May 17, 1938. D. MARINSKY 2,117,897

DIE CAST SEPARABLE FASTENER

Original Filed March 16, 1933 2 Sheets-Sheet 1

Fig. 1

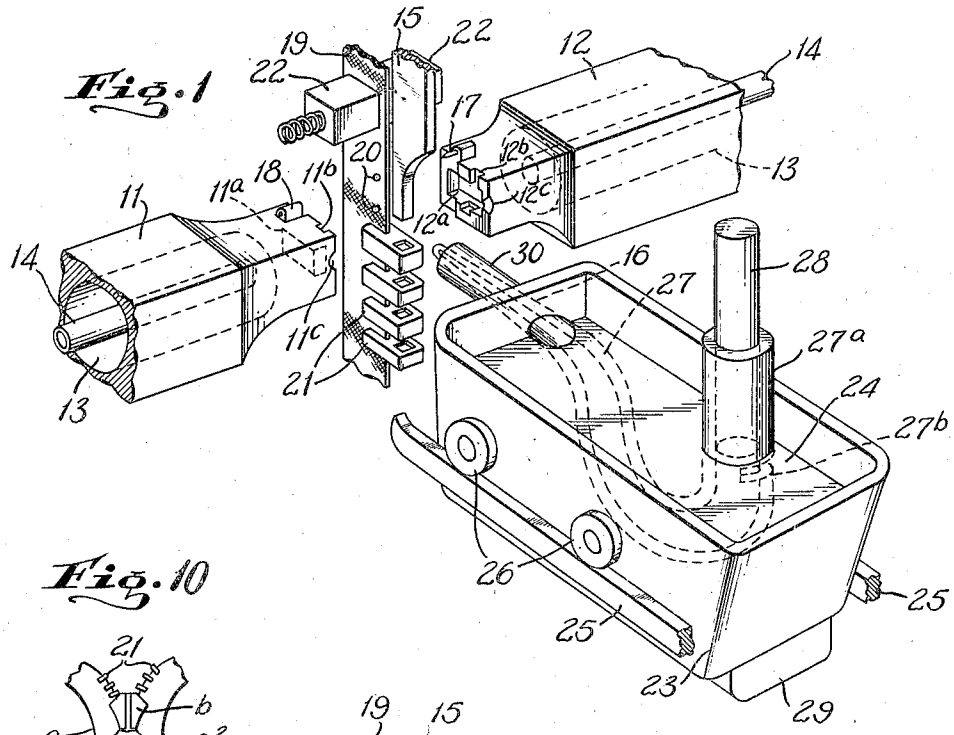
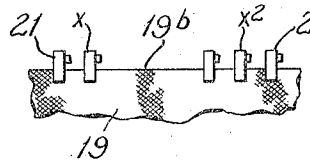


Fig. 10

Fig. 2

Fig. 8

Fig. 9



INVENTOR
DAVIS MARINSKY
BY
ATTORNEY

May 17, 1938. D. MARINSKY 2,117,897

DIE CAST SEPARABLE FASTENER

Original Filed March 16, 1933 2 Sheets-Sheet 2

Fig. 3

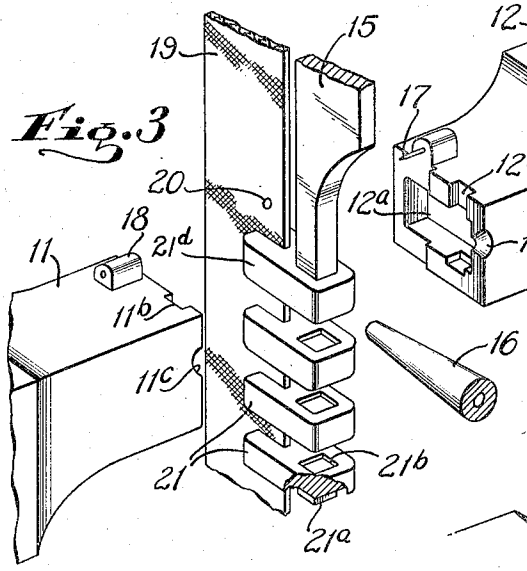


Fig. 4

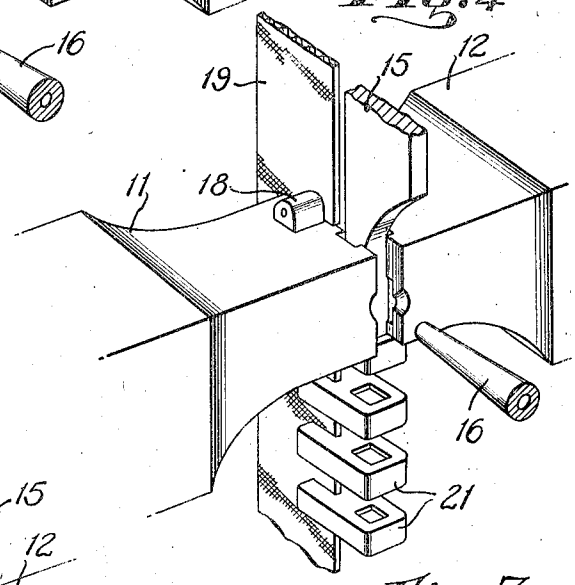


Fig. 5

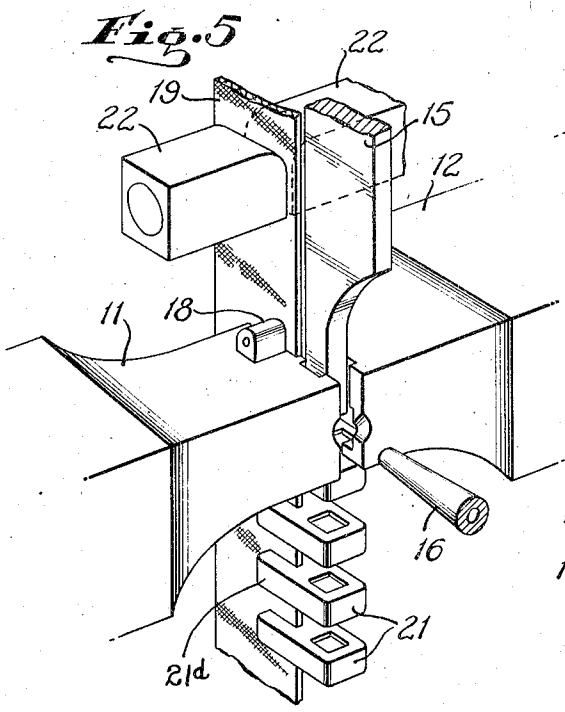


Fig. 7

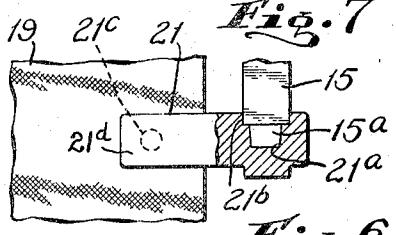
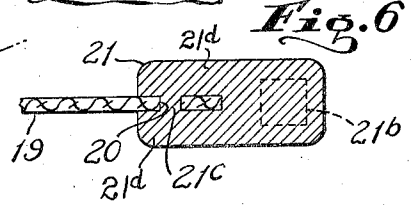


Fig. 6



INVENTOR
DAVIS MARINSKY

BY

ATTORNEY

Patented May 17, 1938 2,117,897

UNITED STATES PATENT OFFICE

2,117,897

DIE CAST SEPARABLE FASTENER

Davis Marinsky, Bronx, N. Y., assignor to Whitehall Patents Corporation, New York, N. Y., a corporation of New York

Original application March 16, 1933, Serial No. 661,099, now Patent No. 2,041,848. Divided and this application April 18, 1936, Serial No. 75,083

4 Claims. (Cl. 24—205)

This invention relates to what are known as separable fastener devices employing stringers having coupling links or elements disposed and spaced longitudinally of their edges and interlocked with each other in coupling and uncoupling the stringers; and the object of the present invention is to provide devices of the class described made in accordance with the method disclosed in a prior application filed by me March 16, 1933 and bearing Serial Number 661,099, of which this application constitutes a division. This prior application has now matured into Patent 2,041,848, granted May 26, 1936.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic view showing one step in the process of forming a fastener stringer, just prior to the molding operation.

Fig. 2 is a similar view, showing the parts during a molding operation.

Fig. 3 is a view similar to Figs. 1 and 2, omitting part of the construction and showing the step immediately after the molding operation.

Figs. 4 and 5 are views similar to Fig. 3 showing the next successive steps in the operation of forming the stringers.

Fig. 6 is an enlarged, sectional view through one of the molded links arranged on the tape in the manner illustrated in Figs. 1 to 5 inclusive, and showing the means of anchoring the link to the tape.

Fig. 7 is a side and sectional view of a tape showing one link thereon and showing a modification.

Fig. 8 is a perspective view of a modified form of stringer that I may produce.

Fig. 9 is a detail view of a part of a stringer showing the spacing of groups of coupling elements; and,

Fig. 10 is a detail view of a pair of stringers diagrammatically illustrating the method of coupling and uncoupling the same.

Heretofore, in the construction of what are known as separable fasteners or devices of this class involving a pair of stringers having arranged longitudinally at one edge thereof interengaging coupling elements for coupling and uncoupling the stringers and the numerous devices or garment parts to which the stringers or coupling elements are attached, it has been customary to form the coupling elements of metal stampings having spaced jaws which are fed onto a mounting tape and then crimped or compressed onto the tape, or to form said elements from independent wire link members having end portions which would wrap around a mounting strand or tape or which pierce the tape in coupling the ends of the wire links thereto, and still further, in the formation of a continuous coil of wire which is fed through a mounting tape, in all of which cases, it was first essential to preform the wire or metal or partially preform the same, and then apply it to a tape or other strand.

It is the purpose of my present invention to obviate and eliminate these old methods of procedure and to eliminate the added cost occasioned thereby, especially in first preforming the raw material to a desired contour or cross sectional form, such for example, as in first forming the wire from which the wire type fasteners were produced, or in first shaping or rolling the strips of metal from which the stampings are formed, and to take the crude or raw material which is in a molten state and to shape it directly upon the mounting strip, tape or other supporting body. In the following specification and claims, where reference is made to molten material or molding and casting material, it will be understood that this is to include any kind or class of metal that may be found suitable for forming the moldings or die casting on the stringer tape or strand, or any type of other plastic or molding material or compositions of material of cellulose base, rubber base and including Bakelite and similar compositions. At this time, it will also be apparent that the form, contour or design of the separate coupling elements as well as the size thereof may be varied to suit the fancies of the customer or consumer.

To illustrate one manner of carrying my improved method into effect, I have shown in Figs. 1 to 5 inclusive what may be regarded as the successive series of steps of forming the successive coupling elements in one cycle of operation of the machine parts or elements.

In these figures, I have shown oppositely disposed dies or molds 11 and 12, each having a bore 13 in which is disposed a pipe 14 for introduction of a cooling fluid into the die to cool the same. The adjacent faces of the dies are recessed as seen at 11*a*, 12*a* to produce the desired molded element or link when said faces of the dies are brought together as indicated in Fig. 2, the dies having recesses 11*b* and 12*b* to receive a core piece and feed member 15, and other recesses 11*c* and 12*c* to receive the nozzle 16 through

which molding material or casting material is inserted into the recesses 11*a* and 12*a*. The die 12 carries a needle-like pin 17 adapted to enter an apertured lug 18 in the die 11 and to pass through a mounting strip or tape 19 to form openings 20 therein as is indicated in Fig. 1. In Fig. 1, I have shown at 21, a number of coupling links or elements secured to the strip 19 and formed by the mold recesses 11*a*, 12*a* of the dies 11 and 12, with the last formed coupling element disposed below and out of the path of the dies 11 and 12, the strip 19 with the coupling elements thereon being supported in position by oppositely disposed friction blocks 22 as clearly seen in Fig. 1.

At 23, I have shown a melting pot containing suitable molten material as indicated at 24, and the pot 23 is slidably mounted on guide rails 25 by means of suitable rollers or wheels 26 to permit movement of the pot 23, including the nozzle 16, toward and from the dies 11 and 12. The nozzle 16 is coupled with and forms a continuation of a gooseneck 27, the free end 27*a* of which extends upwardly and protrudes through the top of the pot 23 to form a pump cylinder in which a piston 28 is movably mounted above and below an admission port 27*b* formed in the cylinder 27*a* so that when the piston 28 is in raised position as shown in Fig. 1, the molten material 24 will enter the gooseneck 27 through the port 27*b* and assume in the gooseneck a level consistent with the level of the material 24 in the pot 23. At this time, it will be understood that the nozzle 16 and especially the discharge end thereof is at all times above the level of the molten material 24 in the pot. It will thus appear that when the piston 28 descends in the cylinder 27*a* below the port 27*b*, the molten material in the gooseneck 27 will be forced out through the nozzle 16 and into the recesses 11*a*, 12*a* of the dies to mold or cast the elements 21, and this position of the parts is shown in Fig. 2 of the drawings. It will be understood that the pot 23 will be heated in any desired manner to maintain the material 24 in proper fluid state to permit the formation of the castings or moldings. At 29, I have indicated at the bottom of the pot 23, a suitable heating unit which may be electrical. In dotted lines, I have indicated at 30 in Fig. 1, a housing enclosing the nozzle 16 which may contain an electric or other heating unit for maintaining the nozzle in heated state at all times, the tip end only of the nozzle being exposed for insertion in the recesses 11*c*, 12*c* of the dies. The heating unit 30 is omitted from Figs. 2 to 5 inclusive for sake of simplicity, it being understood that these features of the apparatus in themselves form no direct part of my invention and will be consistent with the customary practice in molding or casting apparatus of the class under consideration. The heating units and the method of constructing the same as well as the method of constructing the melting pot 23 and its insulation will be made to suit the particular types and kinds of casting and molding material employed.

In the construction shown, the contour of the recesses 11*a*, 12*a* in the dies 11 and 12 is such as to form elongated coupling elements 21, the ends of which protrude beyond the strip 19.

In forming the coupling elements 21, usually the strip 19 is fed downwardly as indicated in the drawings, and, for the sake of convenience in defining the invention, I shall refer to the upper side of an element as it appears, for example, in Fig. 3, as the top of the element and the opposite or lower side of the element as the bottom thereof. Of course, when the fastener is put into actual use, the strip and the elements thereon may take any one of many different positions. It will be seen that each element has a body extending beyond the edge of the strip on which it is mounted, and that the top of each body is provided with a recess 21*b* and that the bottom thereof is provided with a complementary projection 21*a*.

It will be understood that in practice the elements operate in the manner indicated in Fig. 10, an element on one of the two strips *a* and a^2 fitting between two elements on the other of the strips, and the projection on the bottom of one element fitting into a recess on the top of another element on the opposite strip, as known in the art. The elements on the two strips *a* and a^2 are caused to mesh with each other in this manner by operation of a slider *b* which may be actuated by means of a finger piece or pull *c*.

The exact form of the coupling elements and the complementary recesses and projections may be varied quite widely without departing from the scope of the invention, but it should be noted that each recess has sides whose upper edges are all disposed within the surface of the top. I believe that I am the first to make a separable fastener with elements having complementary recesses and projections of the kind just described and also having those elements cast in situ on the mounting strips.

By casting the coupling elements in situ, I combine the forming of the elements and the uniting of them to the strip, performing both of these steps in one operation. When formed, the elements have jaws 21*d* disposed on opposite sides of the strip, and the material of these jaws, as will be readily understood, intimately engages the opposite surfaces of the strip and minutely conforms to the configurations of those surfaces, whatever those configurations may be. It is common practice to make the strip 19 of fabric, usually woven, and when such a strip is used, the material of the jaws will minutely conform to the woven pattern formed by the threads of the fabric and will also extend into many, if not all, of the interstices between those threads. Likewise, the material of the jaws will flow through the apertures or openings 20 to form binding portions 21*c* (Figs. 6 and 7) to aid in binding the elements to the tape.

By virtue of the molding and casting process herein disclosed, it will be apparent that various designs, imprints and other characteristics of ornamentation or advertising may be incorporated in the coupling elements by simply constructing the dies accordingly, and for the sake of simplicity, a simple form of coupling element is disclosed.

In this connection, attention is directed to the fact that in molding hot, molten metal upon the strip, there will not be any danger of scorching a fibre strip by reason of the well known fact that the heat of the cast or molded metal will immediately flow to the cool metals of the dies 11 and 12 and be absorbed thereby, and this operation is assured through the relatively fast series of molding operations which would necessarily be provided in the production of my improved product by the introduction of the cooling medium or fluid to the dies through the pipes 14 and the bores 13 in the dies. It will also be understood that the elements 21 may be molded or cast on supporting strips, strands or bodies of any kind or class, and in some instances, may include metallic strips, strands or bodies. For

example, in Fig. 8 of the drawings, I have shown coupling elements 21 similar to those shown in Figs. 1 to 5 inclusive molded or cast upon a cord, wire, cable or the like 19a which forms the stringer, or at least part of the stringer of a coupling element of the class under consideration.

In forming coupling stringers of the class under consideration, it is a common practice to form a plurality of groups of coupling elements on the supporting strip or strand and to space one group of elements from another to form the independent stringers by severing the strip or strand intermediate said groups. In Fig. 9 of the drawings, I have indicated at 19b, the space on the strip 19 between two groups x and $x2$ of the coupling elements 21, it being understood that the stringers are produced for commercial use in different lengths to suit various types and kinds of merchandise, and in production, the desired and predetermined inch length requirement of the coupling elements will be formed in the respective groups x, $x2$ and then spaced apart as indicated at 19b for the purposes stated.

In Fig. 7 of the drawings, I have shown a slight modification wherein the core and feed member 15 includes a protruding tapered tongue 15a on the lower face thereof, which forms in the coupling element 21 a supplemental recess 21d below the recess 21b and as a continuation thereof. The purpose of this modification would be primarily to reduce the amount of material employed in molding each link or coupling element 21, without in any way affecting the strength of the coupling element. This feature may, however, also be included to modify the form and contour of the interengaging portions of the links of separate stringers.

The successive steps in each cycle of operation of the machine elements diagrammatically disclosed for producing the molded or cast coupling elements 21, will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following statement.

Considering Fig. 1, the several parts are now in position preparatory to moving the dies 11 and 12 together and to position the nozzle 16 within and between said parts to form another link, the core 15 being disposed between the recesses 11b and 12b of the dies, and the strip 19 supported by the friction blocks 22. From this position, the parts move into the position shown in Fig. 2 wherein the pot 23 including the nozzles 16 has advanced, and the dies 11 and 12 have been brought together under pressure with the perforated strip 19 between the dies with the core 15 disposed in the recesses 11b, 12b and with the nozzle 16 in the recesses 11c, 12c. The instant that the parts are brought together in the position shown in Fig. 2, the plunger or piston 28 is moved downwardly into the position shown in Fig. 2, to force the molten material 24 into the recesses 11a, 12a of the dies to cast or mold one of the coupling elements 21. Immediately after the casting has been formed, the dies 11 and 12 are moved in opposite directions away from the resulting casting and the nozzle 16 including the pot 23 is moved outwardly, the result of which will leave the parts in the position shown in Fig. 3 with the last formed coupling element 21 disposed on the lower end of the core and feed member 15.

The next step in the operation consists in moving the member 15 downwardly after releasing the friction blocks 22 from the strip 19 and to again move the dies 11 and 12 inwardly to such position as to dispose the inner ends of the dies over the side edge portions of the last formed coupling link, which has been moved by the member 15 into a position below the lower surfaces of the dies as clearly seen in Fig. 4 of the drawings, after which the member 15 is moved upwardly as shown in Fig. 5, in which operation, the last formed coupling element is brought into firm engagement with the lower surfaces of the die, and the friction blocks 22 are again moved into position to engage and support the strip 19 to retain said strip with the coupling elements thereon against movement, and as will be apparent, the core 15 is released from the recess 21b of the last formed coupling element. In raising said member it is returned into the position shown in Fig. 1, after which the dies 11 and 12 are also returned into the position shown in Fig. 1.

During the foregoing steps in the operation, as illustrated in Figs. 3, 4 and 5 and back to Fig. 1, the pot 23 and nozzle 16 thereof remain stationary, it being understood that after the piston 28 has forced the molding material into the die as shown in Fig. 2, it will immediately return to the position shown in Fig. 1, in which operation the piston will suck the molding material contained in the nozzle inwardly to expose the same to the material within the pot through the passage 27b, which is then open, thus preventing any clogging of material in the discharge end of the nozzle 16. It will also be apparent that in the inward movement of the dies as shown in Figs. 4 and 5 of the drawings, a second hole 20 will be partially formed in the strip 19 above the first hole formed therein by the inward movement of the dies as shown in Fig. 2 of the drawings. It will be further apparent that the movement of the last formed coupling element into engagement with the lower surface of the dies 11 and 12 serves to definitely space the links one from the other, which spacing is in part controlled by the member 15 and the movements imparted thereto. The blocks 22 merely serve to support the strip 19 with the elements 21 thereon intermittently in fixed position, the spacing as at 19b being accomplished by an independent feed as is common in other apparatus of the class under consideration, or in fact, this strip may be fed to provide the space 19b by hand.

In the use of some metals in forming the castings it may be found necessary and desirable to treat fibrous supporting strips, strands or bodies with a material which will render the same substantially fire or flame proof to prevent burning, scorching or other breaking down of the fibre of the strip or supporting body where the coupling element is attached thereto. However, I have found in practice that in using a molding material composed of zinc or a composition containing a fairly large percentage of zinc, no scorching or burning of a fibrous body will be experienced, bearing in mind the fact that the heat of the molded element will flow through and be absorbed by the dies which are water cooled.

From the foregoing, it will be apparent that each coupling element 21 is formed through a series of operations similar to those above described with respect to the illustrations in Figs. 1 to 5 inclusive. It will be understood that while I have diagrammatically illustrated certain forms of dies and other elements in carrying my improved method into effect and have illustrated the specific forms of coupling elements, my in-

vention is not limited in these respects, nor am I limited to the specific steps of the method herein disclosed nor to the use of any particular type or kind of molding or casting material, and various other changes in and modifications of the construction herein shown and described may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A separable fastener of the type comprising a mounting strip and a plurality of coupling elements spaced along one edge of said strip, each of said elements comprising a body extending beyond the edge of the strip and having on the top thereof a recess all of whose sides have upper edges within the surface of said top and having on the bottom thereof a projection which is complementary to said recess, said body having jaws on opposite sides of said strip, the material of said jaws intimately engaging the opposite surfaces of the strip and minutely conforming to the configurations of said surfaces.

2. A separable fastener of the type comprising a mounting strip and a plurality of coupling elements spaced along one edge of said strip, each of said elements comprising a body extending beyond the edge of the strip and having on the top thereof a recess all of whose sides have upper edges within the surface of said top and having on the bottom thereof a projection which is complementary to said recess, said body having jaws on opposite sides of said strip, said strip being formed of fabric having small interstices between the threads thereof and the material of said jaws intimately engaging the opposite surfaces of the strip and minutely conforming to the configurations of said surfaces and extending into many of said interstices.

3. A separable fastener of the type comprising a mounting strip and a plurality of coupling elements spaced along one edge of said strip, each of said elements comprising a body extending beyond the edge of the strip and having on the top thereof a recess all of whose sides have upper edges within the surface of said top and having on the bottom thereof a projection which is complementary to said recess, said body having jaws on, and engaging opposite sides of, said strip, said coupling elements being cast in situ.

4. A separable fastener of the type comprising a mounting strip and a plurality of coupling elements spaced along one edge of said strip, each of said elements comprising a body extending beyond the edge of the strip and having on the top thereof a recess all of whose sides have upper edges within the surface of said top and having on the bottom thereof a projection which is complementary to said recess, said body having jaws on, and engaging opposite sides of, said strip and having binding portions extending through openings in said strip.

DAVIS MARINSKY.