

[72] Inventor **Kurt A. Rieth**  
**Warwick, R.I.**  
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 [73] Assignee **Textron Inc., Providence, R.I.**

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Primary Examiner—Charles W. Lanham

Assistant Examiner—Gene P. Crosby

Attorney—Robert L. Thompson

[54] **EXPANSIBLE LINKAGE FOR USE IN MAKING A WATCH BAND OR SIMILAR ARTICLE OF JEWELRY**  
**8 Claims, 10 Drawing Figs.**

[52] U.S. Cl. .... **59/79,**  
 63/5

[51] Int. Cl. .... **F16g 13/24**

[50] Field of Search ..... **59/79, 79.5;**  
 214/4.8; 63/4, 5

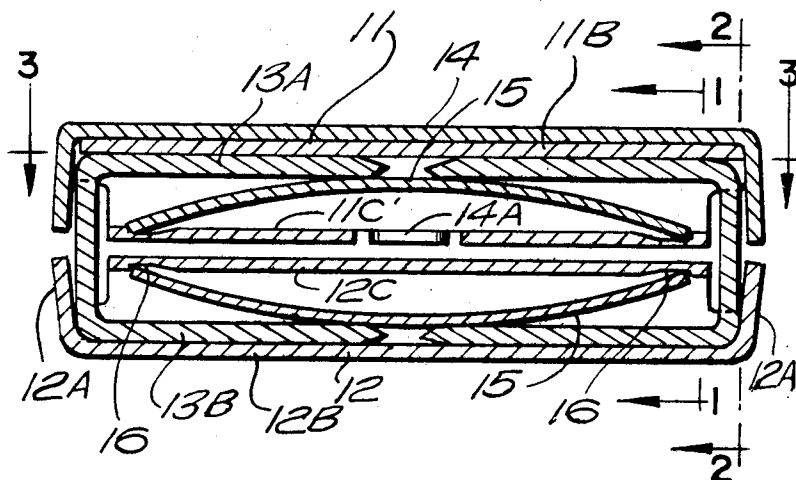
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**ABSTRACT:** This disclosure is directed to an expansible linkage for use in making a watch band, bracelet or the like.

The expansible linkage includes two rows of hollow links staggered and positioned in two different planes, the links being coupled together by U-shaped connecting members having legs positioned in the links and resiliently biased by at least one flat spring supported in each of the links. The outer portions of the spring engage the inner wall of the link and the central portion of the spring is shaped to resiliently urge the legs of the connecting members towards the outer wall of the link and away from a link of the other row of links.



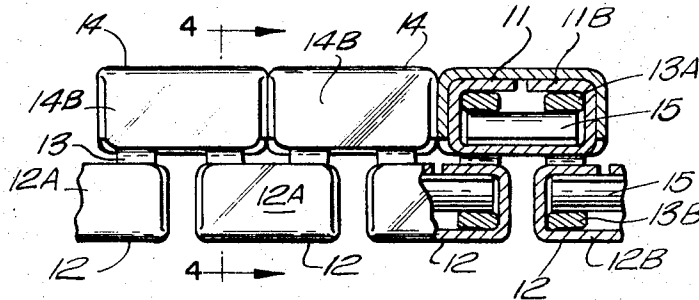


FIG. 1

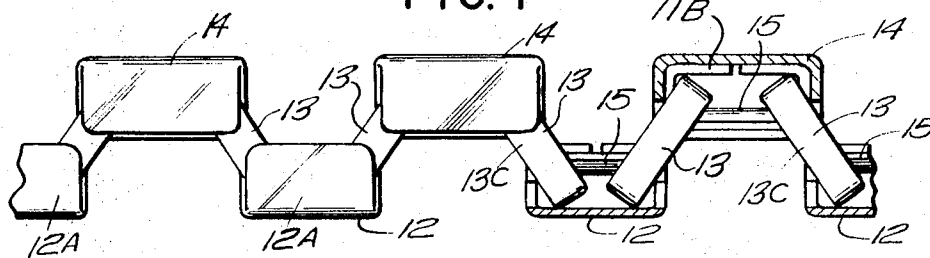


FIG. 2

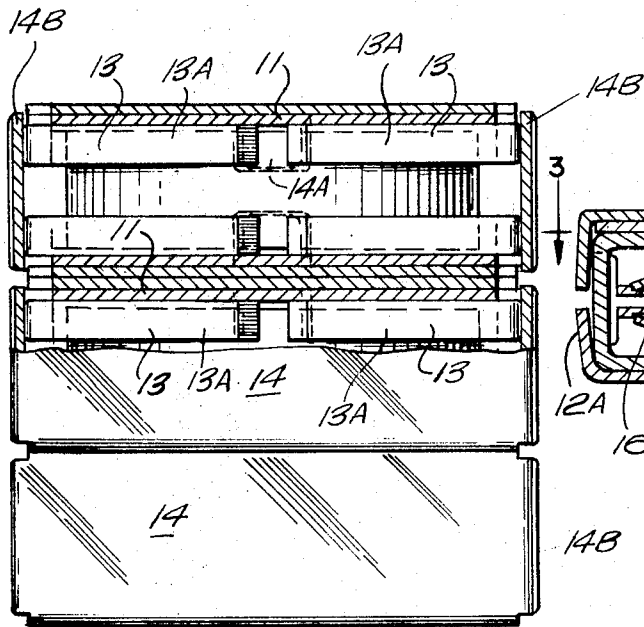


FIG. 3

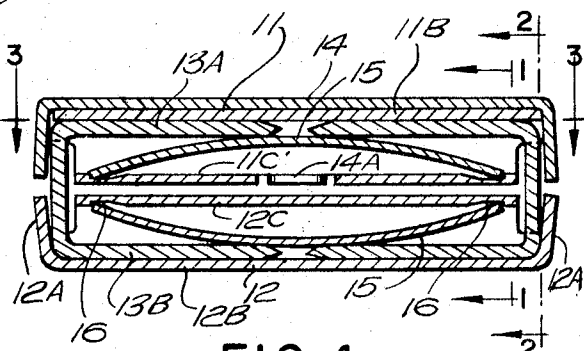


FIG. 4

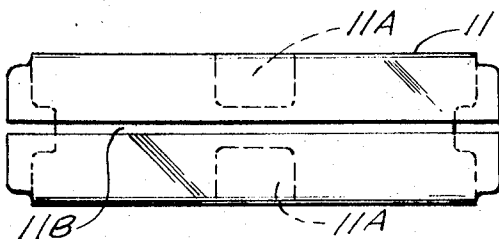


FIG. 5

INVENTOR  
KURT A. RIETH

BY

*Dike, Thompson & Bronstein*  
ATTORNEYS

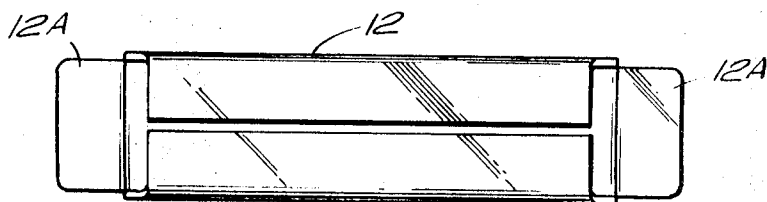


FIG. 6

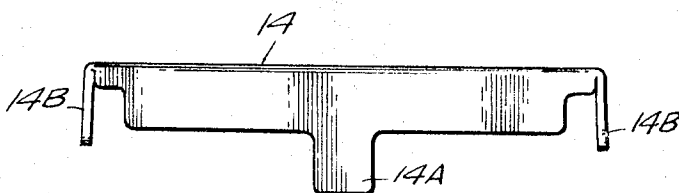


FIG. 7

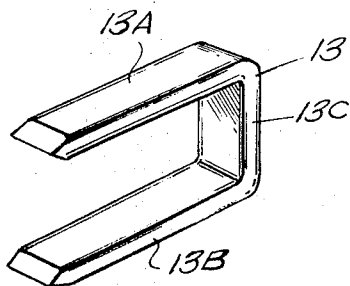


FIG. 9

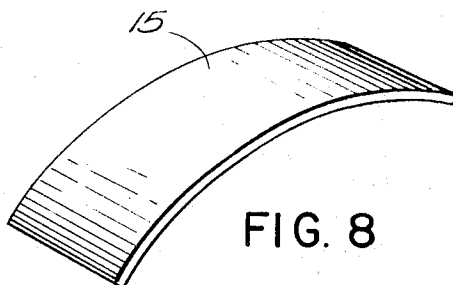


FIG. 8

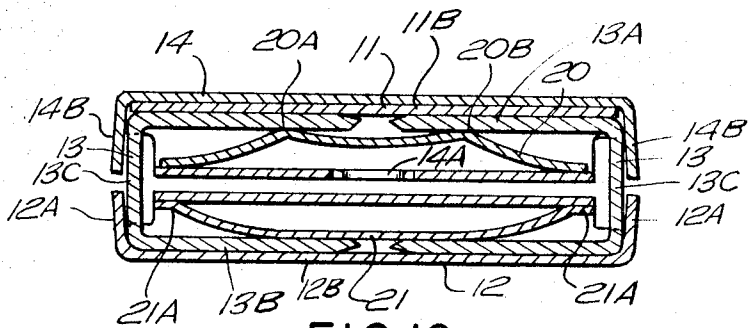


FIG. 10

INVENTOR  
KURT A. RIETH  
BY  
*Dike, Thompson & Bronstein*  
ATTORNEYS

# EXPANSIBLE LINKAGE FOR USE IN MAKING A WATCH BAND OR SIMILAR ARTICLE OF JEWELRY

## BACKGROUND OF THE INVENTION

To date one of the most satisfactory expansible linkages used in the expansion bracelet industry includes two rows of overlapping staggered links in which each link extends in a direction generally transverse to the length of the band, and interconnecting members having legs located within the links of the upper and lower rows which pivotally connect them to each other. At least one flat spring is located within each link and extends from an intermediate portion of one wall of the link to engage the legs with an initial deflection. The initial deflection of all of the springs is sufficient normally to urge the links of the band to fully contracted position. The ends of the springs which engage the legs are further deflected when the band is expanded by stretching it to slip a wristwatch and band over the hand of the wearer to his wrist. When the stretching force is released the springs act upon the legs and the legs act upon the links to cause the links to return to a nearly contracted position in which the band grips the wrist with sufficient pressure to prevent the movement of the band and watch along the wrist. This type of linkage is disclosed in the U.S. Pat. Nos. 2,689,450 issued in Sept. 1954 to Stiegele, 2,799,135 issued in July 1957 to Dolansky, 2,941,351 issued in June 1960 to Dolansky and 3,307,348 issued in Mar. 1967 to Vanover.

While the aforesaid prior art linkages have been satisfactory in the manufacture of men's and ladies' watch bands, the industry has continued to look for new and improved constructions which would substantially reduce manufacturing costs. With the constructions of the prior art linkages extensive quality control is necessary to insure that the legs of the U-shaped connecting members have not been inserted in the links so that they are in a wrong or improper relationship with respect to the springs and the links, which when it occurs requires disassembly and reassembly of the linkage. Further the industry has sought methods of increasing the useful life of the springs since they are subjected to repeated flexing when the watch and bracelet are put on and taken off the wrist of the wearer. The costs involved in operating the business are increased depending upon how long springs stand up in use before they must be repaired or replaced.

In view of the above, this invention has provided a new and improved linkage which not only facilitates the insertion of the legs of the connecting members into the links with greater manufacturing efficiency but in addition with the linkage construction provided by this invention, spring life is substantially increased by increasing the effective lengths of the springs without increasing the length of the links and the springs are easier to manufacture and maintain.

Accordingly, one object of this invention is to provide a new and improved expansible linkage which because of its construction may be easily and economically assembled without substantial need for disassembly and reassembly.

Another object is to provide a new and improved expansible linkage construction wherein a substantial improvement in spring life is obtained.

Yet another object is to provide a linkage construction which substantially insures that the connecting members will properly mate with both the top and bottom links of the linkage and the springs positioned therein during assembly thereof.

A still further object is to provide a linkage construction which may utilize springs which are easier to manufacture and maintain.

Yet another object is to provide a linkage in which the ends of the legs of the connecting members may be blunt or square rather than bevelled as is customary in the prior art.

In general the invention comprises using at least one flat spring in at least each link of one row of links each of said flat springs having its end portions supported by the inner wall of the link in which it is located, and its central portion shaped to

resiliently urge the legs of the U-shaped connecting members towards the outer wall of said link. In the preferred embodiment the flat springs are of generally arcuate shape between their localities of engagement with the legs and their localities of engagement with the link wall from which they act.

The use of this particular spring relationship facilitates the insertion of the legs of the connecting members into the links at a much higher rate with better quality control because of the greater target area or throat opening between the ends of the spring and the outer link wall, which opening is adapted to receive the legs of the connecting members. Since the bent end portions of the springs of the prior art linkages may be eliminated or substantially reduced the effective working length of the spring is increased and this increases the useful life of the springs. Further objects and advantages of the invention will be apparent to persons skilled in the art from the following description and from the accompanying drawings which describe and show for illustrative purposes three embodiments of the invention.

In the drawings:

FIG. 1 is a side view of a segment of a linkage embodying the present invention with the parts shown in a contracted position and partly in section, the section being taken along the line 1-1 of FIG. 4;

FIG. 2 is a view like FIG. 1 but showing the links in an expanded position, the section being taken substantially along the line 2-2 of FIG. 4;

FIG. 3 is a top view partially in section showing three of the links in a contracted position, the section being taken along the line 3-3 of FIG. 4;

FIG. 4 is a sectional view taken along the line 4-4 of FIG. 1;

FIG. 5 is a top view of a top link looking at its outer wall before a top shell is assembled therewith;

FIG. 6 is a top view of a bottom link, looking at its inner wall;

FIG. 7 is a side view of a top shell which is adapted to be fitted over the top link;

FIG. 8 is a perspective view of one of the flat springs utilized according to this invention;

FIG. 9 is a perspective view of one of the connecting members utilized according to this invention;

FIG. 10 is a sectional view similar to FIG. 4 showing two alternate spring embodiments which may be utilized according to the invention.

Referring now to FIGS. 1 through 9 the expansible linkage according to this invention comprises a row of top links 11 and a row of bottom links 12 pivotally connected together by substantially U-shaped connecting members 13 having legs 13A, 13B coupled together by an endpiece 13C.

Each top link 11 has an ornamental shell 14 attached thereto by tabs 14A which are received in cutouts 11A of the top link (See FIGS. 5 and 7). The links 11 of the top row of links are staggered with relation to bottom links 12 of the bottom row lengthwise of the linkage. The links of both rows extend in a direction generally transverse to the length of the linkage when viewed from the top.

Top and bottom links 11 and 12 may be made from stainless steel or any other suitable material. The top link is formed as shown in FIG. 5 and the bottom link is formed as shown in FIG. 6. The bottom link is formed with outwardly extending tabs 12A which during assembly of the linkage are bent upwardly to hold in and partially conceal the lower portions of the endpieces 13C of the interconnecting members.

The ornamental top shell 14 may be made from a blank of gold filled stock or stainless steel stock or any other suitable material. When assembled about the top link 11, its outer wall overlies the outer wall of the link, its depending side walls extend along the outside of the side walls of the link and the tabs 14A hold the top shell in this relationship with the link. The top shell is also provided with end tabs 14B and in the final assembled linkage they serve to conceal the upper portions of the endpieces 13C of the interconnecting members. The ornamental top shells may be omitted and the top link formed with

the desirable ornamental appearance without departing from this invention.

Each link of each row is pivotally connected with the two adjacent links of the adjacent row by means of four interconnecting members 13. In assembled condition the legs 13A and 13B of the connecting members extend within the links in a direction generally transverse to the length of the linkage. Two legs of two of the four connecting members are located within a link of a top row near one side thereof, the other leg of one of these connecting members is located within an adjacent link of the bottom row and the other leg of the other connecting member is located within an adjacent link in the bottom row. The other two connecting members are located near the opposite side of the linkage and their legs are located within the links near the opposite side in the same manner.

As shown more clearly in FIG. 4 the legs 13A of the connecting members in each top link are urged towards its outer wall 11B and the legs 13B of the connecting members in each bottom link are urged towards the outer wall 12B of the bottom link by flat springs 15. As may be seen particularly in FIG. 4 the springs of the top and bottom links are bowed in opposite directions with respect to each other. Depressions 16 are formed in the interior surfaces of the inner walls 11C and 12C of the top and bottom links which receive the ends of the springs 15 for centrally locating the springs with respect to the links and the legs 13A and 13B of the connecting members. In this manner the springs 15 are centrally located such that the central portions of the springs will be correctly positioned to resiliently urge the legs 13A and 13B towards the outer walls of the links.

With this particular spring arrangement it is a simple matter to assemble the legs of the connecting members into a linkage because of the large gap or throat between the end portion of each spring and the interior surface of the outer wall of the link and there is no likelihood that the ends of the legs will enter between the end of the spring and the inner walls of the links as occurred in the prior art. In the preferred form shown in FIG. 4 the springs 15 are of a substantially arcuate shape and do not have any bends formed therein so they are easier and cheaper to manufacture. Because the working or effective length of the spring is increased spring stress is decreased and the useful life of the spring is increased.

In FIG. 10 two alternate spring constructions which may be used in accordance with the teachings of this invention are shown. In the top link as shown the spring 20 is provided with two bends 20A and 20B. In the bottom link the ends of the spring 21 are provided with slight bends or flats 21A at the point where they rest upon the inner wall of the link. While in the embodiments of FIG. 10 depressions 16 are not formed in the interior surfaces of the walls 11C and 12C depressions may be provided if desired. It is to be understood that other shape springs may be utilized as long as their end portions rest upon the inner walls of the links and they function to urge the legs of the connecting members towards the outer walls of the links and they are generally of the shape disclosed in FIGS. 1 through 10.

As well-known in the prior art connecting members having legs of different cross sections may be used, although a generally rectangular cross section is preferred.

The ends of the connecting members may be blunt or square rather than bevelled as shown in FIG. 9.

Connecting members may also be used in which the legs of opposite U-shaped members are connected together to form members of either C-shape or rectangular shape.

While three desirable embodiments of the invention have been shown in the drawings it is to be understood that this disclosure is for the purpose of illustration only and various changes in shape, proportion and arrangement of parts as well as the substitution of equivalent elements from those shown and described herein may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. An expansible linkage comprising in combination two rows of overlapping staggered links, each of said links including outer and inner walls and openings near the sides, each link extending in a direction generally transverse to the length of the linkage, means for interconnecting each of the links of one row with two

adjacent links of the other row, said interconnecting means comprising a first pair of U-shaped members, the legs of each U-shaped member being made of substantially rigid material and said legs being substantially parallel to each other at all times, the end of one leg of each of said U-shaped members extending into the opening near one side of a link of one row and the ends of the other legs of said U-shaped members extending into the corresponding openings near the sides of adjacent links in the other row, a second pair of U-shaped members, the legs of each U-shaped member being made of substantially rigid material and said legs being substantially parallel to each other at all times, the end of one leg of each of said second pair of U-shaped members extending into the opening near the opposite side of said link of said one row and the ends of the other legs of said second pair of U-shaped members extending into the corresponding openings near the sides of said adjacent links of the other row, whereby each link of one row is connected with two adjacent links of the other row by two pairs of U-shaped members and when the ends of the linkage are stretched longitudinally from a contracted towards an expanded position the links of each row are displaced longitudinally and the legs of said U-shaped members are rotated,

a flat spring located in each link of said one row of links, the outer end portions of said spring engaging into the outer end portions of the inner wall of said link and the central portion of said spring engaging the legs of said two pairs of U-shaped members which are located in said link thereby to resiliently urge said legs of said U-shaped members into engagement with the outer wall of said link and away from the other row of links, and

a flat spring located in each link of said other row of links the outer end portions of said spring engaging into the outer end portions of the inner wall of said link and the central portion of said spring engaging the legs of said two pairs of U-shaped members which are located in said link thereby to resiliently urge said legs of said U-shaped members into engagement with the outer wall of said link and away from said one row of links,

whereby during assembly of the linkage the ends of the legs of each pair of U-shaped members may be readily inserted in gaps formed between the outer end portions of the flat springs and the interior surfaces of the outer walls of said links rather than between the outer end portions of the springs and the inner walls of the links.

2. An expansible linkage according to claim 1 wherein each spring is generally arcuate in shape and is bowed at its central portion.

3. An expansible linkage according to claim 1 wherein each spring has at least one bend formed in its central portion.

4. An expansible linkage according to claim 1 wherein a pair of spaced depressions are formed in the interior surface of the inner wall of each link, one near each end thereof, to receive the end portions of the flat spring.

5. An expansible linkage comprising in combination two rows of overlapping staggered links, each of said links including outer and inner walls and openings near the sides, each link extending in a direction generally transverse to the length of the linkage, means for interconnecting each of the links of one row with two

adjacent links of the other row, said interconnecting means comprising a first pair of U-shaped members, the legs of each U-shaped member being made of substantially rigid material and said legs being substantially parallel to each other at all times, the end of one leg of each of said U-shaped members extending into the opening near one side

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of a link of one row and the ends of the other legs of said U-shaped members extending into the corresponding openings near the sides of adjacent links of the other row, a second pair of U-shaped members, the legs of each U-shaped member being made of substantially rigid material and said legs being substantially parallel to each other at all times, the end of one leg of each of said second pair of U-shaped members extending into the opening near the opposite side of said link of said one row and the ends of the other legs of said second pair of U-shaped members extending into the corresponding openings near the sides of said adjacent links in the other row, whereby each link of one row is connected with two adjacent links of the other row by two pairs of U-shaped members and when the ends of the linkage are stretched longitudinally from a contracted towards an expanded position the links of each row are displaced longitudinally of the linkage and the legs of said U-shaped members are rotated, and a flat spring located in each link of said one row of links, the outer end portions of said spring engaging into the outer end portions of the inner wall of said link and the central portion of said spring extending into engagement with the outer wall of said link whereby substantial gaps are

formed between the outer end portions of said spring and the interior surface of the outer wall of said link near the sides of the link, and after insertion of the U-shaped members into the link the central portion of said spring engages the legs of said two pairs of U-shaped members which are located in said link thereby to resiliently urge said legs of said U-shaped members into engagement with the outer wall of said link and away from the other row of links,

whereby during assembly of the linkage the ends of the legs of each pair of U-shaped members may be readily inserted in said gaps rather than between the outer end portions of the spring and the inner wall of said link.

6. An expansible linkage according to claim 5 wherein each spring is generally arcuate in shape and is bowed at its central portion.

7. An expansible linkage according to claim 5 wherein each spring has at least one bend formed in its central portion.

8. An expansible linkage according to claim 5 wherein a pair of spaced depressions are formed in the interior surface of the inner wall of each link of said one row of links, one near each end thereof, to receive the end portions of the flat spring.

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