PATENT SPECIFICATION

806,180

Date of Application and filing Complete Specification: Nov. 5, 1956. No. 33651/56.

Application made in Germany on Oct. 11, 1956.

Complete Specification Published: Dec. 23, 1958.

Index at acceptance:—Class 43, H1A.
International Classification:—A44c.

COMPLETE SPECIFICATION

An Improved Elastic Link Strap, particularly for use as a Watch Bracelet

We, RODI & WIENENBERGER AKTIENGESELLSCHAFT, of Bleichstrasse, 58-68, Pforzheim, Baden, Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

The present invention relates to improvements in elastic link straps for ornamental or utilitarian purposes, and especially in watch bracelets, of the type consisting of a plurality of hollow links and connecting members which are pivotable against spring action and connect these links to each other so as to be flexible as well as expansible relative to each other. The hollow links of this type of link straps are formed of two layers of rectangular casing, while the connecting members are formed of substantially U-shaped brackets which are disposed along the longitudinal sides of the strap and one arm of which is inserted into each open end of one casing of one layer and the other arm into each open end of the adjacent casing of the other layer.

The elastic link straps of this type such as were known prior to this invention consisted of two superimposed layers of such hollow links or link casings which were staggered relatively to each other and connected with each other intermediate the two layers merely by the connecting brackets so that the corresponding arms of two adjacent brackets then engaged at each side of the strap into the open end of each casing of both layers. Such two-layer link straps have the disadvantage that it is very difficult to assemble and connect the individual parts thereof since it is necessary first to arrange the individual link casing adjacent to each other in a row as well as above each other in two layers which are staggered relative to each other, and then to connect the adjacent links of one layer with those of the other layer.

It is the principal object of the present invention to overcome this disadvantage to the two-layer link straps as previously designed, and to simplify the construction and facilitate the assembly of the link strap considerably, and thus to reduce the cost of manufacture thereof.

Another object of the present invention consists in materially reducing the number of parts necessary to make up the new elastic link strap.

The basic feature of the invention for attaining the above-mentioned objects consists in rigidly securing each casing of one layer of the strap with one casing of the other layer so that these casings then form the upper and lower parts of a single double-link. Due to such construction, only one-half of the number of connecting brackets as previously required in a double-layer strap will now be needed to connect the adjacent links to each other, since only one arm of a single connecting bracket is inserted into each open end of the superimposed upper and lower parts of two adjacent double-links. When assembling the link strap, it will thus no longer be necessary to arrange the individual link casings of the two layers both above as well as adjacent to each other and in the required staggered relation to each other, but it will now suffice if the finished double-links are simply placed adjacent to each other so as to form a row of double-links, the two layers of which are automatically staggered in relation to each other.

The double-links may be simply formed by soldering one link of each layer to each other in staggered relationship. A preferred feature, however, consists in making each double-link of a single stamped-out piece of sheet material, and preferably sheet metal, which is bent into a cross-sectional shape resembling the number "8" in an oblique

position.

Each hollow part or casing of such double-link is provided at the inside thereof with an angularly bent leaf spring, the outer or convex side of which engages with that wall of the casing which contacts the adjacent casing of the other layer. The outer ends of this angular leaf spring are preferably slightly bent over or bevelled in opposite directions and engage with the arms of the connecting brackets which extend into the casings, so that each leaf spring will then resiliently oppose a pivotal movement of these connecting brackets relative to the casing or double-links when the strap is being expanded or bent.

The upper and lower casings forming one double-link may be made of greater width and, for example, approximately twice as wide as the back portion of the connecting brackets, so that the two casings of each double-link are at least partly superimposed upon each other when the strap is in the contracted position. Thus, if the two interconnected casings of each double-link are staggered relative to each other, for example, by the width of one-half casing, the projecting portions of the common wall connecting the two links or the inwardly bent end portion of each casing of one layer which extends laterally beyond the side wall of the casing of the other layer, also extends beyond these back portions of the connecting brackets and serves as a contacting surface for the projecting portion of the opposite casing of each adjacent double-link. Thus, by rigidly securing the two casings of one pair to each other or by making them of one piece of material, one of the two pairs of connecting brackets as required in each pair of casings of the two-layer link straps of prior design will become unnecessary.

The length and width of the leaf springs which are preferably inserted into each casing of the double-links substantially corresponds to the inner length and width of the casings. However, since the back portions of the connecting brackets are only approximately half as wide as the links, this means that when the strap is observed upon the narrow longitudinal side thereof, it will have a somewhat uneven appearance.

It is a further object to avoid this disadvantage. For this purpose, the two ends of the sheet-metal pieces which are bent substantially into the shape of a number "8" to form one double-link are bent over inwardly so as to form partitions which divide each casing in half. The leaf springs which extend within the links transversely to the longitudinal direction of the strap are made in such event of a width substantially corresponding to the width of the back portions of the connecting brackets.

The last-mentioned object may also be achieved by designing the individual double-links of the strap so that the two interconnected casings thereof are staggered relative to each other by the width of one entire casing. The inner width of each casing is then made only substantially equal to the width of the back portions of the connecting brackets and the entire extent of the inner wall of the two interconnected casings of one double-link facing toward the other layer then serves as a contacting surface for the corresponding wall of the two adjacent double-links. However, unless the back portions of the connecting brackets are made wider than the arms thereon which extend into the casings, it is to be understood that the two casing of each double-link have to be of a width greater by approximately twice the thickness of their walls than the connecting brackets which are inserted therein. One vertical side wall of each casing is continuous and in the same plane with one side wall of the casing of the other layer.

As usual in elastic straps of this type, the arms of the connecting brackets fitting with a small amount of play within the casings are of greater width than height. They may furthermore be provided at their inner sides with a transverse groove or a bent portion into or behind which the bent-over ends of the leaf springs engage within the casings so as to prevent the connecting brackets from slipping out of the open ends of the casings.

The upper sides of the double-links forming the ornamental side of the strap and/or the lower, arm-engaging sides thereof may also be provided with extensions at their outer ends which, after the connecting brackets are inserted into the open ends of the casings, are bent downwardly or upwardly, respectively, so as to form tabs which cover up the sides of the strap either partly or entirely and at the same time prevent the connecting brackets from falling out of the open ends of the casings. This last-mentioned feature may be provided either in place of or in addition to the bracket-securing feature as previously mentioned. Since the narrow longitudinal sides of the strap will thus be covered either partly or entirely, the strap when contracted, will have a closed uniform appearance.

If the narrow sides of only one layer of the strap and thus only one-half of the back portion of each connecting bracket are covered by the tablike extensions, the uncovered back portions of the connecting brackets may be bent outwardly relative to the covered portions. These outwardly bent parts of the back portions of the connecting brackets will then lie in substantially the same vertical plane as the bent-over tabs of the casings of the other layer. The side

walls, as well as the outer wall of the open or uncovered casings are then preferably also extended at each end by the thickness of the material of the brackets so as to be within the same plane as the outer surface of the outwardly bent parts of the back portions of the brackets.

A further preferred modification consists in making the upper casings of the double-links wider than the lower casings, as seen in the longitudinal direction of the strap. When the strap is then in the fully contracted position, the side walls of the adjacent upper casings will engage with each other, while the lower casings will be separated by gaps which will prevent the skin or hairs on the hand and wrist of the wearer from being caught between the lower edges and side walls of the lower casings.

The individual parts of the link strap may be made of nonprecious or precious metals or alloys thereof. If desired, most of the parts may also be made of synthetic materials.

Furthermore, the various features may also be exchanged with one another which will result in many other modifications which have not been described in detail, and any one or more of the novel features as described when applied to an elastic link strap are regarded as falling within the concept of this invention as defined by the appended claims.

Further objects, features, and advantages of the present invention will be apparent from the following detailed description thereof which is to be read with reference to the accompanying drawings illustrating several different embodiments of the invention diagrammatically and on an enlarged scale, wherein:—

Fig. 1 shows an end view of several double-links according to a first embodiment of the invention placed in a row adjacent to each other;

Fig. 2 shows the same view of the double-links in the fully assembled condition;

Fig. 3 shows a plan view, partly in cross section of the same double-links;

Fig. 4 shows a view similar to Fig. 2, but with the double-links in the expanded position;

Fig. 5 shows a plan view of Fig. 4;

Fig. 6 shows end view similar to Fig. 4, but with the strap in a bent position;

Fig. 7 shows a cross section taken along line VII—VII of Fig. 2;

Fig. 8 shows a cross section taken along line VIII—VIII of Fig. 2;

Fig. 9 shows a view similar to Fig. 2; in which, however, the lower casings of the double-links are of narrower width than the upper casings;

Fig. 10 shows an end view of the double-links of a link strap in which the open ends of the casings of both layers are completely covered;

Fig. 11 shows a plan view, partly in section, of a link strap according to Fig. 10;

Fig. 12 shows a plan view of a strap according to Figs. 10 and 11 in the expanded position;

Fig. 13 shows a cross section taken along line XIII—XIII of Fig. 10;

Fig. 14 shows a cross section taken along line XIV—XIV of Fig. 10;

Fig. 15 shows a view similar to Fig. 10, in which, however, the lower casings of the double-links, the open ends of which are completely covered, are of narrower width than the upper casings;

Fig. 16 shows a perspective view of a single double-link of a strap according to Figs. 1 to 8;

Fig. 17 shows a perspective view of a double-link with extension projecting from the ends of the upper side thereof;

Fig. 18 shows a similar view of a double-link with extension on the ends of both the upper and lower sides thereof;

Fig. 19 shows a perspective view of a double-link according to Fig. 17 with the extensions bent over downwardly so as to cover the open ends of the upper casing;

Fig. 20 shows a similar view of a double-link according to Fig. 18 with the extensions bent over toward each other so as to cover the open ends of both casings of the double-link;

Fig. 21 shows a perspective view of one one of the leaf springs;

Fig. 22 shows a perspective view of a connecting bracket according to the invention;

Fig. 23 shows a similar view of another embodiment of a connecting bracket;

Fig. 24 shows an end view of a part of a link strap with double-links according to Figs. 17 and 19, in which only the open ends of the upper layer of casings are covered;

Fig. 25 shows an end view similar to Fig. 24, in which, however, the lower casings are of narrower width than the upper casings;

Fig. 26 shows a cross section taken along line XXVI—XXVI of Fig. 24;

Fig. 27 shows a cross section taken along line XXVII—XXVII of Fig. 24;

Fig. 28 shows an end view of a modification of the double-links placed in a row adjacent to each other;

Fig. 29 shows a perspective view of an individual double-link according to Fig. 28;

Fig. 30 shows a view similar to Fig. 28, but with the double-links in the fully assembled condition:

Fig. 31 shows a view similar to Fig. 30, in which, however, the lower casings are narrower than the upper casings;

Fig. 32 shows an end view of a further modification of the double-links placed in a

row adjacent each other;

Fig. 33 shows a view similar to Fig. 32, but with the double-links in the fully assembled condition;

Fig. 34 shows a plan view, partly in section, of Fig. 33;

Fig. 35 shows an end view similar to Fig. 33, but with the links in the expanded position;

Fig. 36 shows a plan view of Fig. 35;

Fig. 37 shows a perspective view of an individual double-link according to Figs. 32 to 36;

Fig. 38 shows a similar view of a double-link in which, however, the ends of the upper side of the upper casing are provided with extensions;

Fig. 39 shows a similar view of a double-link in which the ends of both the upper and lower sides of the link are provided with extensions;

Fig. 40 shows an end view of a part of a link strap composed of double-links according to Fig. 39;

Fig. 41 shows a plan view, partly in section of Fig. 40;

Fig. 42 shows a plan view of Fig. 40, but with the links in the expanded position;

Fig. 43 shows an end view of a strap composed of double-links according to Fig. 38;

Fig. 44 shows a cross section taken along line XXXXIV—XXXXIV of Fig. 43;

Fig. 45 shows an end view similar to Fig. 33 in which, however, the lower casings of the double-links are narrower than the upper casings;

Fig. 46 shows a view similar to Fig. 40 of the modification according to Fig. 45;

Fig. 47 shows a view similar to Fig. 43 of the modification according to Fig. 45;

Fig. 48 shows a cross section through a double-link according to a further modification;

Fig. 49 shows a view similar to Fig. 48, of a further modification;

Fig. 50 shows an individual connecting bracket according to Figs. 48 and 49;

Fig. 51 shows a perspective view of a double-link according to Fig. 49; while

Fig. 52 shows a similar view to Fig. 51, but in which a pair of connecting brackets of the type as shown in Fig. 50 are inserted into the lower casing.

Referring to the drawings in which the same reference numerals are used to indicate similar parts of the various embodiments of the invention, each of the hollow double-links 2 is preferably made of a single piece of sheet metal or a suitable synthetic material which is bent so as to form two interconnected, substantially rectangular casings 3 and 4 which are disposed in two different planes and are staggered relative to each other. In most of the embodiments of the invention, as shown in Figs. 1 to 31, the two casings of each double-link are staggered relative to each other by the width of one-half casing. For this purpose, one-half of an elongated strip of sheet material is bent to form, for example, the lower casing 4 so that the free end portion of this strip forms one-half of the upper wall 25 of the lower casing 4, while the other half of such wall at the same time forms one-half of the bottom 24 of the upper casing 3. The other half of the strip of material is then bent upwardly from the central point of engagement of the two wall portions 25 of the lower casing 4 so as first to form one vertical side wall 18 of the upper casing 3. The other end portion of the strip which is finally bent inwardly from the other side wall 19 of the upper casing then forms the other half of the bottom 24 of the upper casing 3. The two inwardly bent end portions of the strip forming one-half of the wall 25 of the lower casing 4 and one-half of the bottom 24 of the upper casing 3 then form the contacting surfaces which engage with the corresponding surfaces of the two adjacent double-links 2 and slide along the same when the strap is being expanded or contracted. It is to be understood that the foregoing description is merely intended to define the shape of the double-links and their relation to each other, and that it is not intended to limit the particular manner of constructing the double-links as this may obviously be done in various ways.

The adjacent double-links are connected with each other by a pair of connecting brackets 12, each having a back portion 13 and a pair of arms 14 thereon extending substantially at a right angle thereto. A distinguishing feature of the present invention consists in the fact that the back portions 13 of all the connecting brackets 12 at each side of the strap extend parallel to each other in the released as well as in the expanded position of the strap. This is due to the fact that, since the upper and lower casings 3 and 4 of each double-link 2 are rigidly connected, each upper casing 3 of one double-link only needs to be pivotally connected with one lower casing 4 of one adjacent double-link by means of a single pair of a connecting brackets 12, arms 14 of which are inserted for this purpose into the open ends of casings 3 and 4.

Each casing 3 and 4 of the strap has a leaf spring 9 inserted therein. These leaf springs are bent at an angle and the central apex 10 thereof is preferably flattened or inwardly curved so as to seat the spring more securely. This flattened or curved central portion 10 engages with the respective inner wall of the casing, that is, with the lower wall 24 of the upper casing 3 or the upper wall 25 of the lower casing 4, re-

spectively, while the outer ends of each spring 9 engage with the corresponding arms 14 of one pair of connecting brackets 12. In order to permit the two arms of springs 9 to slide more easily along the inner surfaces of bracket arms 14 when the strap is being expanded or released and connecting brackets 12 are pivoted, the outer ends 11 of the springs are slightly bevelled or bent backwardly so that the actual edge or surface thereof engaging bracket arms 14 will be smooth. If the ends of casings 3 and 4 are left open, as shown in Figs. 1 to 8, it will be necessary to provide suitable means for preventing the connecting brackets from slipping out of these open ends and for insuring that the adjacent double-links 2 will not unintentionally be separated. For this purpose, the free ends 15 of bracket arms 14 are bent slightly inwardly so as to act as stops which reach behind the spring ends 11 and in resilient locking engagement therewith. In order to separate two adjacent double links 2, it is therefore necessary to pull brackets 12 out of the open ends of casings 3 and 4 against the action of springs 9.

For assembling a link strap as shown in the first embodiment according to Figs. 1 to 8, it is merely necessary to assemble the individual double-links 2 so as to form a row, as shown in Fig. 1, then to insert one leaf spring 9 in each casing 3 and 4, and finally to attach the connecting brackets 12 to each side of the double-links and to snap bracket arms 14 into locking engagement with spring ends 11.

For preventing the skin or hairs on the hand and wrist of the wearer from being caught between side walls 20 and 21 of the adjacent lower casings 4, it is advisable as shown, for example in Fig. 9, to make these lower casings of a slightly narrower width than the upper casings 3. When the strap is then in the fully released position, side walls 18 and 19 of the upper casings 3 of adjacent double-links 2 will engage with each other, while gaps 22 will remain between side walls 20 and 21 of the lower casings 4.

Since, as shown, for example, in Fig. 2, the back portions 13 of connecting brackets 12 are of a width slightly less than one-half of the inner width of casings 3 and 4, the narrow longitudinal sides of such a strap are rather irregular and produce an uneven, unattractive appearance. This may be prevented either partly or entirely by providing either one or both of the upper walls 5 of the upper casing 3 and the bottom wall 6 of the lower casing 4 with outer extensions 7 or 8 of a length substantially equal to the height of one casing. After the double-links 2 are assembled in a row adjacent to each other and the leaf springs 9 and connecting brackets 12 are inserted into the open ends of each casing 3 and 4, these outer extensions 7 or 8 are bent either downwardly or upwardly so as to form tabs or end walls which cover the open ends of the respective casing. Thus, if only one layer of casings, for example, the upper layer, is provided with such bent-over tabs 7, the open ends of such layer, as well as one-half of the height of the back portions 13 of brackets 12 will be covered so that, for example, the upper half of the side edges of the strap which is especially noticeable will be covered, as shown, for instance, in Fig. 24. If both layers of casings 3 and 4 are provided with such bent-over tabs 7 and 8, the open ends of the casings and the entire back portions 13 of brackets 12 will be completely covered and the side edges of the strap will present an entirely closed uniform appearance as shown, for instance, in Fig. 10.

The bent-over tabs 7 or 8, even if provided on only one layer of casings, will also serve as means for preventing arms 14 of connecting brackets 12 from slipping out of engagement with the ends of leaf springs 9 and from falling out of the casing of either layer. Connecting brackets 12 may then be either of the shape as previously described and shown particularly in Fig. 22 or of a plain rectangular shape as shown in Fig. 23. Although the inwardly bent ends 15 on the bracket arms 14 will then not be required to prevent the brackets from slipping out of the casings, they may be desirable to maintain springs 9 in their proper central position within the casings.

In Figs. 28 to 30 there is shown a slight modification of the double-links, wherein the free ends of the stamped sheet metal pieces forming the links are extended and bent over inwardly so as to form partitions 32 dividing each upper and lower casing in half. Consequently, only in one of each half of the upper and lower casings leaf springs 9 and the arms 14 of connecting brackets 12 are inserted as shown in Fig. 30. Fig. 31 shows also that the lower casings may be made slightly less wide than the other casings so that gaps 22 will remain between the adjacent sidewalls 20 and 21 of each two lower casings when the strap is in fully released position in order to prevent the skin and hairs of the wearer from being caught.

According to a further embodiment of the invention, as shown in Figs. 32 to 47, the upper and lower casings 3 and 4 of each double-link 2 are staggered relative to each other by the width of one entire casing so that side wall 18 of the upper casing 3 is continuous and in the same vertical plane with side wall 20 of the lower casing 4. Each individual casing, as well as the leaf

spring 9 therein, then also needs to be only of a width slightly larger than that of bracket arms 14, that is, of a width which will permit these bracket arms to pivot freely within each casing when the strap is being expanded, as shown in Fig. 35. The casings may again either be left open at their ends, as shown in Fig. 32 to 37, in which event the connecting brackets should be of the type as shown in Fig. 22, or the casings of one layer, for example, the upper layer, may have tablike extensions 7 which, after the springs 9 and the arms of connecting brackets 12 are inserted into the casings, are bent over to cover the open ends of these casings, as well as one-half of the back portion 13 of each connecting bracket 12, as shown in Figs. 38, 43, and 44, or the casings of both layers may be covered with similar tabs 7 and 8 to cover the open ends thereof, as well as the entire back portions 13 of the connecting brackets 12, as shown in Figs. 39 to 42. Depending upon whether one or both layers are thus covered, the side edges of the strap, particularly when the latter is contracted, will then have either a partly or fully closed appearance, and the simple rectangular type of connecting brackets as shown in Fig. 23 may be used as they will be retained in place on the casings by the overlapping tabs 7 or 8. As shown in Figs. 45 to 47, the lower casings 4 may also be of narrower width than the upper casings 3 so as to be separated by gaps 22 which will prevent the skin or hairs on the hand or wrist of the wearer from being caught between the side walls 20 and 21 of adjacent casings.

Figs. 48 to 52 finally show a modification in which only the upper casings 3 of double-links 2 are covered by bent-over tabs 7. In order to give the side edges of the strap a more uniform and closed appearance, especially when the strap is in the contracted position, the lower half 16 of the back portion 13 of each connecting bracket 12 is bent outwardly so that this portion 16 which is not covered by bent-over tabs will be within the same vertical plane as tabs 7 on the outer ends of the upper casings 3. In addition, the bottom and side walls 6, 20, and 21 of the lower casings 4 may be extended at each end beyond the length of the side and bottom walls 18, 19, and 24 of the upper casing 3 by the thickness of back portion 13 of the brackets, while edges 26 of the upper wall 25 of the lower casing 4 may be recessed accordingly from the outer edges of walls 20 and 21. The cutouts thus formed are adapted to receive the outwardly bent portion 16 of brackets 12, so that the outer surface thereof will also be within the same plane as the outer edges of walls 6, 20, and 21 and will not project outwardly therefrom. Although in Figs. 48 to 52 this modification has been shown as applied to double-links of the fully staggered type, as shown in Figs. 32 to 47, it is to be understood that it may be similarly applied to the embodiments as first described in which the upper and lower casings are only staggered relative to each other by the width of one-half casing, as shown, for example, in Figs. 17 and 19. The lower casings 4 may then, for example, be made of a length corresponding to that of the upper casings 3 including the bent-over tabs 7, and the cutouts 26 may then be provided in only that part, or in that compartment according to Figs. 28 to 31, which is outwardly substantially covered by the back portions 13 of brackets 12 so that the outer surface of the outwardly bent portions 16 of the brackets will be within the same plane as the outer edges of the bottom and side walls of the lower casing 4 as well as the outer surface of tabs 7 of the upper casing 3.

While the invention has been described in detail with reference to certain now preferred examples and embodiments thereof, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

WHAT WE CLAIM IS:—

1. An elastic link strap, particularly for use as a watch bracelet, consisting of hollow links, and connecting members flexibly and expansibly connecting said links to each other and being pivotable against spring action, wherein the hollow links are formed by two layers of rectangular casings, and the connecting members by substantially U-shaped connecting brackets disposed along the longitudinal sides of the strap and each having one arm inserted into the open end of one casing of one layer and the other arm into the open end of the adjacent casing of the other layer, characterized by the fact that each casing of one layer and one casing of the other layer which is staggered relatively thereto together consist of one piece so that these casings form the upper and lower parts of one double-link, and that only one arm of one connecting bracket is inserted into each open end of each casing.

2. An elastic link strap as defined in Claim 1, characterized by the fact that each double-link is made of a single bent piece of stamped sheet metal.

3. An elastic link strap as defined in Claim 1 or 2, characterized by the fact that each casing contains an angularly bent leaf spring, the apex of which engages with the inside of that wall of the casing which contacts the adjacent casing of the other layer, and the two bent ends of which engage with the arms of the connecting brackets which extend into the casings so as resiliently to

spring 9 therein, then also needs to be only of a width slightly larger than that of bracket arms 14, that is, of a width which will permit these bracket arms to pivot freely within each casing when the strap is being expanded, as shown in Fig. 35. The casings may again either be left open at their ends, as shown in Fig. 32 to 37, in which event the connecting brackets should be of the type as shown in Fig. 22, or the casings of one layer, for example, the upper layer, may have tablike extensions 7 which, after the springs 9 and the arms of connecting brackets 12 are inserted into the casings, are bent over to cover the open ends of these casings, as well as one-half of the back portion 13 of each connecting bracket 12, as shown in Figs. 38, 43, and 44, or the casings of both layers may be covered with similar tabs 7 and 8 to cover the open ends thereof, as well as the entire back portions 13 of the connecting brackets 12, as shown in Figs. 39 to 42. Depending upon whether one or both layers are thus covered, the side edges of the strap, particularly when the latter is contracted, will then have either a partly or fully closed appearance, and the simple rectangular type of connecting brackets as shown in Fig. 23 may be used as they will be retained in place on the casings by the overlapping tabs 7 or 8. As shown in Figs. 45 to 47, the lower casings 4 may also be of narrower width than the upper casings 3 so as to be separated by gaps 22 which will prevent the skin or hairs on the hand or wrist of the wearer from being caught between the side walls 20 and 21 of adjacent casings.

Figs. 48 to 52 finally show a modification in which only the upper casings 3 of double-links 2 are covered by bent-over tabs 7. In order to give the side edges of the strap a more uniform and closed appearance, especially when the strap is in the contracted position, the lower half 16 of the back portion 13 of each connecting bracket 12 is bent outwardly so that this portion 16 which is not covered by bent-over tabs will be within the same vertical plane as tabs 7 on the outer ends of the upper casings 3. In addition, the bottom and side walls 6, 20, and 21 of the lower casings 4 may be extended at each end beyond the length of the side and bottom walls 18, 19, and 24 of the upper casing 3 by the thickness of back portion 13 of the brackets, while edges 26 of the upper wall 25 of the lower casing 4 may be recessed accordingly from the outer edges of walls 20 and 21. The cutouts thus formed are adapted to receive the outwardly bent portion 16 of brackets 12, so that the outer surface thereof will also be within the same plane as the outer edges of walls 6, 20, and 21 and will not project outwardly therefrom. Although in Figs. 48 to 52 this modification has been shown as applied to double-links of the fully staggered type, as shown in Figs. 32 to 47, it is to be understood that it may be similarly applied to the embodiments as first described in which the upper and lower casings are only staggered relative to each other by the width of one-half casing, as shown, for example, in Figs. 17 and 19. The lower casings 4 may then, for example, be made of a length corresponding to that of the upper casings 3 including the bent-over tabs 7, and the cutouts 26 may then be provided in only that part, or in that compartment according to Figs. 28 to 31, which is outwardly substantially covered by the back portions 13 of brackets 12 so that the outer surface of the outwardly bent portions 16 of the brackets will be within the same plane as the outer edges of the bottom and side walls of the lower casing 4 as well as the outer surface of tabs 7 of the upper casing 3.

While the invention has been described in detail with reference to certain now preferred examples and embodiments thereof, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

WHAT WE CLAIM IS:—

1. An elastic link strap, particularly for use as a watch bracelet, consisting of hollow links, and connecting members flexibly and expansibly connecting said links to each other and being pivotable against spring action, wherein the hollow links are formed by two layers of rectangular casings, and the connecting members by substantially U-shaped connecting brackets disposed along the longitudinal sides of the strap and each having one arm inserted into the open end of one casing of one layer and the other arm into the open end of the adjacent casing of the other layer, characterized by the fact that each casing of one layer and one casing of the other layer which is staggered relatively thereto together consist of one piece so that these casings form the upper and lower parts of one double-link, and that only one arm of one connecting bracket is inserted into each open end of each casing.

2. An elastic link strap as defined in Claim 1, characterized by the fact that each double-link is made of a single bent piece of stamped sheet metal.

3. An elastic link strap as defined in Claim 1 or 2, characterized by the fact that each casing contains an angularly bent leaf spring, the apex of which engages with the inside of that wall of the casing which contacts the adjacent casing of the other layer, and the two bent ends of which engage with the arms of the connecting brackets which extend into the casings so as resiliently to

oppose pivotal movement of the connecting brackets relatively to the casings or double links when the strap is being expanded or bent.

4. An elastic link strap as defined in any one of Claims 1, 2, or 3, characterized by the fact that the casings or the upper and lower parts of one double-link are wider than, being approximately twice as wide as, the back portions of the connecting brackets so that the two casings forming each double-link are at least partly superimposed upon each other, each to the extent of approximately one-half casing, while the walls of the other half of each casing facing toward the other layer and projecting beyond the first half serve as contacting surfaces for the adjacent double-links at both sides of this double-link as seen in the longitudinal direction of the strap.

5. An elastic link strap as defined in Claim 3, characterized by the fact that the length and width of the leaf springs within the casings substantially corresponds to the length and inner width of the casings.

6. An elastic link strap as defined in Claim 3, characterized by the fact that the ends of a stamped sheet-metal piece bent to form one double-link are bent-over inwardly at a right angle so as to form partitions dividing the casings in half, and that the width of the leaf springs extending within the casings transverse to the longitudinal direction of the strap corresponds approximately to the width of the back portions of the connecting brackets.

7. An elastic link strap as defined in any one of Claims 1 to 3, characterized by the fact that the casings or the upper and lower parts of one double-link are substantially as wide as the back portions of the connecting brackets so that the two casings forming each double-link are entirely staggered relative to each other, and that the entire walls of the casings facing toward the other layer serve as contacting surfaces for the corresponding walls of the adjacent double-links at both sides of these casings, as seen in the longitudinal direction of the strap, and that one vertical side wall of one casing of each double-link is continuous and in the same plane with one side wall of the other casing of the same double-link.

8. An elastic link strap as defined in any one of the preceding claims, characterized by the fact that the arms of the connecting brackets which fit loosely into the casings are of greater width than height and are each provided with a transverse groove or an inwardly bent end portion into or behind which the bent-over ends of the leaf springs engage so as to prevent the connecting brackets from slipping laterally out of the casings.

9. An elastic link strap as defined in any one of the preceding claims, characterized by the fact that the outer ends of the upper walls of the double-links forming the ornamental side of the strap and/or of the lower walls of the double-links forming the arm-engaging side of the strap have extensions thereon at the longitudinal sides of the strap which, after the connecting brackets are inserted into the open ends of the casings, are bent over downwardly or upwardly, respectively, and thus cover the sides of the strap either partly or entirely so as to give the strap a closed and uniform appearance and either by themselves or additionally to prevent the connecting brackets from falling laterally out of the casings.

10. An elastic link strap as defined in Claim 9 having covered ends on only one layer of casings, characterized by the fact that the back portions of the connecting brackets are bent outwardly at the uncovered upper or lower casings so that the outwardly bent portions are disposed substantially within the same vertical plane as the bent-over extensions of the other layer.

11. An elastic link strap as defined in Claim 10, characterized by the fact that the outer ends of the arm-engaging walls of the lower casing or the upper walls of the upper casings and the respective side walls thereof have extensions thereon for covering the outwardly bent portions of the back portions of the connecting brackets laterally, as well as from the lower or upper side, respectively.

12. An elastic link strap as defined in any of the preceding claims, characterized by the fact that the lower casings of the double links are narrower than the upper casings as seen in the longitudinal direction of the strap, so that a gap will be formed between the side walls of the lower casings of adjacent double-links, whereby the skin and hairs on the hand and wrist of the wearer will not be caught between these side walls even when the strap is in the fully contracted position.

13. An elastic link as defined in any one of the preceding claims, characterized by the fact that the back portions of the connecting brackets extend parallel to each other both in the contracted and expanded position of the strap.

14. An elastic link strap substantially as described in the foregoing Specification and as illustrated in the accompanying drawings.

MARKS & CLERK.

Printed for Her Majesty's Stationery Office by Wickes & Andrews, Ltd., E.C.4. 684/2.—1958.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.