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HINGE CONSTRUCTION

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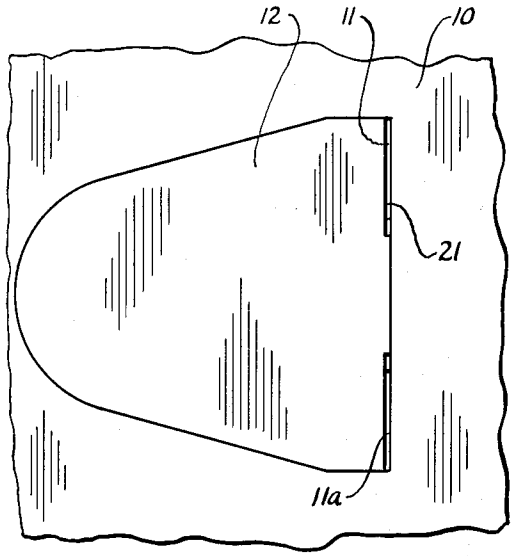

FIG. 1

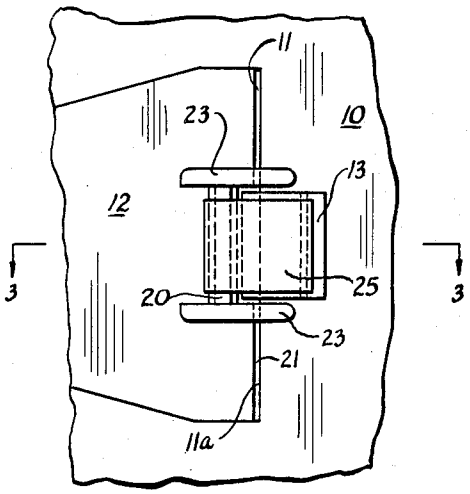

FIG. 2

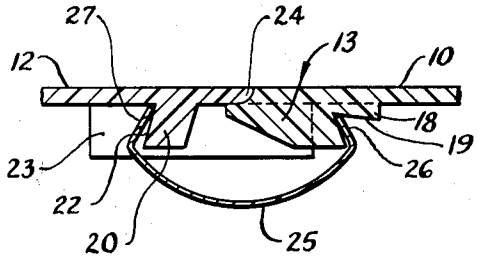

FIG. 3

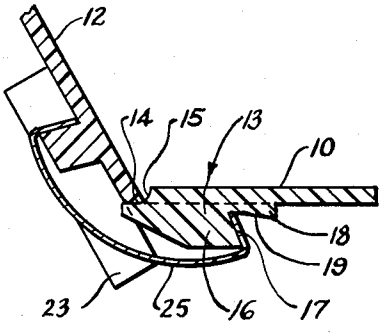

FIG. 4

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HINGE CONSTRUCTION

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2 Claims. (Cl. 16—128)

This invention relates generally to hinge constructions, and is particularly directed to a novel hinge construction wherein a swingable part is resiliently held in angularly-spaced positions.

The particular embodiment of the present invention, which is illustrated in the drawings and which will be described hereinafter in greater detail, comprises generally a pair of hinge members, a lip on one of the hinge members supporting the other hinge member for swinging movement between angularly-spaced positions, and resilient means connected between the hinge members for yieldably urging the swinging hinge member into the adjacent one of said spaced positions.

It is one object of the present invention to provide a hinge construction of the type described which is especially suited for economical manufacture, both in fabrication and assembly. More particularly, the present invention contemplates a hinge device in which the hinge members lend themselves to mass production molding techniques, and in which the hinge members and resilient means can be assembled in an extremely simple and rapid operation.

It is another object of the present invention to provide a hinge construction having the characteristics mentioned in the foregoing paragraph, in which the hinge mechanism requires relatively little space and is disposed entirely on one side of the hinge plate members, so as to be completely concealed from view on the other side thereof. Thus, the hinge device of the present invention has been found particularly advantageous for use with relatively small objects, such as toys, and where the article embodying the hinge construction is intended to outwardly simulate a larger article having hinged parts. That is, the concealed hinge structure of the present invention is adapted to permit accurate simulation of various types of exposed hinge construction by means of surface ornamentation, and of course, permits accurate simulation of all types of concealed hinge structures.

It is a further object of the present invention to provide a hinge construction including the novel features and having the advantages set forth above, which is simple in construction and durable in operation, and which can be embodied in various types of articles at relatively low costs.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

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

In the drawings:

Figure 1 is a partial, top plan view showing the hood and adjacent body portion of a toy vehicle which embodies the hinge construction of the present invention;

Fig. 2 is a partial, bottom plan view of the structure shown in Fig. 1;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2; and

Fig. 4 is a view similar to Fig. 3 showing the hinge construction in another position of its operative movement.

Referring now more particularly to the drawings, the embodiment of the invention illustrated therein comprises a plate-like member or wall **10**, which may be the body of a toy vehicle as illustrated, or other desired article. A wall opening or aperture **11** is formed in the body or plate-like member **10**, in which opening is conformably received a plate-like member or closure **12** shaped to simulate the hood of a vehicle. It will be noted, see Fig. 1, that the wall opening 11 has one bounding edge **11*a*** disposed in facing relation with respect to one edge **21** of the plate-like, closure member **12**, and that the hinge mechanism is completely concealed from external view.

On the internal surface or underside of the body member **10**, adjacent to the facing edge **11*a***, is formed a boss or lug **13**, which has one portion extending leftward, as seen in Fig. 4, beyond the edge **11*a*** to define an outwardly-facing shoulder or lip **14** in underlying supporting engagement with the adjacent portion of the hinge member or closure **12**. Further, the shoulder or lip **14** is concavely-curved or filleted, as at **15**, for conforming engagement with the convexly-curved or rounded edge portion **24** of the facing closure edge **21**, for a purpose appearing presently.

The boss or lug **13** includes a main lug portion or lug proper **16**, having a flat bottom surface and an undercut end face or wall **17**. An additional projection or boss **18** is formed on the inner side of the body member **10** adjacent to the lug proper **16** and includes an inclined underface **19** which combines with the rear lug face **17** to provide a substantially V-shaped notch.

On the inner side of the hinge member or closure **12**, adjacent to and spaced from the facing closure edge **21**, is formed another lug **20** also having an undercut rear face **22**. The lugs **16** and **20** are preferably arranged in opposed, aligned relation with respect to each other, and substantially laterally coextensive.

On opposite sides of the lug **20**, preferably integral with the lug and the underside of the closure member **12**, are formed abutments or stops **23**, **23** which extend beyond the facing closure edge **21** and are disposed in underlying, abutting engagement with the underside of the body **10** when the closure is in the closed or aligned position of Fig. 3. Further, when the closure **12** is in aligned relation with respect to the plate-like member or body **10** so as to close the opening **11**, it will be seen that the shoulder or lip **14** prevents downward movement of the closure relative to the body, while the abutments **23** prevent upward movement of the closure relative to the body. Conversely, upward and downward movement of the body relative to the closure is prevented by the edge portion **24** and abutment **23**, respectively.

Arranged on the underside of the body **10** and closure **12** and extending between the lugs **16** and **20**, is a resilient member or spring **25**. More particularly, a curved, resilient sheet or leaf spring **25** is arranged inwardly of or below the lugs **16** and **20** and has its opposite ends bent inwardly, as at **26** and **27**, and in bearing engagement with the outer lug faces **17** and **22**. Thus, in the closed or aligned position of Fig. 3, the leaf spring **25** is under tension and urges the lugs toward each other, tending to rotate the closure in the counter-clockwise direction. However, such movement of the closure is prevented by engagement of the abutments **23** with the body **10**.

When the closure **12** is swung in the clockwise direction to the position illustrated in Fig. 4, it is seen that

the filleted shoulder or lip **14** will permit free sliding or rotative movement of the closure edge portion **24** and thus provide a journal bearing for the latter. Obviously, clockwise rotation of the closure **12** from its aligned position must operate against the resilient force of the leaf spring **25** tending to hold the closure in such position. However, when the line of forces acting on the lugs **16** and **20** as a result of the tension member or spring **25** moves through and beyond the axis of rotation of the closure, as in the position shown in Fig. 4, it will be obvious that the spring, tending to move the lugs toward each other, will serve to effect clockwise rotation of the closure. This clockwise closure rotation is limited by engagement of the spring **25** with the extending lip or shoulder **14** of the boss **13**, in which position the spring serves to yieldably maintain the closure in angular relation with respect to the body **10**. Hence, it will now be understood that the closure **12** will be yieldably urged by the spring **25** into its closed position when the line of forces exerted on the lugs **16** and **20** is inwardly of the axis of rotation of the closure; and, the closure will be yieldably urged into its outwardly, open position when such line of forces is outwardly of the axis of rotation, so that the closure will normally be resiliently urged toward and yieldably maintained in its adjacent, extreme position of movement.

As is apparent from the drawings, the platelike body member **10**, lug **16**, extension **14** and projection **18** may be integrally die molded, and are preferably fabricated of plastic or other suitable material, to effect maximum economy in manufacture. Similarly, the plate-like closure member **12**, the lug **20** and abutments **23**, **23** may also be die molded to form an integral hinge part. In assembly, the plate-like hinge members **10** and **12** are preferably inverted and arranged on a supporting surface in their aligned relation with respect to each other, the closure edge portion **24** seating on the lip **14** and the abutments **23** engaging with the member **10**. The leaf spring **25** may be then disposed over the lugs **16** and **20** with one end **27** in engagement with the rear lug face **22** and the closure **12** between the abutments **23**, **23**. Mere depression of the spring central portion will distend the latter to snap the spring end **26** over the lug **16** and into the V-shaped notch defined by the surfaces **17** and **19**. Obviously, the spring end **27** will contract itself so as to engage within the vertex of the notch, as shown in Fig. 3. Slight spacing of the spring end portions from the rear end lug faces is desirable when the plate-like members are in their aligned relation, so as to permit substantial outward swinging movement of the closure without binding.

From the foregoing, it is seen that the present invention provides a hinge construction which fully accomplishes its intended objects, and which is well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. In a toy vehicle or the like, a hollow body having a wall opening formed therein, a first lug on the internal surface of said body and located adjacent an end edge of said opening and inwardly of the side edges thereof, said first lug having a portion extending beyond said end edge of said opening and defining therewith a shoulder, a plate-like closure disposed within said opening and having an end edge portion supported on said shoulder for swinging movement between closed and open positions with respect to said opening, a second lug on the internal surface of said closure adjacent to said closure end edge portion and opposite said first lug, a pair of stops carried on the internal surface of said closure on opposite sides of said second lug and also extending beyond said closure end edge portion and engageable with the side edges of said first lug to maintain the lateral position of said closure end portion on said shoulder, said stops being also engageable with the internal surface of said body to limit movement of said closure to its closed position, and resilient means connected between said lugs and operable to urge said closure into said closed and open positions.

2. A device according to claim 1, said resilient means being engageable with said extending lug portion upon movement of said closure into its open position to prevent continued opening movement therebeyond.

References Cited in the file of this patent

UNITED STATES PATENTS

639,254	Lahnbeutz	Dec. 19, 1899
1,467,124	Sunde et al.	Sept. 4, 1923
2,287,903	Rathbun	June 30, 1942
2,308,625	Rathbun	Jan. 19, 1943