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HINGE FOR PLASTIC HOUSINGS

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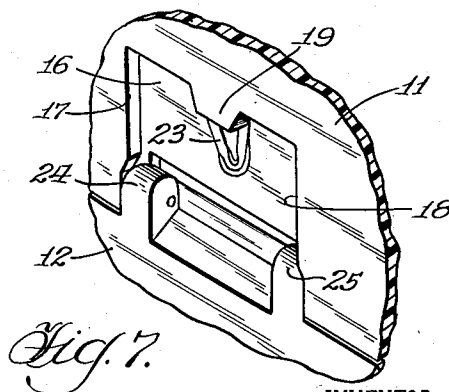
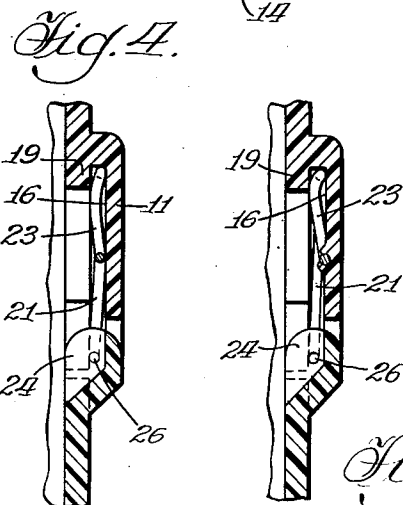
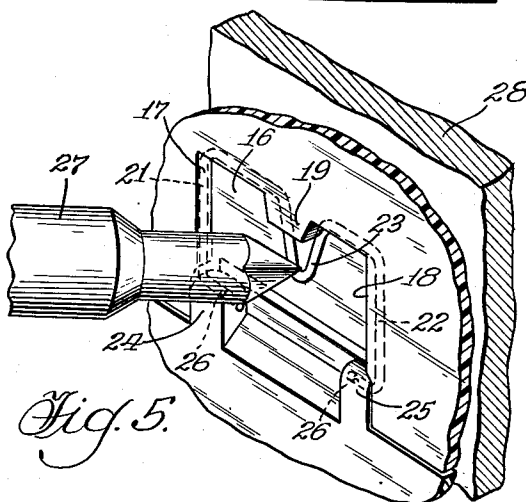
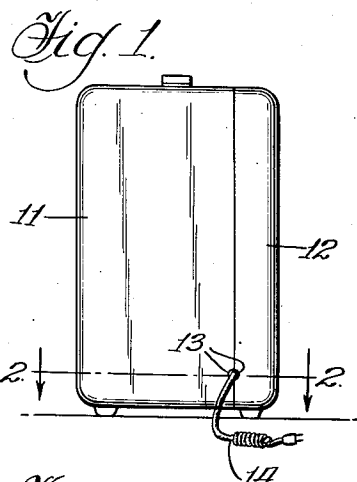
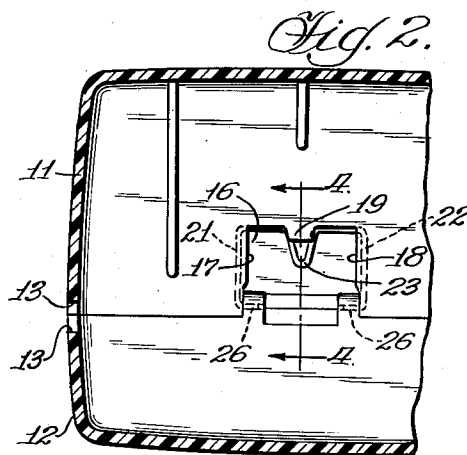
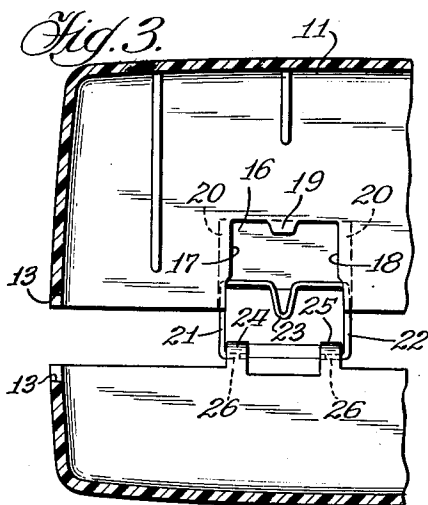


Fig. 6.

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HINGE FOR PLASTIC HOUSINGS

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The present invention relates to the hinging of members of molded construction. More particularly this invention relates to a hinge structure and to the method of securing a hinging member to a body of molded construction.

In container housings which are made of a plastic or similar molded material, such as the cabinets of portable radios, jewel boxes, vanity cases, or the like, it is often desirable to provide an inexpensive hinge for connecting parts of the housing, which is sufficiently rugged to provide good service, but which is secured to the housing by some means other than screws or the like. While hinge structures incorporating these features are known in the art, they have been heretofore relatively expensive to manufacture, and result in increasing the cost on the article with which they are used. Further, because of the brittleness of the plastic material, it is preferable that the hinge provide some resilience to prevent cracking or breaking of the material in the event the hinged parts are improperly closed.

It is therefore an object of the present invention to provide an improved and relatively inexpensive hinge arrangement for use on bodies of molded plastic material.

It is a further object of the present invention to provide a simple method of securing a hinge member to a housing or body of molded plastic construction in which a portion of the hinge member is fused to the plastic body.

Another object of this invention is to provide a hinge structure for providing a rugged pivotal connection between plastic parts in which the hinge member is secured to a plastic part by guideways formed therein and by a portion of the plastic which is deformed by heat.

A feature of the invention is the provision of a simple method of attaching a hinging member to a body of molded construction, in which the hinging member is positioned on the body and a portion of the body is heated to the point of fluidity, with the hinging member being pressed against the molten portion and embedded therein, and being firmly anchored therein when the body hardens.

Another feature of the invention is the provision of a hinge structure including a first body of molded construction having guideways formed therein in which a hinging member is seated, with the hinging member having a portion embedded in the molded body for anchoring the same and also having pivot portions for supporting a cover or the like.

Still another feature of the invention is the

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provision of a hinge structure for connecting molded bodies including a U-shaped resilient hinge member having leg portions supported in guideways formed in one of the bodies and a middle portion having an anchor tensioned against the body and embedded therein.

Other objects, features and attendant advantages will be readily apparent from the following disclosure when considered in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a portable radio having a cabinet of molded construction and incorporating a hinged cover constructed in accordance with the present invention;

Fig. 2 is a cross sectional view of the cabinet shown in Fig. 1, illustrating the hinge structure comprising a part of the invention;

Fig. 3 is a disassembled view of the structure shown in Fig. 2, and illustrates one of the steps in the construction of the structure;

Fig. 4 is a cross sectional view of the structure taken through plane 4—4 of Fig. 2, showing the structure after the operational step illustrated in Fig. 3;

Fig. 5 is a fragmentary, perspective view showing the hinged structure, and illustrating another of the operational steps in construction;

Fig. 6 is a cross sectional view of the structure, showing the same after the operational step illustrated in Fig. 5; and

Fig. 7 is a fragmentary, perspective view showing the completed hinge structure.

In practicing the invention, a cheap, easily produced hinged structure which is particularly desirable for use in the manufacture of plastic casings for portable radios, such as the one shown in Fig. 1 of the drawings, is provided. Referring to Fig. 1, the housing 11 constitutes the casing of a portable radio which is of molded plastic construction, and has a cover 12 hinged thereto by means of a novel hinge which, along with the method of producing the same, comprises the invention. The cover 12 provides access to the battery compartment of the portable radio, and to the compartment which houses the cord for connecting the radio to an external power source. It is therefore used only when it is necessary to change the batteries or to convert the radio for use with an outside source of electricity. For such use it is not desired that an expensive hinge be provided for the cover 12, for this would increase the cost of the radio unnecessarily. However, it is essential that the hinge be sufficiently rugged to withstand certain operating conditions that arise. For example, housing 11 and cover 12

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each has a semi-circular opening therein, which together, define an aperture 13 that comprises a lead-in opening for the external power supply conductor 14. This construction is standard in practically all portable radio receivers, and has been the source of a considerable amount of trouble. For, should the cover 12 be closed against housing 11 and the conductor 14 not be properly seated in aperture 13, springing or bending of the hinge securing cover 12 on body 11 occurs. Quite often such springing or bending results in such damage that a factory repair job is required to correct it. Consequently, it can be readily appreciated, that the hinge structure must be both cheap and durable, if the article on which it is used is to be successfully marketed. The present invention, the preferred form of practicing which is disclosed herein, provides such a hinged structure.

Prior to the final assembly of the hinged structure comprising a part of the invention, certain preparatory measures must be taken. First, in molding the housing or first body 11, or whatever body is to have a cover hinged thereto, an open, rectangular, accessible area comprising a recess 16, best seen in Fig. 2, is formed in the surface of the body. The area is defined by a pair of opposing wall portions which comprise a pair of opposed sides 17 and 18 of the rectangular recess 16. Each of the wall portions 17 and 18 has a guideway comprising a groove or slot 20 formed in the underportion thereof, which opens inwardly to recess 16, and is accessible therefrom. Spaced between wall portions 17 and 18, is a third wall portion 19 which is formed on one of the two remaining sides of recess 16. Wall portion 19 forms a secondary guideway formed in its underportion which is accessible from the recess 16, as is shown in Fig. 6. The side of recess 16 opposite wall portion 19 is open for the purpose of providing access to each of the guideways in the underportion of wall portions or sides 17, 18, and 19, and to recess 16. While this particular construction has been illustrated, it is thought apparent that the area formed by recess 16 could be equally well provided in other ways such as by wall portions built up on the surface of body 11, and having guideways shaped therein. In either construction, it can be readily seen that molding of the wall portions defining the guideway, requires only a simple and inexpensive modification of the die used in making the molded article, and does not substantially complicate its manufacture.

The next operation comprises fitting of the hinging member to the cover or second body 12 which is to be hinged on the first body 11. Referring to Fig. 3, the hinging member consists of a substantially U-shaped, integral, resilient wire having a pair of leg portions 21 and 22 and a U-shaped anchor portion 23 formed in the bight portion thereof. U-shaped anchor 23 is bent to form an angle with the plane containing leg portions 21 and 22, and the ends 26 of leg portions 21 and 22 are bent inwardly, in the manner best shown in Fig. 3, to provide a pivotal support for the second body 12. The second body 12 preferably has a pair of raised supports 24 and 25 formed thereon, which have centrally disposed, laterally extending bores therein accommodating the bent ends of leg portions 21 and 22. The raised supports 24 and 25 can be easily provided when molding the second body 12, if it be of molded construction, and the bores drilled in subsequently. Likewise, the production of the

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hinging member, and the sub-assembly of the hinging member on the second body, can be accomplished with a minimum of effort.

Having the necessary sub-assembly components available, the first step in the assembly of the hinged structure, comprises inserting the legs 21 and 22 of the hinging member in the guideways formed in the wall portions or sides 17 and 18 formed in the first body 11, in the manner shown in Fig. 3. The second body 12 and hinging member are then thrust inwardly to the position shown in Fig. 2. This action results in tensioning or pressing the vertex of anchor portion 23 against the surface of the first body 11, in the manner best seen in Fig. 6.

In the next step of the operation, a hot iron 27 is applied to the vertex of anchor portion 23, or to the surface of molded body 11 at the point of contact of anchor 23, and the portion of body 11 engaged by the vertex of anchor 23 is heated. Molded body 11 comprises a thermo-plastic material having a relatively low melting point, and, upon the application of hot iron 27 thereto, is heated to the point of fluidity. Due to the fact that the vertex of anchor 23 is pressed against the surface, it becomes embedded in the molten portion of the body, and the surface of the body becomes fused to the hinging member, in the manner shown in Fig. 6. During this step, a backing of some fashion, such as is indicated at 28, prevents the formation of bubbles in the molten portion of housing 11.

After removal of the heating iron 27, and hardening of the molded body, the hinging member is rigidly secured to the molded housing or body 11, and forms a rugged but simple hinge mounting for the second body or cover 12.

From the above description it is apparent that by means of the invention, an inexpensive, readily assembled hinge structure which is permanent in its nature, is provided. This is made possible, due largely to the fact that accommodations for the hinging member can be easily molded into body 11 during its construction, without complicating the molding operation required to produce the body. The component parts can thereafter be quickly assembled together so that all that is required to permanently secure them in place, is the application of a hot iron to the vertex portion of the hinging member. In the device shown, the resiliency of U-shaped member 21 and 22, and the freedom for flexing provided by anchor portion 23, provide a hinged structure that is sufficiently flexible to absorb a great deal of punishment. Should the lead-in wire 14 normally disposed in aperture 13, be caught between the second body or cover 12 and the first body or housing 11, there is sufficient springiness in the hinge structure to accommodate the wire without deforming the casing, or the structure itself.

Obviously, the disclosed embodiment of the invention is not the only form in which it is useful. The structure could be readily adapted for use on cases or containers wherein it is desired that there be no visible indication of the hinge. Other modifications and variations are possible in the light of the above teachings. It is therefore to be understood that changes may be made herein, which are within the full intended scope of the invention, as defined by the appended claims.

I claim:

1. In a hinged structure which includes a pair of thermo-plastic casing sections, the combination with said sections of a pair of spaced parallel

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guides with facing grooves formed on the internal surface of one of said casing sections and extending perpendicularly inwardly from one edge thereof; a third guide formed on the internal surface of said last-mentioned casing section perpendicular to and between said pair of guides and spaced a selected distance from the aforesaid edge of said section with a groove facing said edge; a substantially U-shaped resilient wire having a pair of spaced parallel leg portions, and having a U-shaped anchor portion in the bight thereof extending inwardly and disposed in the plane of said leg portions, and further having a pair of inwardly-extending perpendicular end portions at the respective extremities of said leg portions, said resilient wire being supported in the aforesaid guides with said leg portions respectively supported in the grooves of said pair of spaced guides and with at least a portion of said bight in the groove of said third guide and with said anchor portion embedded in the wall of said last-mentioned casing section; and a pair of raised supports integral with an edge of the other of said casing sections respectively having a pair of laterally extending bores accommodating the aforesaid end portions of said resilient wire.

2. A hinged structure including in combination, a thermo-plastic casing section having a recess formed therein adjacent one edge thereof, said recess having a pair of spaced parallel grooved sides extending perpendicularly inwardly from the aforesaid edge and further having a third grooved side perpendicular to and between said pair of sides and spaced a selected distance from

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and parallel to the aforesaid edge; a substantially U-shaped resilient wire having a pair of spaced parallel leg portions, and having a U-shaped anchor portion in the bight thereof extending inwardly and disposed in the plane of said leg portions, and further having a pair of inwardly extending perpendicular end portions at the respective extremities of said leg portions; said resilient wire being supported in the aforesaid grooved sides of said recess with said leg portions respectively supported in the grooves of said pair of spaced sides and with at least a portion of said bight in the groove of said third side and with said anchor portion embedded in the wall of said casing; and a cover for said casing having a pair of raised supports integral with an edge thereof and respectively having a pair of laterally extending bores accommodating the aforesaid end portions of said resilient wire.

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