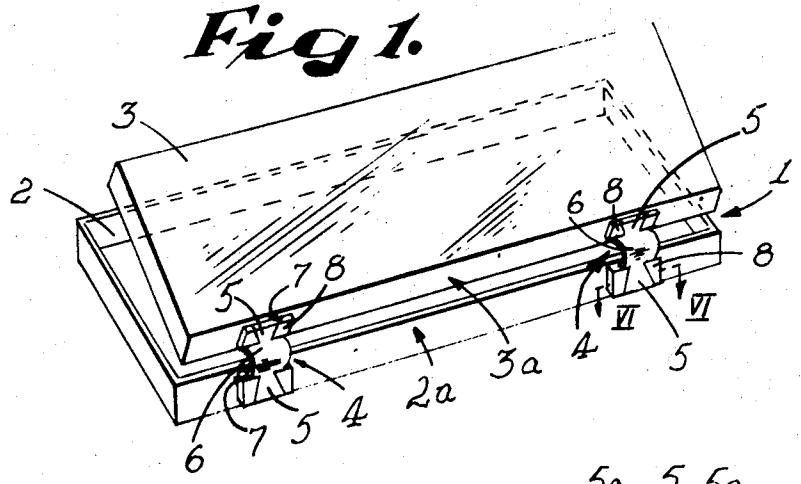
Oct. 26, 1971 J. W. B. NEWTON 3,615,035

UNITARY HINGES OF SYNTHETIC RESINOUS OR LIKE MATERIAL

Filed Aug. 12, 1969

Fig 1.



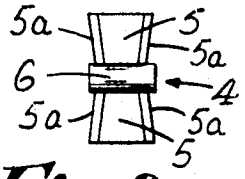


Fig 2.

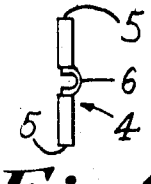


Fig 3.

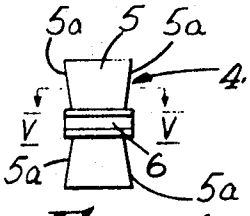


Fig 4.



Fig 5.

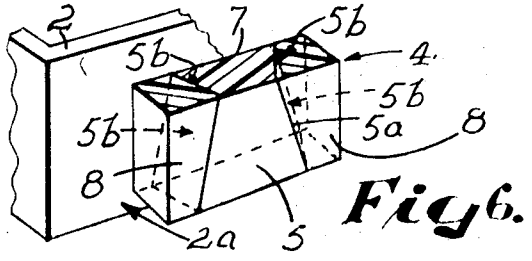


Fig 6.

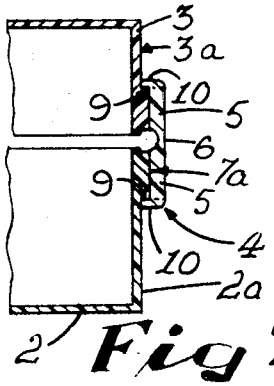


Fig 7.

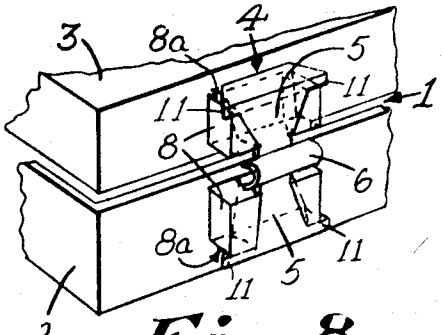


Fig 8.

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United States Patent Office

3,615,035

Patented Oct. 26, 1971

3,615,035

UNITARY HINGES OF SYNTHETIC RESINOUS OR LIKE MATERIAL

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Filed Aug. 12, 1969, Ser. No. 856,247

Claims priority, application Republic of South Africa, Aug. 20, 1968, 68/5,394

Int. Cl. B65d *51/04;* E05d *9/00*

U.S. Cl. 220—31 S 8 Claims

ABSTRACT OF THE DISCLOSURE

A hinge unit of the type comprising a pair of leaves; and a web integrally connecting the leaves together, the leaves and the web being made of synthetic resinous or like material and the web presenting a bending zone about which the leaves are pivotable relative to one another, which is characterized in that at least one of the leaves presents a mounting formation, such as a dove-tailed tongue, which is interengageable with a complementary hinge mounting formation, such as a dove-tailed groove, on a member, such as a container part, which is to be hingedly mounted.

This invention relates to unitary hinges of synthetic resinous or like material.

It is well known to provide a hinge unit of the type comprising a pair of leaves; and a web integrally connecting the leaves together, the leaves and web being made of synthetic resinous or like material and the web presenting a bending zone about which the leaves are pivotable relative to one another. A hinge unit of this nature will hereinafter be referred to as "a hinge unit of the type in question."

Normally, the leaves and web of a hinge unit of the type in question are integrally formed of polypropylene and the thickness of the web is less than that of the leaves.

Hinges of the type in question have found many practical applications. In one particular application, a polypropylene hinge unit of the type in question mounts a lid on a box for a pharmaceutical or like product, the leaves and web of the hinge unit extending the entire length of the box and lid and the outer edges of the leaves being integrally connected with the material of the box and the lid to give a container of unitary construction. A very neat and effective container is obtained, but it is relatively complicated and expensive integrally to connect the leaves of the hinge unit with the box and lid parts of the container.

It is also known to provide polypropylene cabinet hinge units of the type in question in which the leaves are adapted to be secured to the appropriate cabinet parts by means of screws or the like passing through holes in the leaves. It will be appreciated that, whereas this arrangement might be suitable for cabinets and the like, it is not satisfactory for pharmaceutical and like containers.

It is accordingly an object of the present invention to provide a new and improved hinge arrangement which is suitable for pharmaceutical and like containers and which is relatively simple and inexpensive to make and install.

According to the invention an article comprising a member which is to be hingedly mounted and at least one

hinge unit of the type in question on the member, is characterized by interengagable mounting formations presented by and connecting the member and one of the hinge leaves.

The mounting formations are preferably detachably interengageable.

The article may comprise a pair of members and at least one hinge unit of the type in question hingedly connecting the members together, each hinge leaf and its associated member presenting interengageable mounting formations.

A plurality of hinge units of the type in question may be located in spaced relationship along the members, the hinge units being interengageable with the members.

The two members which are hingedly connected together may respectively comprise a box or tray part and a co-operating lid part of a container.

The invention therefore, includes within its scope a container comprising a box or tray part and a lid part which are hingedly connected together by at least one, but preferably a plurality of spaced hinge units as specified above, or each hinge unit being connected to the container parts by interengageable mounting formations.

The interengagable mounting formations presented by a hinge leaf and its associated member may comprise a groove presented by the member; and a complementary tongue presented by the hinge leaf, the resiliency of the cooperating parts permitting engagement of the tongue and groove.

At least one tongue retaining formation may be provided on the surrounds of the groove.

The tongue and groove may present complementary dovetailed configurations in cross-section and in front view.

The tongue may present at least one retaining formation towards its outer end, the resiliency of the material of the co-operating parts permitting engagement of the tongue with the groove in a direction generally transversely to the mouth of the groove and the retaining formation on the tongue acting to prevent or at least inhibit withdrawal of the tongue from the groove in an axial direction relative to the tongue.

The tongue may present retaining formation in the nature of a pair of wings which project outwardly in opposite directions from the outer end of the tongue generally in the plane of the tongue, the wings being operative to engage the surrounds of the groove at the relevant end thereof.

Alternatively or additionally the tongue may present a retaining formation in the nature of a flange projecting transversely from the tongue at the outer end thereof, the flange being operative to engage the surrounds of the groove at the relevant end thereof.

The groove presented by the member may be defined in a raised formation projecting from the member or part thereof.

In the case where the tongue presents a retaining formation in the nature of a transversely projecting flange, a retaining recess may be provided in the surface of the member at the base of the groove, the recess being adapted to receive a complementary end formation on the retaining flange. The recess may have a curved base, the retaining flange having a complementary convex end.

Alternatively or additionally, the groove may be defined in a raised formation which also defines a shoulder or step at the base of the groove over which the retaining flange on the tongue is engageable.

The invention includes within its scope of a novel hinge unit of the type in question as defined above.

Preferred embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a container according to the invention.

FIG. 2 is a front view of a hinge unit according to the invention of the container of FIG. 1.

FIG. 3 is a side view of the hinge unit of FIG. 2.

FIG. 4 is a rear view of the hinge unit of FIGS. 2 and 3.

FIG. 5 is a cross-sectional view on the line V—V in FIG. 4.

FIG. 6 is a sectional view on the line IV—IV in FIG. 1 of the hinge unit.

FIG. 7 is a fragmentary sectional side view of a container according to the invention with an alternative form of hinge unit according to the invention.

FIG. 8 is a fragmentary perspective view of a container according to the invention with yet another form of hinge unit according to the invention.

Referring to FIGS. 1 to 6, container **1** comprises tray **2** and lid **3** which are hingedly connected together by a pair of spaced hinge units **4**.

Each hinge unit **4** comprises a pair of leaves **5** and a web **6**, integrally connecting leaves **5** together and presenting a bending zone about which the leaves **5** are pivotable relative to one another. Leaves **5** and web **6** are integrally formed of polypropylene and the thickness of web **6** is less than that of leaves **5**.

Each hinge leaf **5** comprises a tongue presenting a dovetailed configuration in front and back view with sides **5***a* diverging outwardly away from web **6**, as can be seen in FIGS. 2, 4 and 6. Each hinge tongue **5** also presents a dove-tailed configuration in cross-section with sloping side faces **5***b*, as can be seen in FIGS. 5 and 6.

Each hinge tongue **5** is detachably interengagable with its own complementary groove **7** defined in a raised formation **8** projecting from tray **2** or lid **3** as the case may be.

Tray **2** and lid **3**, each with a pair of longitudinally spaced raised and grooved formations **8**, and the two hinge units **4** are made separately, the hinge units **4** being made of polypropylene and tray **2** and lid **3** being made of any suitable synthetic resinous material.

Tray **2** and lid **3** are hingedly connected together by interengaging each hinge tongue **5** with its own complementary groove **7**, the resiliency of the material of the cooperating parts permitting engagement of the dove-tailed tongue formations with their complementary grooves.

It will be appreciated that the dove-tailed configuration of the interengageable tongues and grooves inhibit disengagement thereof.

In the arrangement of FIGS. 1 to 6, the bases of grooves **7** are flush with the surface **2***a* of tray **2** or the surface **3***a* of lid **3**, as the case may be, form which raised formations **8** project.

In the embodiment of FIG. 7, the bases **7***a* of the grooves are spaced from the surfaces **2***a*, **3***a* to present shoulders **9** at the outer ends of the grooves. Furthermore, each hinge tongue **5** includes a transversely projecting retaining flange **10** engageable over its associated shoulder **9** to prevent or at least inhibit withdrawal of the dove-tailed hinge tongue **5** from its complementary groove in an axial direction relative to the tongue.

In the embodiment of FIG. 8 each dove-tailed hinge tongue **5** includes retaining formations in the nature of a pair of wings **1** projecting outwardly in opposite directions from the outer end of the tongue and engageable with the outer end surface **8***a* of the associated raised formation **8**.

A hinge according to the invention is relatively easy and inexpensive to make and install by hand on a pair of members which are to be hingedly connected together.

It will be appreciated that many variations in detail are possible without departing from the scope of the appended claims. For example, in the case where a hinge tongue includes a retaining formation or formations, such as flange **10** in FIG. 7 or wings **11** in FIG. 8, the sides **5***a* of the tongue may converge outwardly away from web **6** in front view, in opposite manner to that shown in FIGS. 2 and 4.

I claim:

1. A container comprising a tray part, a lid part, at least one separate hinge unit therebetween, and a hinge-engaging formation on each of the tray and lid parts, the hinge unit comprising a pair of substantially flat tongues and a web integrally connecting the tongues together, each of the tongues having a dovetailed configuration in cross section and also in front view with the longitudinal sides of the tongue diverging outwardly away from the web, the tongues and web being of synthetic resinous material and the web having a bending zone which extends transversely to the tongues and about which the tongues are pivotable relative to one another, each of the hinge-engaging formations on the tray and lid parts comprising a raised formation on the part in question and having a dove-tailed groove which is complementary in configuration to and interengaged with one of the tongues of the hinge unit, the groove having an open mouth extending the length of the groove and facing transversely thereto, the raised formations and the tongues being substantially equal in thickness.

3. An article as claimed in claim **1**, wherein the tongue presents at least one retaining formation towards its outer end, the resiliency of the material of the co-operating parts permitting engagement of the tongue with the groove in a direction generally transversely to the mouth of the groove and the retaining formation on the tongue acting to at least inhibit withdrawal of the tongue from the groove in an axial direction relative to the tongue.

3. An article as claimed in claim **1**, wherein the tongue presents retaining formations comprising a pair of wings projecting outwardly in opposite directions from the outer end of the tongue generally in the plane of the tongue, the wings being operative to engage the surrounds of the groove at the relevant end thereof.

4. An article as claimed in claim **1**, wherein the tongue presents a retaining formation comprising a flange protecting transversely from the tongue at the outer end thereof, the flange being operative to engage the surrounds of the groove at the relevant end thereof.

5. In combination, two parts to be hinged together, and at least one separate hinge unit therebetween, a hinge-engaging formation on each of said parts, the hinge unit comprising a pair of substantially flat tongues and a web integrally connecting the tongues together, each of the tongues having a dovetail configuration in cross section and also in front view with the longitudinal sides of the tongue diverging outwardly away from the web, the tongues and web being or synthetic resinous material and the web having a bending zone which extends transversely to the tongues and about which the tongues are pivotable relative to one another, each of the hinge-engaging formations on said parts comprising a raised formation on the part in question and having a dovetailed groove which is complementary in configuration to and interengaged with one of the tongues of the hinge unit, the groove having an open mouth extending the length of the groove and facing transversely thereto, the raised formations and the tongues being substantially equal in thickness.

6. Structure as claimed in claim **5**, wherein the tongue presents at least one retaining formation towards its outer end, the resiliency of the material of the cooperating parts permitting engagement of the tongue with the groove in a direction generally transversely to the mouth of the groove and the retaining formation on the tongue acting to at least inhibit withdrawal of the tongue from the groove in an axial direction relative to the tongue.

7. Structure as claimed in claim 6, wherein the tongue presents retaining formations comprising a pair of wings projecting outwardly in opposite directions from the outer end of the tongue generally in the plane of the tongue, the wings being operative to engage the surrounds of the groove at the relevant end thereof.

8. Structure as claimed in claim 6, wherein the tongue presents a retaining formation comprising a flange projecting transversely from the tongue at the outer end thereof, the flange being operative to engage the surrounds of the groove at the revelant end thereof.

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U.S. Cl. X.R.

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