Aug. 12, 1941. J. PÜSCHNER ET AL 2,252,305

SEPARABLE FASTENER

Original Filed Jan. 28, 1938

Fig. 1

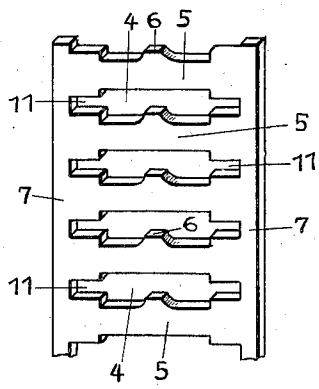


Fig. 2

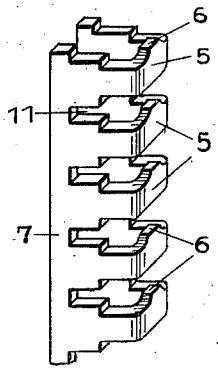


Fig. 3

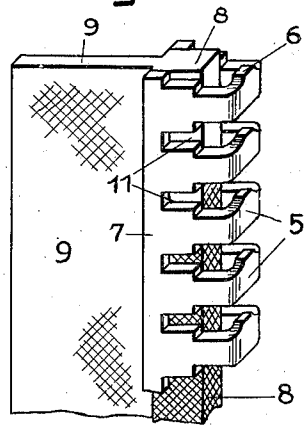


Fig. 4

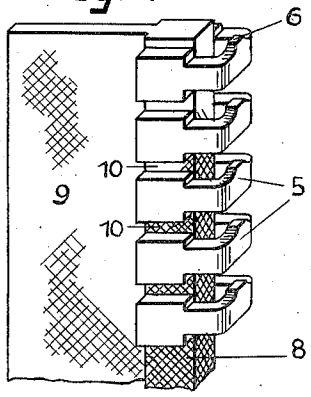


Fig. 5

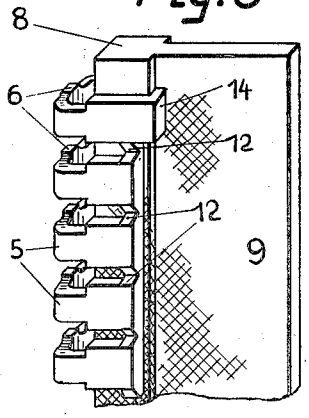
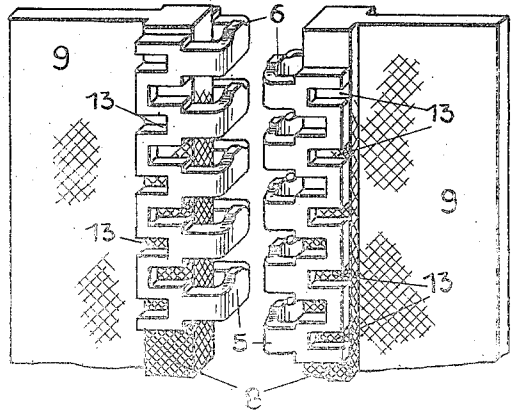


Fig. 6



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SEPARABLE FASTENER

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Original application January 28, 1938, Serial No. 187,396. Divided and this application January 6, 1939, Serial No. 249,550. In Czechoslovakia February 2, 1937

22 Claims. (Cl. 24—205)

This invention relates to improvements in separable fasteners and has for one of its objects to provide efficient, economical and practical fasteners which may be sold in blanks (each blank providing for a plurality of these fasteners) or in the shape and condition for direct and instant application.

This application is a division of our co-pending application bearing Serial No. 187,396, filed on January 28, 1938.

It is a further object of the present invention to provide a ladder-like structure of U-shaped cross section the steps or cross-members of which are spaced from one another at a distance somewhat in excess of the width of a cross-member and provided with a nose-like projection in the center of one edge thereof. This ladder-like structure is placed on the band or stringer so that a hollow space remains between the structure and the stringer and is then secured with its edges to the band. The cross-members of the ladder-like structure are bent in U-fashion and form the fastening elements. To provide for relative mobility of the fastening elements the edges of the ladder-like structure are cut away or indented to permit the cross-members secured to the band and serving as fastening elements to follow the bending of the band.

The ladder-like structure may consist of any suitable material. It is preferably made by converting a flat strip of the material of which the elements of the fastener are to consist into a ladder-like form by equidistantly punching out windows and then bending the strip about its central longitudinal axis into U-shape. It is, of course, also possible to produce the structure of U-shaped cross section directly by the die casting process or by pressing if artificial resin is used as material.

The invention is particularly advantageous for producing separable fasteners having elements of non-metallic, rigid material which can be worked when heated, such as Celluloid. The manufacture of such fasteners was hitherto extraordinarily bothersome and expensive.

Other objects and advantages will be apparent during the course of the following description.

This invention accordingly consists in the features of construction, combination of parts and in the unique relationship of members and in the relative proportioning and disposition thereof all as more completely outlined herein.

To enable others skilled in the art fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by the invention, a drawing depicting certain forms of the invention has been annexed as a part of this disclosure, and in such drawing like characters of reference denote corresponding parts throughout of the views, of which:

Figure 1 shows a strip converted into ladder-like shape by punching;

Fig. 2 shows the ladder-like strip shown in Fig. 1 bent into U-shape;

Fig. 3 shows how the U-shaped strip of Fig. 2 is placed on a stringer so that an intermediate space remains and is secured thereto;

Fig. 4 indicates how greater flexibility is attained by removing the portion of the edge of the U-shaped strip located between the steps of the ladder-like structure;

Fig. 5 is a modification of a separable fastener, in which the edges between the steps are weakened only by notches; and

Fig. 6 is a view of another modification, in which greater flexibility of the ladder-like structure is produced by indentations provided on a level with the steps.

In carrying out the invention we proceed from a flat strip preferably consisting of a non-metallic rigid material that can be deformed when heated, such as Celluloid. By punching out the windows 4 this strip is converted into a uniform ladder-like structure possessing the steps or cross members 5 and the edges 7, as shown in Fig. 1. The steps 5 are provided in the center of one edge with noses 6. The space between two successive steps 5 is somewhat larger than the width of a step 5 except at the noses 6 where the space amounts to less than the width of a step. The spaces may have reduced ends as at 11.

In further accordance with an embodiment of the invention the stamped ladder-like structure is bent about its central longitudinal axis into U-shape, as indicated in Fig. 2, after the material has preferably been heated to make it workable. The bent structure is placed on the thickened edge 8 of the band 9, but only so far that a hollow space remains between the edge of the band 9 and the vertex of the U-shaped structure, as indicated in Figs. 3 to 6. The bent steps 5 project therefore beyond the edge of the band 9 in the form of a bow, and the U-shaped piece embracing the band 9 is cemented with its edges 7 to the band in known manner. Owing to the elasticity of the material, such as Celluloid, from which the ladder-like structure is made, the band with the U-shaped structure attached thereto possesses flexibility in various directions.

The U-shaped steps 5 of the U-shaped structure attached to the band 9 serve as fastening members of the separable fastener to be produced.

The completed fastener comprises of course two bands which face each other with the edges supporting the U-shaped ladder-like structure. For connecting the two bands the steps or cross members 5 serving as fastening elements are

somewhat spread apart by means of a slide member sliding on both bands, (not shown) so that always one cross member of one band can be inserted in the space between two cross members of the other band. When the spreading action ceases after the members 5 of both bands are in engagement with one another, the nose 6 of each member 5 of one band enters the bow of the adjacent member 5 of the other band, whereby mutual locking is effected. A separable fastener of this type is relatively rigid, which is desirable for many purposes. Flexibility can be increased by providing the ladder-like structure with marginal indentations 13 on a level with the members 5, as shown in Fig. 6. Instead of indentations 13 notches 12 may be provided in the edges 7 between the members 5. It is further possible completely to remove the portion of the edges 7 disposed between the members 5 after the ladder-like structure has been secured to the band either by cutting or by applying hot stamps, as indicated in Fig. 4 at 10. As Celluloid is easily workable, particularly under heat, these spaces between the steps of the ladder-like structure can be produced by cutting, stamping, etc. without damaging the band. Furthermore this subsequent treatment does not interfere with proper seating of the cross members 5 serving as fastening elements on the band, as the treatment occurs at places to which the ladder-like structure is cemented with its edge. If the ladder-like structure is made of metal, artificial resin, etc. the portions thereof at which the edges are to be separated later on are preferably provided during the punching operation with weakening notches, as shown by the numeral 12 in Fig. 5. To increase the hold of the fastening elements 5 on the band cramps 14 (Fig. 5) engaging the thickened edge of the latter from the rear may be provided.

From the foregoing description, taken in connection with the accompanying drawing, the advantage of the construction and operation of the device shown will be readily understood by those skilled in the art to which the invention pertains; and while we have described the principle of operation, together with the device which we now consider to be the best embodiment thereof, we desire to have it understood that the device shown is merely illustrative and that such changes may be made as are within the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. As a new article of manufacture an intermediate product suitable for use in the manufacture of sliding clasp series of interlocking fasteners comprising a plurality of sections laterally connected together in spaced relationship and in ladder-like formation, each section having the form of a substantially rectangular strip and being made of thin sheet plastic material, and a nose-like portion located on one of its edges and projecting into the space between adjacent sections, said strips, lateral connections and nose-like portions all lying in the same general surface.

2. An intermediate product as claimed in claim 1 in which the width of each rectangular strip is large in comparison with the thickness of the said strip.

3. An intermediate product as claimed in claim 1 in which the extent to which the nose-like portion projects into the space between adjacent sections is small in comparison with the width of the said space between adjacent sections.

4. An intermediate product as claimed in claim 1 in which each section is of substantially uniform thickness.

5. An intermediate product as claimed in claim 1 in which the face of each member remote from the nose-like projection is in the form of a U-surface lying substantially wholly in a plane at right angles to the length of the ladder-like structure.

6. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections in spaced relation and arranged in ladder-like formation and defining closed spaces therebetween, a nose-like portion on each section projecting within the space between adjacent sections, and marginal portions connecting said sections and provided with recesses opening into the spaces of adjacent sections to increase resiliency of said fastener elements.

7. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections arranged in ladder-like formation and provided with closed slots therebetween, a nose-like portion on one edge of each section centrally projecting within each slot, and marginal portions connecting said sections and provided with recesses opening into the spaces between adjacent sections to increase resiliency of said fastener elements.

8. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections arranged in ladder-like formation and provided with closed slots therebetween, a nose-like portion on one edge of each section and projecting within each slot, and marginal portions connecting said sections and provided with recesses, said recesses opening into said slots and being narrower with respect thereto.

9. As an article of manufacture, a strip of fastener elements comprising a plurality of U-shaped sections of plastic material arranged in ladder-like formation and provided with closed slots therebetween, a nose-like projection extending from each section within each slot, and marginal portions connecting said sections, said portions being provided with one series of recesses opening into said slots, respectively, and with another series of recesses extending from the outer edge of said marginal portions and between adjacent recesses of said one series.

10. As an article of manufacture, a strip of fastener elements comprising a plurality of U-shaped sections of plastic composition arranged in ladder-like formation and provided with closed slots therebetween, a nose-like projection centrally disposed on one edge of each section and projecting within a slot between adjacent sections, and marginal portions laterally connecting said sections, said marginal portions being provided with alternate recesses opening into said slots and being in alignment with said sections, respectively.

11. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections of plastic composition arranged in ladder-like formation and provided with slots therebetween, a nose-like portion centrally disposed on one edge

of each section and projecting within each slot between adjacent sections, and marginal portions connecting said sections, said marginal portions having alternate recesses opening into said slots and being substantially open at the outer edges of said marginal portions, respectively, said recesses being of a narrower width with respect to said slots and adapted to increase resiliency of said fastener elements.

12. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections of plastic composition arranged in ladder-like formation and provided with slots therebetween, a nose-like portion centrally disposed on one edge of said section and projecting within each slot, said nose-like portions being alignedly arranged with respect to each other, and marginal portions connecting said sections and provided with clamping means, said marginal portions having recesses opening into said slots, and other recesses intermediate said former recesses and open at the outer edges of said marginal portions to increase resiliency of said fastener elements.

13. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections of plastic composition arranged in ladder-like formation and having slots therebetween, a nose-like projection extending from each of said sections within each slot between said sections, and marginal portions connecting said sections and provided with recesses opening into said slots, and with notches disposed adjacent said recesses to increase resiliency of said fastener elements.

14. As an article of manufacture, a blank for forming a series of interlocking fastener elements comprising a plurality of U-shaped sections of plastic composition arranged in ladder-like formation and having slots therebetween, a nose-like projection extending from each of said sections within each slot between said sections, marginal portions connecting said sections and provided with recesses opening into said slots and with notches disposed adjacent said recesses and substantially at the outer edges of said marginal portions, and securing means on said marginal portions and extending from at least one of said sections.

15. As an article of manufacture, a strip of fastener elements comprising a plurality of U-shaped sections of thin sheet plastic material in spaced relation and arranged in ladder-like formation, a nose-like portion on each section projecting within the space between adjacent sections, and marginal portions connecting said sections and provided with recesses opening into the spaces of adjacent sections to increase resiliency of said fastener elements, and tape means adhesively secured to the U-shaped sections between the open ends thereof.

16. As an article of manufacture, a plurality of spaced U-shaped members of thin sheet non-metallic material bent in their thin dimension and having relatively flat end portions, arranged in ladder-like formation, with a nose-like portion on the bent portion of each member, a tape with a flat-surfaced edge, and adhesive securing the end portions of the U-shaped members to the flat-surfaced tape edge.

17. As an article of manufacture, a unitary fastener strip comprising a plurality of spaced U-shaped sections of thin sheet non-metallic plastic material, arranged in ladder-like formation with a nose-like projection on the bent portion of each member, and having relieved portions between the end portions of the U-shaped sections to impart flexibility to the strip, a tape with an enlarged flat edge, and adhesive securing the end portions of the U-shaped sections to the flat-surfaced tape edge.

18. As an article of manufacture, a pair of fastener stringers each comprising a plurality of spaced U-shaped members of thin sheet plastic non-metallic material bent about an axis parallel to the length of said stringers and arranged in ladder-like formation, with a nose-like portion on the bent portion of each member, and end portions extending from said bent portions, and a flexible tape extending between said end portions of the U-shaped members and exposed at least in part between said end portions of the U-shaped members whereby flexibility of the stringers is maintained, said tape being adhesively bonded to said end portions of the U-shaped members, each nose-like portion of each U-shaped member of one of said stringers being adapted to engage the bent portion of an adjacent U-shaped member of the other of said stringers whereby the U-shaped members of both said stringers are respectively interlocked with each other in engaged position of said stringers.

19. As an article of manufacture, a pair of fastener stringers each comprising a plurality of spaced U-shaped members of thin sheet plastic non-metallic material bent in their thin dimension and arranged in ladder-like formation, the end portions of the U-shaped members being relatively broader than the bent portions whereby to secure a relatively large area for adhesive, with a short nose-like portion on the bent portion of each member, a flexible tape extending between the end portions of the U-shaped members, and adhesive securing the end portions of the U-shaped members to the tape; each nose-like portion of each U-shaped member being adapted to engage the bent portion of the next U-shaped member in series whereby all the U-shaped members are interlocked with each other when the stringers are in engaged position.

20. A blank for forming a series of interlocking fastener elements comprising a substantially elongated narrow body of thin sheet plastic material with a large plurality of parallel laterally elongated transverse closed slots with intervening laterally elongated transverse portions of plastic material joined to each other at the ends of the slots, each of said transverse portions having on one edge thereof a central nose-like projection, of width small compared to that of the adjacent slot and extending into the adjacent slot.

21. The blank of claim 20 wherein the slots have end portions of reduced width extending close to the lateral margins of the body to impart flexibility.

22. The article of claim 18 wherein said nose-like portion of each U-shaped member is spacedly arranged from the extreme forward edge of each tape, providing an opening between the bent portion of each member and said forward edge of said tape.

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