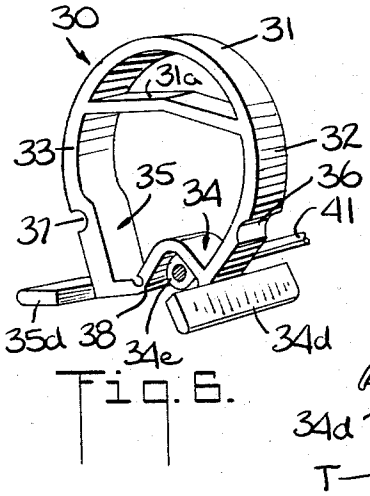


Fig. 7.

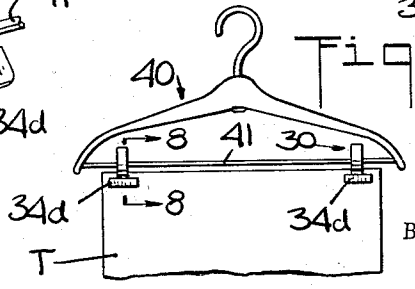
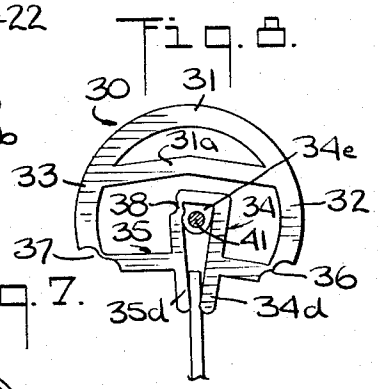


Fig. 8.



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INTEGRAL SNAP-ACTION CLIPS

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This invention relates to snap-action gripping means or clips and more particularly is directed to such devices molded of elastomeric plastic resinous material having integral means for selectively opening and closing a pair of pressure exerting jaws.

Among the objects of the invention is to provide a single, unitary integral structure molded of elastomeric material incorporating a snap-action gripping means particularly adaptable for embodiment as a clothes pin or like clip, which shall utilize a plurality of integral hinges coacting with resilient members for selective and resilient self retention of its jaws in alternative open and closed positions, which jaws shall be pressure responsive for snap-action between said positions and operable with a minimum of friction on the material being gripped thereby eliminating possible damage to delicate fabrics, which shall be economical to manufacture in quantity production as a unitary structure by modern molding methods in a wide variety of attractive colors, sizes and configurations, which shall be durable, rugged, foolproof in operation and practical and efficient to a high degree in use.

Other objects of the invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists of features of constructions, combinations of elements and arrangements of parts which will be exemplified in the constructions hereinafter described, the scope of the application of which will be indicated in the claims following.

In the accompanying drawings in which various embodiments of the invention are shown:

FIG. 1 is a perspective view of a clothes pin shown in operative position clamping an article of laundry on a clothes line.

FIG. 2 is a front elevational view of the clothes pin illustrated in FIG. 1 showing details of the jaws in closed position.

FIG. 3 is a front elevational view of the clothes pin illustrated in FIGS. 1 and 2 removed from the clothes line with the jaws in open position, a midpoint between open and closed position being indicated in broken lines.

FIG. 4 is a perspective view of a modified form of clothes pin shown in open position.

FIG. 5 is a front elevational view taken similar to FIG. 2 of the modified form of clothes pin in FIG. 4 shown in closed position mounted on a clothes line and clamping an article of laundry.

FIG. 6 is a perspective view of another modified form of clothes pin shown in open position.

FIG. 7 is a front elevational view of a clothes hanger showing the clothes pin mounted on a cross bar suspending trousers or a skirt therefrom, and

FIG. 8 is a sectional view taken on line 8—8 in FIG. 7 showing the clothes pin in closed position.

Referring in detail to FIGS. 1, 2 and 3 of the drawings, **10** generally denotes a clip constructed to embody the invention in the form of a clothes pin which may be molded as an integral unit, as for example, by injection molding methods, of a suitable elastomeric plastic resin, such as, linear polyethylene, polypropylene, or the like material having tough foldable tear resistant properties satisfying the requirements for an integral hinge or pivot.

As seen in FIG. 3, clothes pin **10** may be provided as a colored ring structure comprising a relatively rigid support section **11** having opposite resilient arm sections **12** and **13** which are joined to a pair of jaw sections **14** and **15** by relatively thin foldable webs forming hinges **16** and **17**, respectively. Jaw sections **14** and **15** are interconnected at their adjacent ends by a third foldable web forming hinge **18** to complete the closed ring structure.

Rigid support section **11**, which may be fashioned in any suitable manner, as for example, by thickening the material, providing therein a web or ribs, or, as here shown, by a cross brace **11***a*, disposes resilient arm sections **12** and **13** in a normal retracted position whereby hinges **16** and **17** are retained at a predetermined minimum distance from each other. Resilient arm sections **12** and **13** are fashioned to flex outwardly, away from each other, when pressure is applied thereto by the jaw sections **14** and **15** being moved between open and closed positions as indicated in broken lines in FIG. 3.

Jaw sections **14** and **15** are sized and shaped to have a combined average effective length greater than the distance between the hinges **16** and **17** when resilient arm sections **12** and **13** are in the normal retracted position, that is, to position hinge **18** a spaced distance on either side of the line *x*—*x* drawn between hinges **16** and **17** as will be clear from FIGS. 2 and 3. Jaw sections **14** and **15** are also shaped to provide a boxed-in clamping area when in the closed position shown in FIG. 2, the portions forming the clamping area being openly exposed when jaw sections **14** and **15** are in open position.

A feature of the invention is the structural arrangement of the jaw sections whereby upward relative pressure by the article to be clipped or grasped when applied against portions of the jaw sections serves to spring the latter into closed position, and conversely, downward relative pressure of the article applied against other portions of the closed jaw sections serves to spring the latter into open position wherein they remain resiliently retained ready for reuse.

To achieve the ends hereinbefore described, jaw section **14** is seen to comprise a reentrant portion having a clamp member **14***a* and a transverse member **14***c*, the latter being interconnected by hinge **18** to an opposing clamp member **15***a* of jaw section **15**. As seen in FIG. 2, when jaw sections **14** and **15** are in closed position, clamp member **14***a*, transverse member **14***c* and clamp member **15***a* are disposed to provide said boxed-in clamping area. Jaw sections **14** and **15**, each also comprises a support member **14***b* and **15***b* connected to hinges **16** and **17**, respectively. Each of the support members **14***b* and **15***b* is swingable on its respective hinge **16** and **17** from an open position in alignment with respective resilient arm sections **12** and **13** shown in FIG. 3 to the closed position in substantial alignment with each other but at a small inwardly tapering angle having its apex above the line *x*—*x* as shown in FIG. 2. Jaw section **14** also carries a hook member **14***d*, the function of which will be hereinafter more fully described, seen as an outward extension of a clamp member **14***a* and having its free end extending toward and partialy underlying support member **15***b* when the jaw sections are in closed position. A protuberance **15***c* may be provided on jaw section **15** as an extension from support member **15***b* beyond clamp member **15***a* to reduce the opening to the boxed-in clamping area when jaw sections **14** and **15** are in closed position thereby serving as a gripping means in the manner hereinafter described.

The practical utility and operation of the invention will now be apparent. Clothes pin **10**, having been molded as an integral structure of an elastomeric plastic, is ready for use when in its open position shown in FIG. 3. An edge or corner of an article A is first folded over the clothes line L in the well understood manner. Clothes pin **10** may then be grasped in one hand at rigid support section **11** and positioned so that the portion of the folded

article A on clothes line L to be secured lies in the reentrant portion of jaw section **14** between clamp member **14***a* and transverse member **14***c*. Then, by simply pressing clothes pin **10** downwardly against clothes line L, jaw sections **14** and **15** are snapped into closed position wherein clamp members **14***a*, **15***a* and transverse member **14***c* assume the boxed-in configuration clamping article A and clothes line L therein against the resiliency of arm sections **12** and **13**, as seen in FIG. 2. For removal, clothes pin **10** is merely pulled up from clothes line L whereby jaw sections **14** and **15** are returned to and remain in open position shown in FIG. 3.

The closing of jaw sections **14** and **15** is accomplished by their pivoting with respect to arm sections **12** and **13** at hinges **16** and **17**, respectively, and pivoting with respect to each other at hinge **18**. In responding to the opposing inward, that is, the upward pressure exerted against said reentrant portion of jaw section **14** by clothes line L, jaw sections **14** and **15** pass through a maximum effective length configuration when hinge **18** crosses line *x*—*x* whereby resilient arm sections **12** and **13** are spread apart and tension loaded to spring jaw sections **14** and **15** into closed position. Where the sizes and proportions of jaw section clamp members **14***b*, **15***b*, transverse member **14***c* and the overall thickness of folded article A on clothes line L being gripped by clothes pin **10** so require, protuberance **15***c* is sized to coact with jaw section **14** to provide additional gripping of folded article A beneath clothes line L. As seen in FIG. 2, hook member **14***d* may likewise coact with support member **15***b* as an auxiliary gripping means for folded article A.

In responding to the opposing outward, that is, the downward, pressure exerted by clothes line L when clothes pin **10** is being removed, jaw sections **14** and **15** again pass through a maximum effective length configuration spreading resilient arm sections **12** and **13**. It will also be apparent that hook member **14***d* is positioned to engage clothes line L as it emerges from said boxed-in clamping area thereby insuring positive movement of jaw sections **14** and **15** to the open position shown in FIG. 3 to prepare clothes pin **10** for reuse without further manipulation and eliminating the possibility of clothes line L bearing its folded article A slipping out of said boxed-in clamping area without springing jaw sections **14** and **15** to open position.

FIGS. 4 and 5 show a modified form of the invention as clothes pin **20** provided as a closed ring structure comprising rigid support member **21**, cross brace **21***a*, resilient arm sections **22** and **23**, hinges **26**, **27** and **28** and jaw sections **24** and **25** formed with clamp members **24***a*, **25***a*, support members **24***b*, **25***b* and transverse member **24***c*, all substantially similar to the corresponding parts of clothes pin **10**.

Jaw sections **24** and **25** are shown modified to include a pair of gripping members **24***d* and **25***d*, projecting substantially at right angles from support members **24***b* and **25***b* respectively, to engage each other at the free ends thereof when jaw sections **24** and **25** are in closed position as shown in FIG. 5. Jaw section **25** may also include protuberance **25***c* which may be longer than corresponding protuberance **15***c* in clothes pin **10**. To improve the holding characteristics of gripping members **24***d* and **25***d* suitable interengaging means may be provided on the opposing surfaces thereof, such as rib **25***e* and complimentary groove **24***e*.

FIGS. 6, 7 and 8 illustrate an embodiment of the invention as a clip **30** for supporting trousers T or skirts on the rung or crossbar **41** of a coathanger **40**. Clip **30** is seen to comprise a rigid support member **31**, cross brace **31***a*, resilient arm sections **32** and **33**, hinges **36**, **37** and **38** and jaw sections **34** and **35**, all substantially similar to the corresponding parts of clothes pins **10** and **20**. Clip **30** resembles clothes pin **20** in being provided with gripping members **34***d* and **35***d* which may be elongated at right angles to the plane of clip **30** to present a longer gripping surface. A feature of clip **30** is its permanent attachment to crossbar **41** which is readily accomplished by a slight modification of a jaw section, for example, by providing an integral eyelet **34***e* in the reentrant portion of jaw **34** for receiving hanger crossbar **41** therethrough.

The operation of clothes pin **20** and clip **30** is substantially identical to clothes pin **10** as hereinbefore described. In addition to the snap-action from open to closed position which is common to all three illustrated embodiments of the invention, the arrangement of gripping members **24***d*, **25***d* and **34***d*, **35***d* permits the respective jaw sections **24**, **25** and **34**, **35** to be operated between the closed position and a partially open position, that is, a position just short of the maximum effective length of the jaw sections. As will be clear from FIG. 5, commencing with jaw sections **24**, **25** in closed position, the user pulls upwardly on rigid support member **21** with respect to clothes line L which depresses protuberance **25***c* and flexes jaw sections **24**, **25** in a downward direction against the resiliency of arm sections **22**, **23** thereby spreading gripping members **24***d*, **25***d* sufficiently for inserting an edge border of article A therebetween. Upon release of the upward pull, jaw sections **24**, **25** and gripping members **24***d*, **25***d* return to fully closed position, being retained therein by resilient arm sections **22**, **23**. A slight upward pull on rigid support member **21** against clothes line L releases the compression force between gripping members **24***d*, **25***d* for disengagement of article A. Likewise, the user, pulling upwardly on rigid support member **31** of clip **30** with respect to crossbar **41**, causes the latter to pull downwardly on eyelet **34***e* to flex jaw sections **34**, **35** and part gripping members **34***d*, **35***d* for insertion therebetween or removal therefrom of an edge border of trousers T.

It is to be understood that the pressure responsive snap-action of a gripping means provided by an integral ring structure of elastomeric plastic material embodying the invention as illustrated in clothes pins or clips **10**, **20** and **30** will find other household applications including use as pressure actuated tool holders and as drapery and curtain holders replacing fabric piercing drapery hooks and the like.

The improved integral snap-action clips herein disclosed are seen to achieve the several objects of the invention and to be well adapted to meet conditions of practical use. As various possible embodiments might be made in the above invention, and as various changes might be made in the disclosed constructions, it is to be understood that all matters herein set forth or shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

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

1. A clip of the character described comprising a closed integral ring structure sectionalized into a relatively rigid support section carrying opposite resilient arm sections each terminating in a foldable thin web portion, a pair of jaw sections, one extending from each web portion and connected to each other by a third foldable thin web portion, said jaw sections being selectively retained in open and closed positions by said resilient arm sections and being movable between said positions.

2. The clip defined in claim **1** in which said jaw sections are proportioned to locate said third foldable thin web when in said open and closed positions at spaced points on opposite sides of a straight line between said first mentioned thin web portions.

3. The clip defined in claim **2** in which said jaw sections are shaped to define a boxed-in clamping area located radially inwardly of said straight line when the jaw sections are in said closed position and an exposed area located radially outwardly of said straight line when the jaw sections are in said open position.

4. A clip of the character described comprising a closed integral ring structure sectionalized into a relatively rigid support section carrying opposite resilient arm sections each terminating in an integral hinge formed as a foldable thin web portion, a pair of jaw sections, one extend-

ing from each hinge and connected to each other by a third hinge formed as a foldable thin web portion, said jaw sections being constructed and arranged for pivoting at said hinges between open and closed positions in which the jaw sections are disposed to assume a minimum effective length between said first mentioned hinges, said resilient arm sections coacting with each other and said jaw sections to selectively retain the latter in said open and closed positions and to be spread apart in tension loading for snap-action of the jaw sections into the alternate position by the latter being pivoted through a disposition of increased effective length between said first mentioned hinges.

5. The clip defined in claim **4** in which said jaw sections are shaped to define an exposed area in said open position to receive relative inward pressure thereon by an object for effecting said snap-action to said closed position.

6. The clip defined in claim **5** in which said jaw sections are shaped to define a boxed-in clamping area substantially surrounding and gripping said object in said closed position.

7. The clip defined in claim **4** in which said jaw sections each include a gripping member which extends outwardly from said ring structure, said gripping members being in operative engagement for gripping an article therebetween when the jaw sections are in closed position.

8. The clip defined in claim **7** in which one of said jaw sections includes an integral eyelet for receiving a mounting means for the clip, said eyelet being located to receive relative inward pressure for effecting said snap-action to said closed position and relative outward pressure for effecting said snap-action to said open position.

9. A clip of the character described comprising a closed integral ring structure sectionalized into a relatively rigid support section carrying opposite resilient arm sections each terminating in an integral hinge formed as a foldable thin web portion, a pair of jaw sections, one extending from each hinge and connected to each other by a third hinge formed as a foldable thin web portion, said jaw sections being selectively retained in open and closed positions by said resilient arm sections and being movable by snap-action between said positions, said jaw sections being shaped to define an exposed area in said open position to receive relative inward pressure thereon by an object for effecting said snap-action to said closed position and to define a boxed-in clamping area substantially surrounding and gripping said object in said closed position, one of said jaw sections having a hook member extending toward the other of said jaw sections when the jaw sections are in closed position, said hook member being located for engagement by said object as relative outward pressure is exerted thereby in moving said closed jaw sections toward open position to insure the snap-action to said open position.

10. A clip of the character described comprising a closed integral ring structure sectionalized into a relatively rigid support section carrying opposite resilient arm sections each terminating in an integral hinge formed as a foldable thin web portion, a pair of jaw sections, one extending from each hinge and connected to each other by a third hinge formed as a foldable thin web portion, said jaw sections being constructed and arranged for pivoting at said hinges between first and second extreme positions in which the jaw sections are disposed to assume a minimum effective length between said first mentioned hinges, said resilient arm sections coacting with each other and said jaw sections to selectively retain the latter in said first and second extreme positions and to be spread apart in tension loading for snap-action of the jaw sections into the alternate position by the latter being pivoted through a disposition of increased effective length between said first mentioned hinges, and a gripping member extending from each of the jaw sections, said gripping members being in operative closed engagement with each other for gripping an article therebetween when the jaw sections are in one of said extreme positions and separating when the jaw sections are moved to the other of said extreme positions.

11. The clip defined in claim **10** in which one of said jaw sections includes an integral eyelet for receiving a mounting means for the clip, said eyelet being located to receive relative inward pressure for effecting said snap-action to one of said extreme positions and relative outward pressure for effecting said snap-action to the other of said extreme positions.

12. A clip integrally molded of an elastomeric plastic material comprising a relatively rigid support section carrying opposite resilient arm sections each terminating in a foldable thin web portion, a pair of jaw sections, one extending from each web portion and connected to each other by a third foldable thin web portion, said jaw sections being selectively retained in open and closed positions by said resilient arm sections and being movable by snap-action between said positions on application of a force sufficient to overcome the resiliency of said arms, at least one of said jaw sections being formed with means for receiving said force as relative pressure thereon by an object for effecting said snap-action.

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