

[54] **MOLDED GARMENT CLAMP**

[72] Inventor: **John H. Batts**, Grand Rapids, Mich.

[73] Assignee: **John Thomas Batts, Inc.**, Zeeland, Mich.

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[51] Int. Cl. **A44b 21/00**

[58] Field of Search.....223/91, DIG. 1, 93, 96;
16/87.2; 24/258, 255 SL, 84, 137, 245 FF

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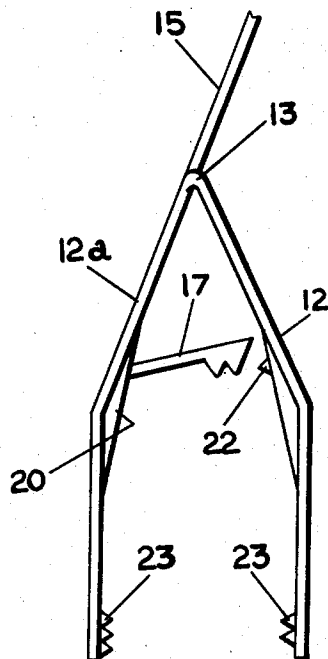
Primary Examiner—Donald A. Griffin

Attorney—Price, Heneveld, Huizenga & Cooper

[57] **ABSTRACT**

A device for gripping and hanging articles. The device includes, as a single integral part molded from a plastic material, a pair of clamping members, a flexible web joining these members and serving as a hinge, a latch to lock the members in closed position and a hook by which the device can be suspended. The arrangement of the various features of the device is such that the device can be molded in a two-part die without the use of cams or similar devices to permit release of the molded part from the die.

25 Claims, 16 Drawing Figures



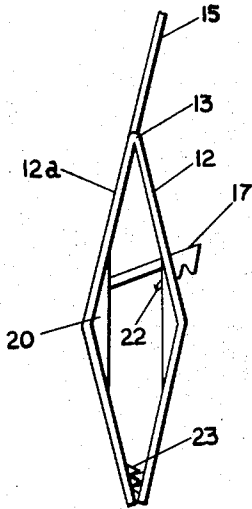


FIG. 1

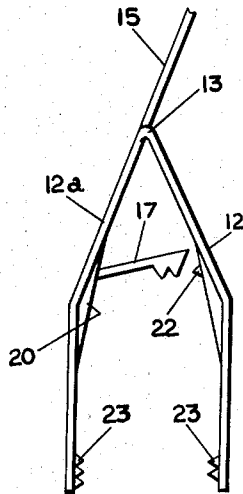


FIG. 2

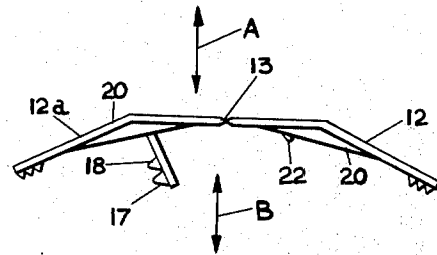


FIG. 4

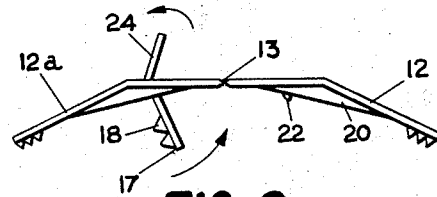


FIG. 6

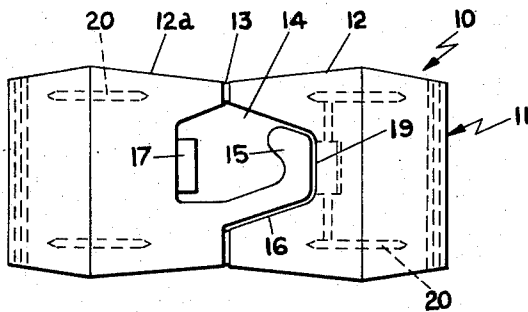


FIG. 3

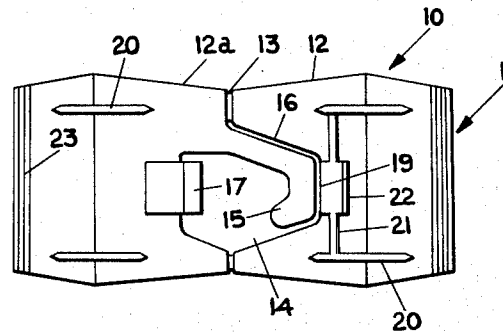


FIG. 5

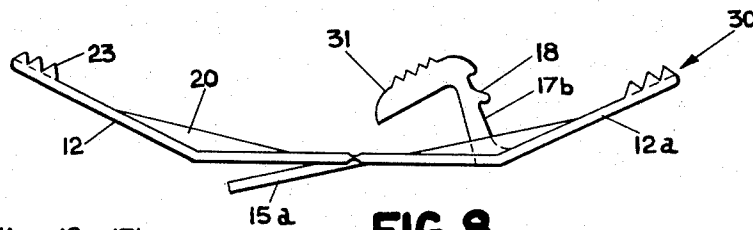


FIG. 8

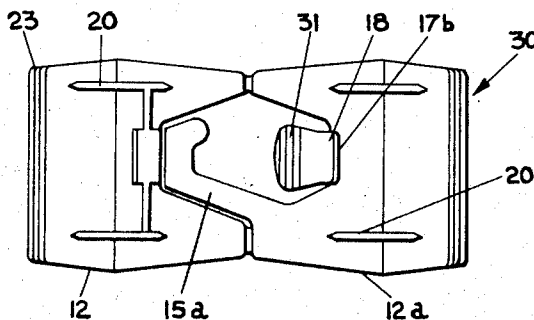


FIG. 9

INVENTOR.
JOHN H. BATTS
BY *Price, Leneveld*
Luzenga & Cooper
ATTORNEYS

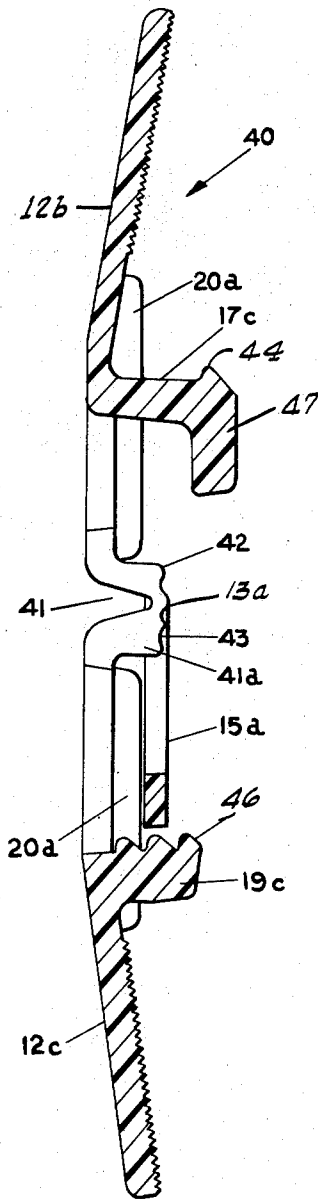


FIG. 12

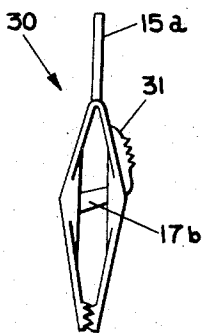


FIG. 7

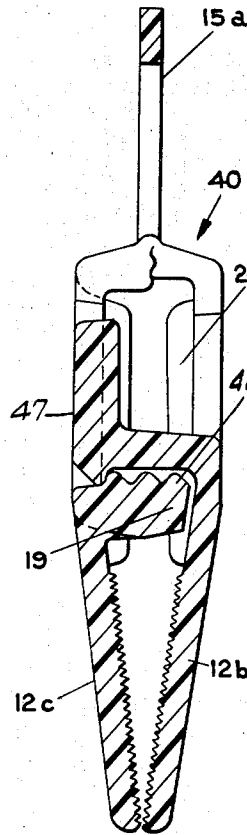


FIG. 10

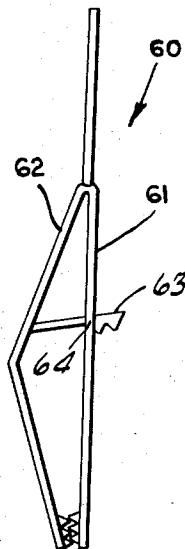


FIG. 13

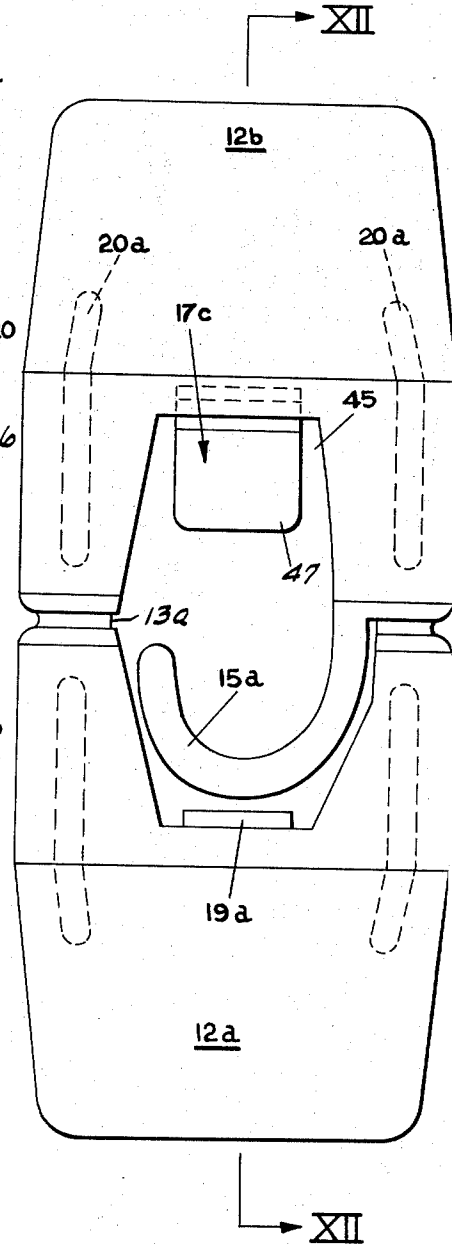


FIG. 11

INVENTOR
JOHN H. BATTS
BY *Orice. Leneveld*
Luzinga & Cooper
ATTORNEYS

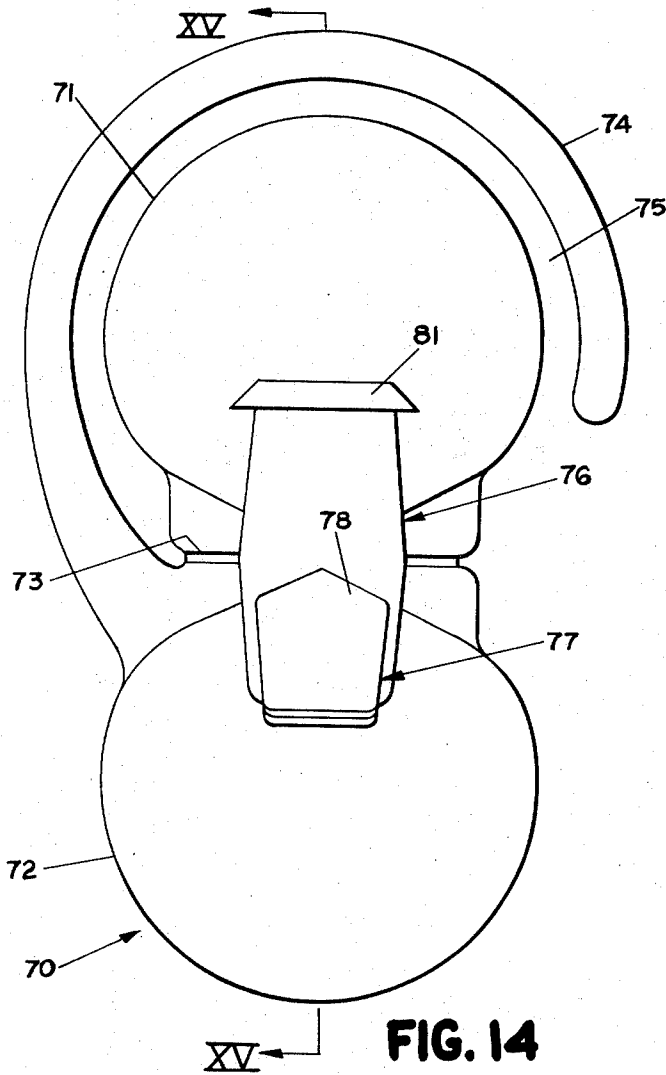


FIG. 14

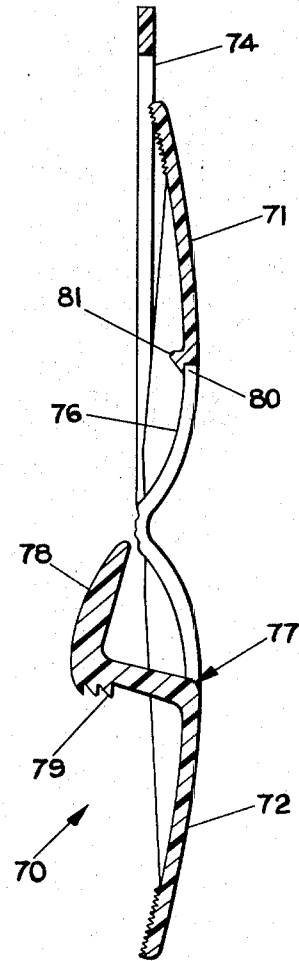


FIG. 15

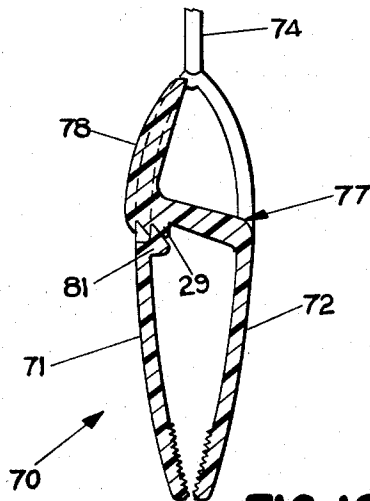


FIG. 16

INVENTOR
JOHN H. BATTS
BY *Rice, Heneveld*
Luizenga & Cooper
ATTORNEYS

MOLDED GARMENT CLAMP**BACKGROUND OF THE INVENTION**

This application is related to my application entitled "Garment Clamping Hanger" Ser. No. 18,130 filed on Mar. 10, 1970.

The invention is a one-piece molded plastic clamp having a pair of side members joined along one edge by a flexible web serving as a hinge. The opposite edges of the side members are free and, when the clamp is closed, are designed to grip an article placed between them. Between the free ends and the flexible web, the side members are spaced apart even when the clamp is closed. The clamp is made of a resiliently deflectable material whereby these side members may be deflected under pressure before they are latched together to create clamping pressure on the article. One of the side members has a latch and the other a keeper which, when engaged, lock the side members in clamping or closed position. The clamp also includes a supporting hook which is also integral with the side members to permit the device to be hung from a suitable support such as a rod or a bar. The entire device is designed to be manufactured by injection molding as a single piece in a simple two-part die because it lacks reentry shapes which would otherwise lock it in the mold.

Clamps for hanging all types of objects particularly small objects have been known for many years and have a wide variety of uses. They have been made from numerous materials including metal, wood and plastic. This invention, however, is intended to provide a clamp which supplies a need that has not heretofore been satisfied by existing devices. It is specifically intended to be capable of such inexpensive manufacture that it can be used and discarded. Examples of such use would be the display of hosiery, gloves, ties, scarves and similar clothing articles in a store or to hang film negatives during development. The invention provides a clamp which is sufficiently economical that it may be given away with the article when the article is sold. Further it

is intended to do this yet provide, in a single integral part not only means to grip and thus support the article but means by which the article can be suspended for display. This is particularly important in connection with articles such as gloves, hosiery and ties which are more readily seen by the potential purchaser if they are displayed while suspended rather than piled one upon another on a shelf or counter. Further, because this device is particularly designed for molding from plastic, the material will cause no damage to the article such as rust, cutting or transfer of any decorative surface coatings. Because the invention permits the entire unit including its supporting hook to be made as a single part without further finishing operations or the assembly of separate components, this device can be manufactured for a fraction of existing devices presently on the market.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a clamp embodying this invention illustrated in closed position;

FIG. 2 is an illustration of the same clamp in open position;

FIG. 3 is a view of the fully open clamp as it is removed from the mold;

FIG. 4 is a side elevation view of the clamp in the position shown in FIG. 3;

FIG. 5 is a view similar to FIG. 3 but showing the opposite face;

FIG. 6 is a view similar to FIG. 4 but showing a modified form of this invention;

FIG. 7 is a side elevation view of a further modified form of this invention;

FIG. 8 is a side elevation view of the clamp illustrated in FIG. 7 shown in open position as it appears as removed from the mold;

FIG. 9 is a view of the clamp shown in FIG. 8 as it appears as removed from the mold;

FIG. 10 is a sectional elevation view of a further modified form of this invention in closed condition;

FIG. 11 is a surface view of the fully open clamp illustrated in FIG. 10 as the clamp appears as removed from the mold;

FIG. 12 is a sectional elevation view taken along the plane XII—XII of FIG. 11;

FIG. 13 is a side elevation view of an additional modification of this invention;

FIG. 14 is a surface view of another modification of this invention showing the clamp as it appears as removed from the mold;

FIG. 15 is a sectional view taken along the plane XV—XV of FIG. 14; and

FIG. 16 is a sectional view taken along the same plane as FIG. 15 showing the clamp closed.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A clamp incorporating the principles of this invention is illustrated in FIGS. 1 through 4. As can be best understood from FIG. 3, the entire clamp structure 10 is a single part comprising a body 11 having a pair of sides 12 and 12a integrally joined by a thin flexible web or hinge 13. An aperture 14 is provided generally centrally of the body 11 and extends into both of the clamping or side members 12 and 12a. Within the aperture 14 is a hook 15, one end of which is integral with the side member 12a. The rest of the hook is separated from the side member 12 by a narrow gap 16. At one end of the aperture 14 is a latch 17 extending inwardly of the clamp. The latch is best seen in FIGS. 1, 2 and 4. The latch 17 may have one or more teeth 18 designed to engage and lock with the opposite edge of the opening 14 which in this particular construction, forms the keeper 19.

It will be observed from FIGS. 1, 2 and 4 that each of the side members 12 and 12a, between the web 13 and their free ends, is arched away from the other and that this arching is sufficient to substantially space the side members even when the clamp is closed and the free ends are pressed together firmly (FIG. 1). At the apex of the arch the side members 12 and 12a are preferably reinforced by ribs 20. The keeper 19 may also be reinforced by a cross rib 21 which can incorporate a camming surface 22 to guide the latch 17 as it is moved into locking position (FIG. 5). The ability of the clamp to grip an article can be increased by the provision of gripping teeth 23 on the free ends of the side members 12 and 12a.

It will be observed from FIGS. 3, 4 and 5 that the clamp can be molded in a two-part mold without the

use of cams, with the mold-halves opening and closing in the direction of the arrows A and B (FIG. 4). It will be seen that in such an arrangement there are no such undercut or reentry structures as will prevent the part from being removed from the mold when the mold is opened. Yet the part, as removed from the mold, is complete and requires no further work whatsoever to prepare it for its final use. It will be noted that the hook is erected simply by folding the side members 12 and 12a into their operating position. It will also be noted that the latch 17 will automatically engage the keeper 19 as the side members approach clamping position. By the provision of more than one tooth 18 on the latch the clamp can be made to exert the requires gripping pressure on articles of various thickness.

It is contemplated that this invention will be manufactured by injection molding. In this type of molding it is particularly important that the molds or dies be as simple as possible. The addition of cams or other movable parts to the mold materially increases product cost because it lengthens the molding cycle, substantially increases initial mold cost and significantly decreases mold life. It also frequently decreases the number of cavities which may be incorporated in each mold.

A number of synthetic resinous materials may be used for this product. Resins particularly suitable for the manufacture of this product include polypropylene, polyethylene and nylon. The material must provide a part in which the side members 12 and 12a are resilient and may be slightly deflected. In this manner when the clamp is closed the arch in the sides may be slightly flattened thus building up clamping pressure and assuring a positive lock between the latch 17 and the keeper 19. When so deflected the sides when released must spring out firmly to assure the locking effect between the latch and the keeper and to assure retention of the desired clamping pressure. It must also be capable of providing the web 13 serving as the hinge and withstand repeated flexing without fatigue.

FIG. 6 illustrates a slight modification of the clamp shown in FIGS. 1 through 5. In this arrangement the latch 17a instead of simply bridging the distance between the two side members is extended beyond the side member 12a to form a manipulation arm or pad 24. By pressing on this pad the latch can be caused to release when it is desired to open the clamp. It will be understood that this is merely a further extension of the same invention.

FIGS. 7, 8 and 9 illustrate a further modification of the invention shown in FIGS. 1 through 5. In this clamp 30 the side members 12 and 12a remain the same. The latch 17b has, in addition to the teeth 18, a manipulation pad 31. The pad is designed so that it overlies a portion of the central aperture 32 in the clamp. As such it does not require any cams to accommodate it to the mold. Thus, it is suitable for molding in a two-part die.

The hook 15a is again integral with the side member 12a but instead of lying in the plane of the side member 12 it is inclined out of this plane sufficiently that when the clamp is closed the plane of the hook is centered about the vertical center line of the clamp as seen in FIG. 7. Once again this can be done because the hook lies entirely within that portion of the opening 32 which is in the side member 12. It will be noted that the pad 31 can be inclined with respect to the latch 17b suf-

ficiently to make it parallel to the adjacent face of the clamping member 12 when the clamp is closed.

FIG. 10, 11 and 12 illustrate a further modification of this invention. In this clamp 40 the edges of the side members 12b and 12c adjacent the flexible web or hinge are formed into flanges extending inwardly of the clamp. These flanges position the web 13a away from the plane of the side members. Thus, when the sides 12b and 12c are folded about the web 13a to their normal operating position, the sides are spaced apart. Further in this arrangement it will be noted that the flange 41 has a raised ridge 42 designed to engage the stop shoulder 43 on the flange 41a. As the clamp is closed, this engagement occurs before the free ends of the side members 12b and 12c contact each other. This interference between the ridge 42 and the stop surface 43 stretches the hinge web 13a, giving the side members a slight bias to spring apart, assuring a locking grip between the latch and its keeper when the clamp is fully closed.

It will be also noted that the hook 15a is integral with the side member 12b at the end of the flange 41. Thus it is offset from the plane of the adjacent portions of both of the side members 12b and 12c and when the clamp is closed the hook will be pivoted into an erected position basically centered on the vertical centerline of the clamp.

As is clearly shown in FIG. 11, the hook 15a lies entirely within that portion of the opening 45 which is within the side member 12c. Thus, it does not interfere with the use of a two-part mold.

Another difference in this clamp is the fact that the keeper 19c consists of an inwardly projecting finger having a plurality of teeth 46. The latch 17c has a manipulation pad 47 and a single tooth 44. Again the clamp may be closed about materials of varying thickness because the provision of the several teeth 46 on the keeper 19c permits this selection of closing positions. It will be noted that when the clamp is closed both the keeper and the latch are confined within the silhouette of the clamp 40. Again ribs 20a are provided to reinforce the side members 12b and 12c. The fact that the teeth 42 on the keeper 19a and the tooth 44 on the latch require a small undercut in the die does not destroy this fact since the material is somewhat resilient and the size of the teeth is such that the teeth may be caused to release from the mold due to slight deflection of the part itself.

FIG. 13 illustrates the fact that this invention can be practiced in a clamp in which only one of the side or clamping members is arched. In the clamp 60, the side member 61 is straight and the side member 62 only is arched. The latch 63 is integral with the side member 62 and the keeper 64 is integral with the side member 61 and is formed within the outline of the side member 62.

FIGS. 14, 15 and 16 show a further modification of this invention in which the supporting hook, as molded, circumscribes one of the side members rather than being circumscribed by it. The clamp 70 has a pair of side or clamping members 71 and 72 joined by a flexible web or hinge 73. A hook 74 has one end integral with the side member 72. The main body of the hook 74 largely surrounds the side member 71 and is separated from it by a gap 75. While the side or clamp-

ing members and the hook are illustrated as substantially circular in configuration, it will be recognized that numerous other shapes could be employed. Also it will be recognized that the shape of the hook need be the same as that of the side members, so long as the hook and the side member it inscribes are separated by a gap. Thus, for example the hook may be generally circular when the side member is generally rectangular or keystone in shape.

A central aperture 76 extends across the hinge 73 into both the side members 71 and 72. At one end of the aperture 76 a latch 77 is integral with the side member 72 and projects inwardly of the clamp, as the parts of the clamp appear when closed. The latch 77 has a finger or manipulation pad 78 on its free end when overlies or is within the outline of the aperture 76 as the clamp appears when fully open (FIG. 14). The pad 78 is generally parallel to the general plane occupied by the side members 71 and 72 and the hook 74 when the clamp is fully open as illustrated in FIG. 14.

The latch has one or more teeth 79 designed to engage the keeper tooth 80. The keeper is formed at the end of the aperture 76 opposite from the latch 77. The keeper preferably includes a camming ramp 81 to facilitate engagement of the latch.

It will be observed from FIGS. 15 and 16 that the side members 71 and 72 are convex or outwardly disked. This provides the necessary spacing of the side members at the latch to permit effective latching and positive article gripping pressure. In all embodiments it is optional whether small teeth, serrations or similar gripping surfaces will be provided on the inner faces of the free ends of the side members. Whether or not such are provided does not change the principles of the invention.

In all of the several embodiments of the invention which have been described, the flexible web or hinge is created by reducing the wall thickness of the plastic. In all cases it is molded of the same plastic as the remainder of the body of the clamp. In all embodiments the side or clamping members are resiliently deflectable within a limited range. This is important to assure both positive engagement between the latch and the keeper and adequate clamping pressure on the articles to effectively grip them. Thus, the plastic material used for the manufacture of this invention must not only be suitable for injection molding, but it must, in a wall thickness of about 0.0625 inch, have significant resistance to deflection yet in a wall thickness of about 0.02 have the characteristic of being both flexible and fatigue resistant.

In all embodiments the invention must be so designed that the entire product can be manufactured as a single, integral part. This must be accomplished by simple, two-part molds which do not have any cams or movable sections to release any reentry portion of the product.

While a preferred embodiment and several modifications of this invention have been illustrated and described, it will be recognized that other modifications of this invention may be made. Such of these modifications incorporate the principles of this invention are to be considered as included in the hereinafter appended claims unless these claims, by their language, expressly state otherwise.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

1. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web, the ends of said side members opposite said web being free and adapted to press against each other to provide an article grip between said free ends, said side members being spaced apart, intermediate said flexible web and said free ends, when said clamp is closed; a latch integral with one of said side members and a latch engaging keeper integral with the other thereof for holding said clamp in a closed position, said latch and said latch engaging keeper being located approximately midway between said flexible web and said free ends of said side members; a supporting hook integral with only one of said side members such that when said clamp is opened said side members are generally aligned in a common plane on opposite sides of said flexible web, said hook extending in the direction of said other side member and having a maximum of a small angular relationship to said common plane of said side members and all portions thereof being offset in a direction parallel to said common plane from all portions of the body of said other side member whereby no portion of said hook and said side members are superimposed over one another in a direction perpendicular to said common plane.

2. The clamp described in claim 1, wherein, when said clamp is open, said hook circumscribes a substantial portion of said other side member.

3. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web, the opposite edges of said side members being free and adapted to press against each other to provide an article grip; said side members being spaced apart, intermediate said flexible web and said free edges, when said clamp is closed; a latch integral with one of said side members and a latch engaging keeper integral with the other thereof for holding said clamp in closed position; a supporting hook integral with one of said side members; when said clamp is open such that said side members are generally aligned in a common plane on opposite sides of said flexible web, said hook extending in the direction of said other side member and having a maximum of a small angular relationship to said common plane of said side members and all portions thereof being offset in a direction parallel to said common plane from all portions of the body of said other side member whereby no portion of said hook and said side members are superimposed over one another in a direction perpendicular to said common plane; and wherein said other side member has an aperture therein extending to said flexible web; and when said clamp is open, said hook projects into said aperture and is circumscribed by said other side member.

4. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web, the opposite edges of said side members being free and adapted to press against each other to provide an article grip; said side members being spaced apart, intermediate said flexible web and said free edges, when said clamp is

closed; a latch integral with one of said side members and a latch engaging keeper integral with the other thereof for holding said clamp in closed position; a supporting hook integral with one of said side members; when said clamp is open such that said side members are generally aligned in a common plane on opposite sides of said flexible web, said hook extending in the direction of said other side member and having a maximum of a small angular relationship to said common plane of said side members and all portions thereof being offset in a direction parallel to said common plane from all portions of the body of said other side member whereby no portion of said hook and said side members are superimposed over one another in a direction perpendicular to said common plane and wherein each of said side members has an aperture therethrough, said latch being integral with one of said side members at the edge of the aperture therein remote from said flexible web; said keeper being integral with the other of said side members at the edge of the aperture therein remote from said flexible web.

5. The clamp described in claim 4, wherein each of said side members has an inner surface and an outer surface as said side members are related to each other when the clamp is closed; said latch projecting inwardly away from the inside surface of the side member with which it is integral; said aperture adjacent said latch being an access opening through which a portion of a two-part mold may pass to the maximum distance said latch projects from said inside surface of said side member.

6. The clamp described in claim 4, wherein each of said side members has an inner surface and an outer surface as said side members are related to each other when the clamp is closed; both of said latch and said keeper projecting inwardly from the inside surfaces of the side members with which they are integral; said aperture being access openings through which portions of a two-part mold may pass to the maximum distances said latch and keeper project from said inside surfaces of said side members.

7. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web at their junction, said web divided into a first and a second portion by an aperture communicant with both of said side members, the opposite edges of said side members being free and adapted to press against each other; said side members being spaced apart, intermediate said flexible web and said free edges, when said clamp is closed; a latch integral with one of said side members and adjacent one edge of said aperture, and a latch engaging keeper integral with the other side member and adjacent an opposite edge of said aperture for holding said clamp in a closed position.

8. A clamp as described in claim 7, wherein a portion of said latch extends through said aperture; said latch having at least one tooth thereon seating over and locking into said keeper when said clamp is closed.

9. A clamp as described in claim 8, wherein a portion of said latch projects beyond the outer surface of the side member with which it is integral to form a latch manipulating pad whereby said latch may be disengaged from said keeper by rocking it about its connection to the side member.

10. A clamp as described in claim 7, wherein said latch has a plurality of teeth spaced apart lengthwise thereof each adapted to seat over and lock to said keeper when said clamp is closed; said side members being resiliently deflectible and the degree of clamping pressure exerted by said free edges being variable by selection of the tooth locked to said keeper.

11. A clamp as described in claim 10, wherein a finger pad is provided on the free end of said latch, said pad being generally parallel to the said common plane of said side member.

12. A clamp as described in claim 7, wherein a reinforcing rib is provided on each of said side members, the ends of said ribs being spaced from both said flexible web and said free edges of said side members, said ribs projecting toward each other when said clamp is closed.

13. A clamp as described in claim 7, wherein one of said first side members is straight and said second side member is arched outwardly from said second side member when said clamp is closed.

14. A clamp as described in claim 7, wherein both said side members are arched, each being arched away from the other.

15. A clamp as described in claim 14, wherein the arching of said side members is in the form of a shallow V.

16. A clamp as described in claim 15, wherein elongated reinforcing ribs project inwardly from the inner face of each of said side members, said ribs being elongated lengthwise of said side members and centered about the apex of the V-shaped arch.

17. A clamp as described in claim 7, wherein one of said side members adjacent said flexible web has a flange extending away from the plane of said side member toward the other of said side members when the clamp is closed, said flexible web joining the edge of said other side member to the end of said flange.

18. A clamp as described in claim 17, wherein one of said edge and said end of said flange have a ridge thereon and the other thereof has a stop surface, said ridge and said stop surface being between said flexible web and the free ends of said side members and engaging each other as the side members of said clamp are moved toward closed position and resiliently stretching said web when said clamp is closed.

19. A clamp as described in claim 7, wherein both of said side members adjacent said flexible web have a flange extending away from the plane of said side members and toward each other when the clamp is closed; said flexible web joining the ends of flanges together.

20. A clamp as described in claim 19, wherein one of said flange ends has a ridge thereon and the other thereof has a stop surface, said ridge and said stop surface being between said flexible web and the free ends of said side members and engaging each other as the side members of said clamp is moved toward closed position and resiliently stretching said web when said clamp is closed.

21. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web, the opposite edges of said side members being free and adapted to press against each other and intermediate said flexible web and said free edges said side members being

spaced apart when said clamp is closed; a latch integral with one of said side members and a latch engaging keeper integral with the other thereof for holding said clamp in closed position; a supporting hook integral with one of said side members; there being an opening in the other of said side members; said hook being superimposed with respect to said opening, lying in a plane having a maximum of a small angular relationship to the plane of said side members when said clamp is open such that said side members are generally aligned in a common plane on opposite sides of said flexible web whereby said clamp can be molded in a two-piece mold.

22. A clamp as described in claim 21, wherein said hook lies in the plane of said other side member when said clamp is open and said side members are generally aligned in a common plane on opposite sides of said flexible web.

23. A one-piece molded plastic clamp having a first side member and a second side member joined together along one edge thereof by a flexible web, the opposite edges of said side members being free and adapted to press against each other; said side members being spaced apart, intermediate said flexible web and said free edges, when said clamp is closed; as a latch integral with one of said side members and a latch engaging keeper integral with the other thereof for holding said clamp in closed position; an opening through both of said side members, the openings in said side members being joined to form a single aperture at said flexible web; a supporting hook integral with one of said side members, said hook being within and circumscribed by said aperture when said clamp is open and said sides are generally aligned in said common plane.

24. A clamp as described in claim 23, wherein said latch is integral with said one of said side members at one end of said aperture and said latch engaging keeper is the opposite end of said aperture.

25. A clamp having a pair of clamping members each having a free edge and joined together along an opposite edge thereof by a flexible web whereby they can be pivoted from an open position in which they are generally aligned in a common plane to a closed position in which their free edges are pressed together; each of said clamping members having an inner face and an outer face as said clamping members are arranged with respect to each other when the clamp is closed: there being an aperture communicant with both of said clamping members; a latch, one end of said latch being integral with one of said clamping members and adjacent an edge of said aperture and projecting from the inner face thereof; a keeper integral with said other clamping member adjacent an opposite edge of said aperture and interengaging with and securing said latch when said clamp is closed; said latch and said keeper being positioned approximately midway between said flexible web and said free edges of said clamping members; a hook integral with one of said clamping members; said clamping members, flexible web, latch, keeper and hook all being a single integral part in which, when said clamp is fully open with the clamping members generally aligned on opposite sides of the flexible web no portion of the clamp in any plane parallel to that occupied by the clamping members overlaps any other portion of the clamp and the clamp may be molded in a two-piece mold opening and closing in a direction perpendicular to the faces of said aligned clamping members.

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Disclaimer

3,698,043.—*John H. Batts*, Grand Rapids, Mich. MOLDED GARMENT CLAMP. Patent dated Oct. 17, 1972. Disclaimer filed June 10, 1976, by the assignee, *John Thomas Batts, Inc.*

The term of this patent subsequent to May 30, 1989, has been disclaimed.
[*Official Gazette August 17, 1976.*]