Nov. 6, 1945. L. KREISLER ET AL 2,388,554

EXPANSION BAND

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Fig. 1.

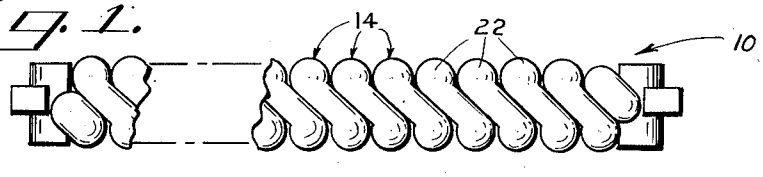
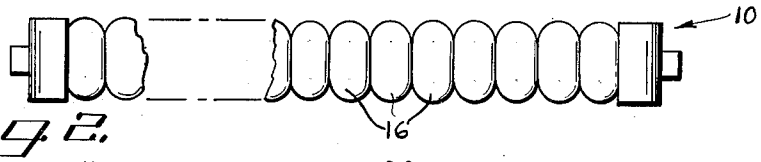


Fig. 2.



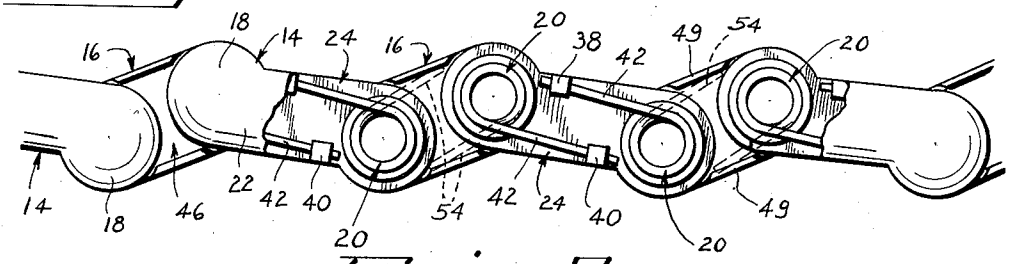


Fig. 3.

Fig. 4.

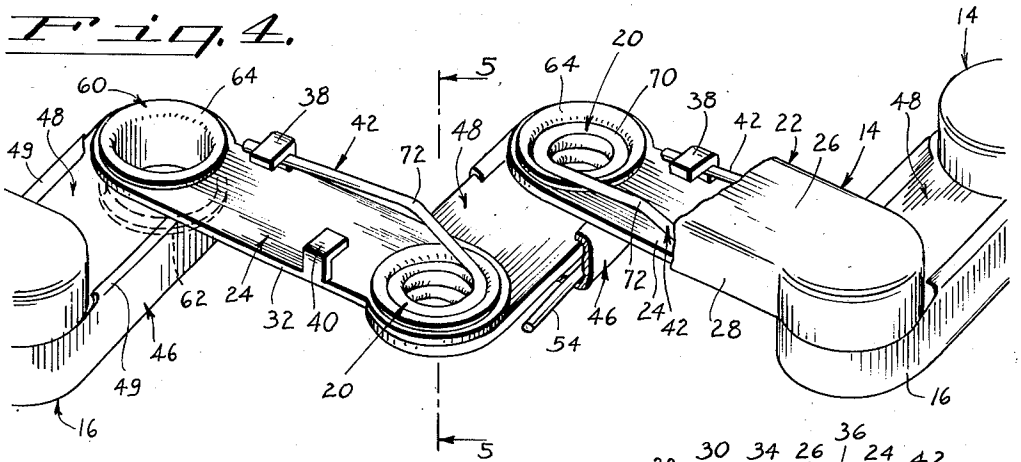


Fig. 6.

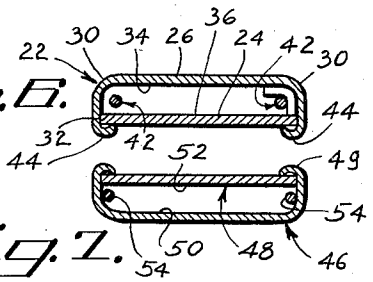


Fig. 7.

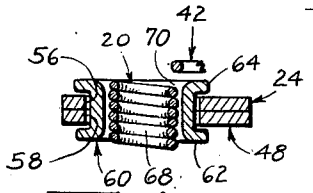


Fig. 5.

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EXPANSION BAND

Filed June 17, 1944 2 Sheets-Sheet 2

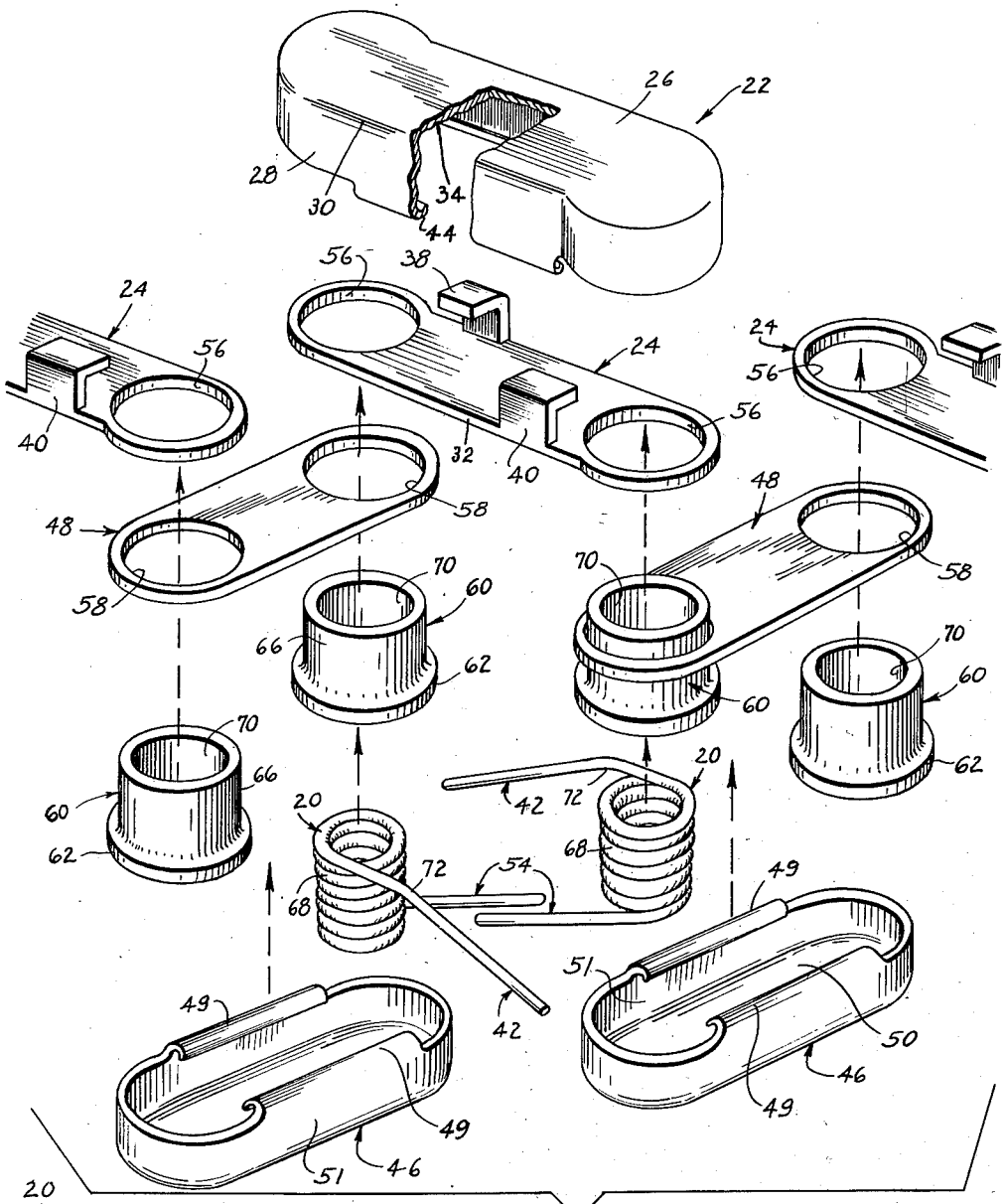

Fig. 8.

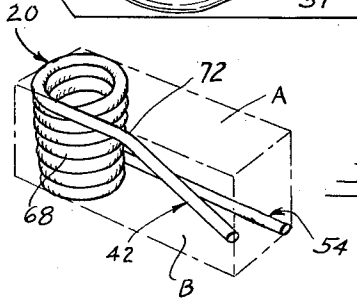

Fig. 9.

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2,388,554

EXPANSION BAND

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Application June 17, 1944, Serial No. 540,846

7 Claims. (Cl. 59—79)

This invention relates to expansion chains or linkages for bracelets, wrist watch straps or bands, or other articles of personal wear and more particularly to such chains or linkages which comprise spring retracted extensible links pivotally connected to each other only at their ends.

Extensible chains or linkages of the type referred to above have a tendency to assume a twisted form in which the links instead of lying in a single flat plane are displaced therefrom with the result that the appearance of the bracelet or band comprising said linkage is impaired. One of the objects of the present invention is to obviate this objection.

Another object is to provide a bracelet comprising a linkage of such construction as to improve the flexibility of a bracelet of the type to which the invention relates.

Another object of the invention is to facilitate the construction of the link members and the assembly of the various parts of the linkage.

Other objects of the invention will become apparent from the following detailed description of the presently preferred embodiment of the invention.

In the drawings:

Fig. 1 is a top view of a wrist watch band or bracelet, embodying the present invention, in the contracted condition thereof;

Fig. 2 is a bottom view of the wrist watch band or bracelet in the contracted condition thereof;

Fig. 3 is a top view on an enlarged scale of several of the links in extended relation, certain parts being removed for the purpose of illustration;

Fig. 4 is a perspective view, on an enlarged scale, of several links in the extended relation thereof, parts being removed for the purpose of illustration;

Fig. 5 is a sectional view on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged transverse sectional view of a top link;

Fig. 7 is an enlarged transverse sectional view of a bottom link;

Fig. 8 is a perspective view, on an enlarged scale, showing the parts of several adjacent links separated from each other but disposed in related positions;

Fig. 9 is a perspective view of one of the linkage-contracting springs shown in relation to a geometrical figure for the purpose of illustrating one of the features of the present invention.

The extensible wrist watch band or bracelet 10 in which the present invention is embodied, as illustrated in the drawings, comprises a plurality of links 14 and 16 which, for convenience in reference, may be designated as top links and bottom links, respectively. Adjacent links 14 and 16 are pivotally connected to each other only at their ends, the adjacent ends of adjacent links being in overlapped relation and the links being of such relative size that the adjacent end portions 18 of two adjacent top links 14 conceal the intermediate bottom link 16 in the contracted condition of the bracelet viewed from the top thereof as illustrated in Fig. 1. The links are movably held in their adjacent side by side relation, in the contracted condition of the bracelet, by coiled springs 20 which also resiliently oppose relative movement of the links to the expanded condition of the bracelet. The springs 20 and their relation to the companion links will be described hereinafter more specifically as their construction and arrangement eliminate the above mentioned objection in regard to the twisting of the links of the bracelet, but first the links 14 and 16 and the pivotal connection thereof to each other will be more specifically described.

Each top link 14 comprises an outer link member or shell 22 and an inner link member 24 which is positioned within said shell. The marginal edge of the top wall 26 of shell 22 and the adjacent part of the peripheral side wall 28 of said shell are curved as indicated at 30 whereby said shell is provided with an inner peripherally extending concave surface which is engaged by the peripheral edge 32 of the inner link member 24 for limiting the movement of the inner link member 24 toward the wall 26 of the shell 22 whereby to provide a space between the confronting surfaces 34 and 36 of the outer and inner link members as clearly shown in Fig. 6. Inner link member 24 is provided with integral lugs 38 and 40 which are bent up from the opposite side edges, respectively, of said inner link member for engagement by the end portions of arms 42 of two of the springs 20, respectively, which are positioned at the opposite ends of each inner link member 24. It will be understood that the spring-retaining lugs 38 and 40 of each inner link member 24 is disposed in the space between the confronting surfaces 34 and 36 of the companion outer and inner link members. The outer edge of the peripheral side wall 28 of shell 22 is provided with a small beaded edge 44 which allows the inner link member 24 to be snapped into the shell and which retains the inner link member in said shell. The bottom links 16 include an outer link member or shell 46 and an inner link member 48. The inner link member 48 fits within the outer companion link member or shell 46, with a space provided between the confronting walls and surface 50 and 52 of said outer and inner link members, respectively, to make room for the arms 54 of a pair of the springs 20. Edge portions 49 of shell 46 are bent over the outer surface of inner link member 48 to hold the latter in the companion shell. It will be understood that the band is flexible in a direction to

allow it to conform readily to the curvature of the wearer's wrist, and in this connection it will be noted that the curved portions at the juncture between the wall 50 and the side wall 51 of links 16 (Fig. 7) and the corresponding curvature between the wall 26 and the side wall of links 14 (Fig. 6) increase the extent to which the band can be curved out of its flat form. While links 14 are preferably the top links as described, the band can be worn with the links 14 at the bottom of the band instead of at the top thereof.

Link members 14 and 16 are pivotally connected to each other by pivotally connecting the adjacent ends of the inner link members 24 of the links 14 to the inner link members 48 of the links 16. More specifically, link members 24 are provided at their opposite ends with circular openings 56 and the inner link members are provided at their opposite ends with circular openings 58, and a hollow pivot member constituted by an eyelet 60 passes through the openings 56 and 58 of the adjacent overlapped ends of adjacent inner link members 24 and 48, respectively, for pivotally connecting said adjacent ends of said inner link members to each other. The end flanges 62 and 64 of the eyelet 60 overlap the adjacent surfaces of link members 48 and 24 around the circular openings 58 and 56, respectively, thereof for limiting the movement of said inner link members away from each other in a direction normal to the confronting surfaces of said link members, that is, in a direction axially of the eyelet. It will be observed by reference to Fig. 8 that before the eyelet 60 is assembled with the companion inner link members it is provided only with the flange 62 so that the peripheral pivot portion or barrel 66 of the eyelet can be projected into the registered openings 58 and 56 of the link members 48 and 24, respectively, flange 64 being formed by upsetting the end portion of part 66 of the eyelet after the latter is projected through the registered openings 58 and 56 of the adjacent inner link members. The eyelet 60 has a loose fit between the openings 56 and 58 of the companion link members and the axial part or barrel 66. The distance between the confronting surfaces of the flanges 62 and 64 of the eyelet is such as to provide a slight clearance between the overlapped surface portions of the inner link members 24 and 48 which are pivotally connected to each other by said eyelet so that said link members are freely pivotally movable on the companion eyelets except to the extent that they are resiliently held against such movement by the springs 20. This construction improves the flexibility of bracelets of this type in respect to the capability of the bracelet to curve around the wearer's wrist.

The axially coiled portion 68 of spring 20 is disposed with a loose fit within the axial opening 70 of the barrel 66 a companion eyelet 60, sufficient clearance being provided between the outer surface of spring portion 68 and the peripheral wall of said eyelet opening to avoid opposition to the action of the spring or interference with the flexibility of the bracelet. The arms 42 and 54 which extend from the opposite ends of the coiled portion 68 of the spring are positioned in the shells 22 and 46, respectively, of two adjacent links as clearly illustrated in Fig. 4, the arm 42 engaging the inner link member 24 in said shell at the lug 38 or 40 and the other arm 54 of the spring engaging the peripheral side wall of the outer link member or shell 46 of the adjacent bottom link 16. It is important to note that as illustrated in the drawings the arm 42 of spring 20 is bent so that it extends in a direction running from one end of the coiled portion 68 of the spring toward the opposite end of said coiled portion as can be more clearly understood by an inspection of Fig. 9 which shows arm 42 of the spring displaced inwardly of the plane surface A of the geometrical figure illustrated in dotted lines toward the opposite parallel plane surface B of said figure. The axial portion 68 of spring 20 is somewhat longer than the eyelet 60 so that the arm 42 of the spring in said eyelet clears the top of the flange 64 of the eyelet. The downward inclination of arm 42 is such that the outer end portion of said arm bears downwardly on the surface of the companion inner link member 24 and resiliently holds said inner link member against the adjacent companion inner link member 46 of the adjacent link 16, the downward resilient force exerted by arm 42 on the companion link member 24 being provided by the intermediate bent portion 72 formed in said arm as clearly illustrated in the drawings. Linkages constructed as hereinbefore described are free from twisting, and this important and advantageous result is attributed to the pressure of the arm 42 on the companion inner link member 24. This action of spring arms eliminates the necessity for providing the links with lateral projections heretofore provided on the adjacent side walls of adjacent top or bottom links in attempting to prevent twisting of the links about the longitudinal line of the band. By reason of the elimination of these projections the adjacent links can lie close to each other in side by side relation in the contracted condition of the band whereby the concealment of the upper surfaces of the bottom links by the top links is substantially complete and exposure of said bottom links when the band is extended is reduced in comparison with the same amount of extension of bands provided with such lateral projections.

It will be understood that the axially coiled portion 68 of the spring 20 is partially tensioned, in the contracted condition of the links, by the engagement of arms 42 and 54 with the lug 38 or 40 and with the side wall of the shell 46 and that the tension of said spring portion is increased when the links are moved in band-extending relation about the hollow pivot members or eyelets 60. Lugs 38 and 40, besides acting as abutments for the ends of the companion spring arms 42, provide means for limiting the movement of the inner link member 24 into the companion outer link member or shell in the assembly of said link members, since the outer ends of said lugs engage or lie close to the inner confronting surface of the outer link member.

While we have shown and described the presently preferred embodiment of our invention, it will be understood that the latter may be embodied otherwise than as herein specifically illustrated or described and that in the illustrated embodiment certain changes in the details of construction and in the arrangement of parts may be made without departing from the underlying principles of the present invention within the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. In an expansible band for bracelets, wrist watches, etc., comprising a plurality of links having inner link members and outer link members, said links pivotally connected only at their ends by hollow pivot pins, the adjacent ends of adja-

cent inner link members being in overlapping relation, and springs having axially coiled portions positioned in said hollow pivot pins, respectively, each of said springs having a pair of arms extending from the opposite ends, respectively, of the coiled portion and engaging the outer and inner link members, respectively, of adjacent links, for resiliently opposing pivotal movement of said links in band-expanding relation; the arm which engages the inner link member having a part which presses the inner link member toward the adjacent link in the direction of the thickness of the band.

2. In an expansible band for bracelets, wrist watches, etc., comprising a plurality of links pivotally connected to each other only at points adjacent the ends thereof and provided with coiled springs which engage adjacent links and resiliently oppose relative pivotal movement of said link in band-expanding relation, said links being arranged so that portions of adjacent links are in overlapped relation, means for preventing twisting of the band, said means including parts of said springs arranged to press adjacent links toward each in the direction of the thickness of the band.

3. An expansible band for bracelets, wrist watches, etc., comprising a plurality of top and bottom links extending transversely of the length of the band and arranged so that each bottom link is overlapped by the adjacent end portions of two adjacent top links, said links comprising inner link members and companion outer link members, said inner link members having openings therethrough adjacent their opposite ends, the openings in the bottom inner link members being in registry with the adjacent openings, respectively, of the inner link members of the adjacent top links, hollow eyelets positioned in the registered pair of openings of adjacent links, respectively, and having end portions positioned over the outer surfaces of the adjacent links for limiting movement of said adjacent links away from each other in the direction of the thickness of the band, and springs having coiled portions disposed in said hollow eyelets, respectively, and portions engaging adjacent links for holding the links in band-contracted relation and resiliently opposing the pivotal movement of said links in band-expanding relation and means for preventing twisting of the band, said means including parts of said springs arranged to press adjacent links toward each other in the direction of the thickness of the band.

4. An expansible band for bracelets, wrist watches, etc., comprising a plurality of top and bottom links extending transversely of the length of the band and arranged so that each bottom link is overlapped by the adjacent end portions of two adjacent top links, said links comprising inner link members and companion outer link members, said inner link members having openings therethrough adjacent their opposite ends, the openings in the bottom inner link members being in registry with the adjacent openings, respectively, of the inner link members of the adjacent top links, hollow eyelets positioned in the registered pair of openings of adjacent links, respectively, and having end portions positioned over the outer surfaces of the adjacent links for limiting movement of said adjacent links away from each other in the direction of the thickness of the band, and springs having coiled portions disposed in said hollow eyelets, respectively, and portions engaging adjacent links for holding the links in band-contracted relation and resiliently opposing the pivotal movement of said links in band-expanding relation, and means including parts of said springs arranged to press on certain of said inner link members for opposing movement of the top links away from the bottom links in the direction of the thickness of bracelet.

5. An expansible band for bracelets, wrist watches, etc., comprising a plurality of top and bottom links extending transversely of the length of the band and arranged so that each bottom link is overlapped by the adjacent end portions of two adjacent top links, said links comprising inner link members and companion outer link members, said inner link members having openings therethrough adjacent their opposite ends, the openings in the bottom inner link members being in registry with the adjacent openings, respectively, of the inner link members of the adjacent top links, hollow eyelets positioned in the registered pair of openings of adjacent links, respectively, and having end portions positioned over the outer surfaces of the adjacent links for limiting movement of said adjacent links away from each other in the direction of the thickness of the band, and springs having coiled portions disposed in said hollow eyelets, respectively, each of said springs having a pair of arms extending from the opposite ends, respectively, of the coiled portion and engaging the outer and inner link members, respectively, of adjacent links, for resiliently opposing pivotal movement of said links in band-expanding relation, the arm which engages the inner link member having a part which presses the inner link member toward the adjacent link in the direction of the thickness of the band.

6. In an expansible band for bracelets, wrist watches, etc., comprising a plurality of links having inner link members and outer link members, said links pivotally connected only at their ends by hollow pivot pins, the adjacent ends of adjacent inner link members being in overlapping relation, and springs having axially coiled portions positioned in said hollow pivot pins, respectively, each of said springs having a pair of arms extending from the opposite ends, respectively, of the coiled portion and engaging the outer and inner link members, respectively of adjacent links, for resiliently opposing pivotal movement of said links in band-expanding relation; and means including parts of said springs arranged to press on certain of said inner link members for opposing movement of the top links away from the bottom links in the direction of the thickness of the bracelet.

7. In an expansible band or bracelet comprising top and bottom links pivotally connected to each other only at their ends, the adjacent top and bottom links being in overlapping relation at their pivotally connected ends; spring means disposed within said links and resiliently pressing said top and bottom links toward each other in the direction of the thickness of the band.

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