Nov. 13, 1951 R. JACCARINO ET AL 2,574,567

EXPANDING CHAIN FOR WRIST BANDS

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Fig. 1.

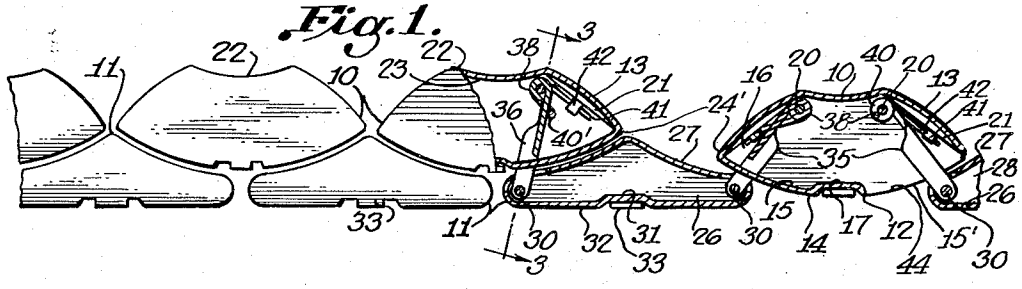


Fig. 2.

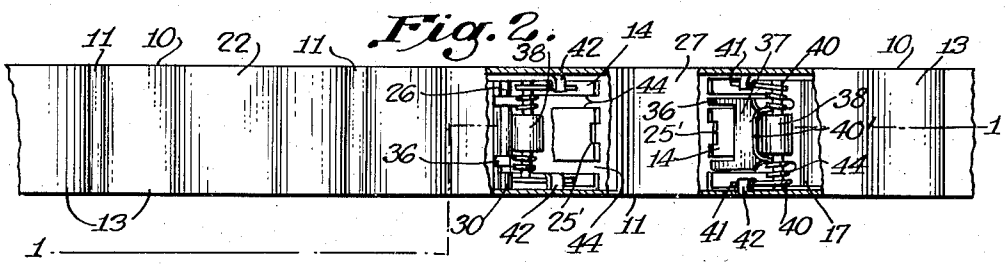


Fig. 4.

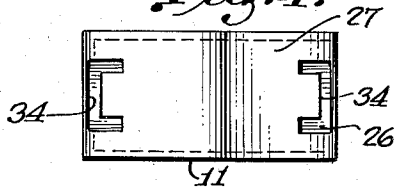


Fig. 3.

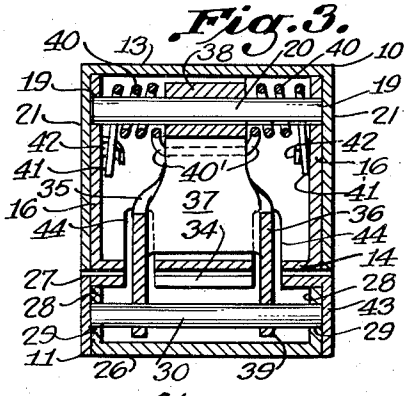


Fig. 6.

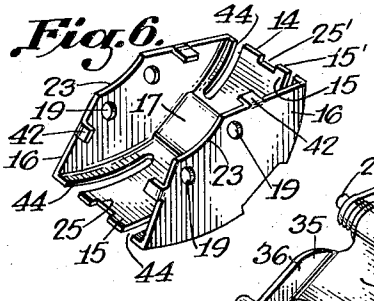


Fig. 5.

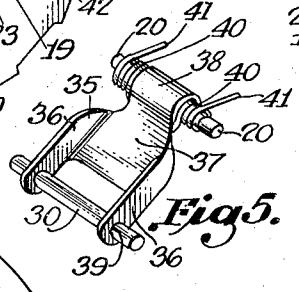


Fig. 7.

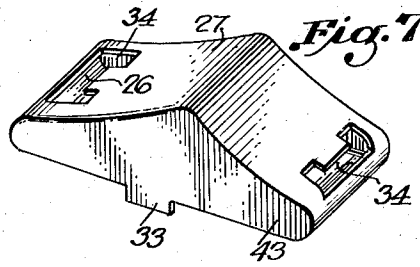
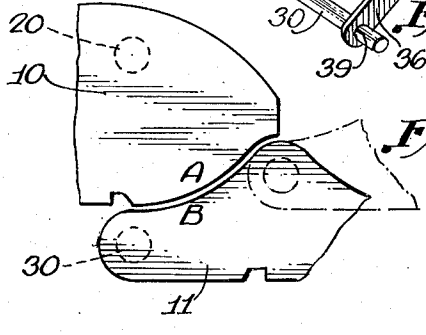


Fig. 8.



INVENTORS.
RICHARD JACCARINO.
ALFRED PINSON.
BY B. Joffe
ATTORNEY.

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EXPANDING CHAIN FOR WRISTBANDS

Richard Jaccarino and Alfred Pinson, Fairfield County, Conn., assignors to Apex Accessories, Co., Inc., Greenwich, Conn.

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Our invention relates to an expanding chain for wrist bands, and the object of the invention is to provide a chain having superimposed alining rows of blocks articulated by spring actuated toggles housed within the blocks so as to eliminate the elaborate coverage normally required for rows of alining blocks similarly connected but placed side by side.

Another object of the invention is to eliminate the use of pinned eyelets that normally house the helical springs that actuate the toggle joint links.

A further object of the invention is to provide a chain that can be pre-assembled in parts or totally without the need of pinning the pivots of the spring actuated toggles.

Most of the expanding chains for wrist bands utilize spring actuated links generally located at the bottom of the chain. When such a chain is expanded to fit over the hand on to the wrist, the chain appears with gaps between the blocks, and it is our object to provide a chain in which the gaps between blocks are barred by underlying blocks which give the chain, whether expanded or contracted, the appearance of a continuous ribbon of blocks.

In the appended drawing, forming part of this application,

Figure 1 is a part elevation and part section on line 1—1, of Figure 2, a fragment of a chain, in which figure a portion of the chain to the right is shown expanded;

Figure 2 is a top plan figure of the chain as shown in Figure 1 with certain parts broken out to illustrate better the construction;

Figure 3 is a vertical section on line 3—3, Figure 1;

Figure 4 is a top view of a bottom block;

Figure 5 is a perspective view of a spring actuated link forming part of a toggle;

Figure 6 is a perspective view of the bottom part of the upper block;

Figure 7 is a perspective view of the bottom block; and

Figure 8 is a diagrammatic view of a connection of a top and bottom block.

Referring to the drawings, 10 are blocks of the upper alined row, and 11 are blocks of the lower alined row. Each upper block 10 is formed of two sections, the lower one which will be referred to as the upper liner 12 and the upper part, which is the dome-shaped cover, as cover 13.

The liner 12 is U-shaped in cross-section, as will be best seen in Figure 6. The bottom 14 of the liner is arcuated to present an inner concave

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substantially cylindrical surface 15 and an outer convex substantially cylindrical surface 15', the elements of which curvatures run between the side walls 16 of the liner 12 and are substantially at right angles thereto. The median portion 17 of the bottom 14 between the side walls 16 is slightly raised within the liner 12, and it serves to reinforce the bottom of the liner and at the same time to provide at the side walls 16 the necessary depressions to accommodate the tongues 18, which lock the dome-shaped cover 13 to the liner when the block is assembled.

Each side wall 16 of the liner is provided with a pair of spaced openings 19 near the upper edge of the walls of the liner 12. The corresponding openings of the opposite walls are in alinement and form bearings for the ends of corresponding pivots 20, which do not extend beyond the outer surfaces of the side walls 16, as best shown in Figure 3.

The pivots 20, although not pinned to the walls 16, are prevented from moving axially in the openings 19 by the side walls 21 of the cover 13. The cover 13 has the top thereof curved cylindrically with an outer convex surface. A median portion 22 of the cover, running transversely thereof, is depressed inwardly to provide an inner convex cylindrical surface, which fits into a corresponding concave recess 23 in the top edge of the side walls 16. The transverse edges 24 of the top 22 are made to engage the transverse edges 25 of the bottom 14 of the top liner 12 by a tongue 24' engaging notches 25'. As will be seen from Figure 3, the dome-shaped cover 13 is also U-shaped in cross-section, and the edges of the side walls 21 of the dome-shaped cover 13 extend to be flush with the outer surface of the bottom 14 of the top liner 12.

The bottom block 11 is also formed of a bottom portion referred to as lower liner 26 and a top portion in the form of a dome-shaped cover 27. The lower liner 26 is a shallow channel-shaped trough in cross-section, as best seen in Figure 3. The sides 28 near each end are provided with alining openings 29 to serve as bearings for a pivot 30 at each end of the lower liner. The ends of the pivots 30 do not pass out beyond the outer surface of the side walls 28 of the lower liner 26; see Figures 2 and 3. In Figure 2 a portion of the upper liner 12 to the left is broken away to show the location of the pivot 30 in the lower liner. A median portion 31 of the flat bottom 32 of the lower liner 26 is raised transversely thereto to reinforce the bottom and provide near the edges

of the side walls means for housing the locking tongues 33 of the cover 27. The cover 27 near each end thereof is provided with U-shaped cut-outs 34, see Figures 4 and 7, to permit the passage therethrough of a link 35.

The link 35 is provided with flanged sides 36, forming an integral part of the flat portion 37 of the ilnk, the flat portion terminating with a sleeve 38, which is of a width narrower than the width of the link and is adapted to engage the pivot 20 housed in the upper line 12. The ends of the flanges projecting below the flat portion 37 have alining openings 39 to be engaged by a pivot 30 housed in the lower liner 26. The pivot 20 to each side of the sleeve 38 accommodates a helical spring 40, preferably each end 40' of each spring 40 engaging the body of the link 35 being made integral. In other words, the helical springs 40 are formed into a unit. The other ends of the helical springs 41 are made to engage abutments 42 provided in the upper edges of the upper liners 12.

The assembly of the chain is as follows:

A link 35 is placed through each U-shaped cut-out 34 in the cover 27 of each lower block 11 with the flat portion 37 of the link fitting the bottom of the U-channel of the cut-out 34 and the flanges 36 engaging the corresponding sides of the U-channel cut-out 34. The lower liner not connected as yet to the top 27 is then connected to the corresponding ends of the flanges 36 by passing a pivot 30 through an opening 29 in the side wall of the lower liner 26, then through the openings 39 in the ends of the flanges 36, then through another opening 29, alining with the first mentioned. The cover 27 can then be moved to the bottom liner with the sides 43 of the cover of the lower block engaging the upper faces of the side walls of the lower liner and thereby preventing the pivots 30 from moving axially in the lower liner. By turning up the tongues 33 into the median portion 31 of the lower liner, the lower block is completely assembled. The ends of the bottom 32 of the bottom of the lower liner 26 are curved up to meet the curved ends of the tops of the cover 27.

The assembled lower block 11 has at each end a link 35 projecting out through a U-shaped cut-out 34 thereat. The bottom of each upper liner 12 has two spaced longitudinal slots 44 open at the end of each edge of the bottom 14 and ending in proximity of the median portion 17 for admitting the flanged sides 36 of one link 35 of a proximate assembled bottom block 11, as best seen in Figures 1 and 2.

The sleeve at the upper end of a link 35, which engages the slots 44 of a bottom liner 12, is brought into alinement with the alining openings 19 nearest to the slot engaged. A pivot 20 is then first passed through an opening 19, then through a helical spring 40, then through the sleeve 38, then through another spring 40, and then into the opening 19 of the opposite wall of the liner. Each helical spring 40 is then properly tensioned, and the ends 41 of the spring 40 are made to engage corresponding abutments 42. The adjacent end of another proximate assembled lower block 11 has its link 35 at that end coupled to the same liner in a similar manner as described. The dome-shaped cover 13 of the upper block 10 can then be locked in place. Another upper liner is then connected in a manner described to proximate ends of two lower assembled blocks, either connected previously with one end or entirely disconnected. This arrangement,

as can be seen, permits preassembly of sections or a continuous assembly of the chain.

The tendency of the helical springs on the pivots 20 in the upper liner normally is to draw the proximate ends of the lower block towards each other, so that in an assembled chain as described, there are two superimposed rows of alining blocks interconnected by spring actuated toggles, the normal tendency of which is to draw the blocks together, the toggle being formed in each upper block by the two spring actuated links 35.

As shown in the diagram of Figure 8, the bottom curvature of the upper block 10 and the top curvature of the bottom block 11, which are proximate to each other, have a radius, the centre of which is in the axis of the pivot 20. In other words, the cylindrical surfaces A and B of the respective blocks 10 and 11 have their elements parallel to that of the axis of the pivots 20. This is an ideal arrangement, for the two proximate surfaces A and B may be said to rotate relatively on the axis of the pivot 20, the clearance between the proximate surfaces remaining in this case constant. But in view of the fact that such blocks in a chain are of a size considerably smaller than what is illustrated in the drawings, the curvature of the proximate surfaces A and B of the upper and lower blocks can be made of a greater radius, thus providing the proximate surfaces A and B with flatter curvatures, in which case the proximate surfaces of the adjacent blocks of the chain will not have a clearance uniform through the distance of their relative rotation, but they will have the same clearance at the normal position of the blocks of the chain and at the expanded position of the blocks as shown in Figure 1. This arrangement is satisfactory in view of the fact that the chain is fully expanded when a band is passed over the hand to engage the wrist and retracts to return substantially to its normal position.

It is evident that a band formed of a chain as described when fitted on to a wrist will have the bottom surfaces of the upper blocks forming a larger angle with the proximate surfaces of the lower blocks at wrist bend of higher curvatures such as on the side of the wrist. But in view of the size of the upper and lower blocks, it will not be noticeable because of the curvatures of the blocks and ribbon-like appearance when viewing the chain portion forming the band from the top.

It will be noted that in our arrangement when the chain is even fully expanded, although there is a gap between the tops of blocks of the upper and the lower rows, the gap between the blocks in either row is obstructed by the overlapping ends of the blocks when viewed from the top or bottom of the extended chain, thereby providing a ribbon of blocks without gaps or unobstructed openings.

In the described chain the spring actuated toggle is housed within the proximate blocks of the upper and lower rows, and its articulation is in the vertical plane of the chain. The pivots of the toggle joint being housed within the proximate and corresponding blocks of the upper and lower rows of the chain, and, as previously described, being neither pinned nor riveted, are nevertheless prevented from axial displacement and serve to reinforce the blocks of either row from the lateral deformation.

We claim:

1. An expanding chain for wrist bands compris-

ing a pair of superimposed rows of alining blocks, the blocks of one alining row being staggered with relation to the blocks of the other alining row, and a spring actuated toggle joint within each block of the upper row coupled to the proximate ends of the blocks in the lower row to draw the blocks together, the proximate superimposed surfaces of the blocks of the upper and lower rows having co-axial curves, one convex and one concave respectively, with the elements of curvatures of the two curved surfaces running transversely of the blocks said blocks at the superimposed surfaces having slots for said toggle joints arranged to permit an extension of the chain without visible gaps between adjacent blocks when viewed from the upper surface of the extended chain.

2. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of one alining row being staggered with relation to the blocks of the other alining row, and a spring actuated toggle joint pivoted within each block of the upper row and within the proximate ends of the blocks in the lower row to draw the blocks together, the proximate superimposed surfaces of the blocks of the upper and lower rows having curved surfaces, one convex and the other concave respectively, the elements of curvatures of said convex and concave surfaces having a common axis lying substantially parallel to the pivotal axis of their toggle joints said blocks at the superimposed surfaces having slots for said toggle joints arranged to permit an extension of the chain elements without exposing any part of the toggle joints from the upper face of the extended chain.

3. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of the alining rows being staggered with relation to one another, each block of either row comprising a liner and a dome-shaped cover enclosing its liner, a spring actuated toggle joint pivoted in the liner of the upper block and having its links extending out of the bottom of the upper liner into the proximate end of the lower block through the cover thereof, and a pivot connecting the entering link with the liner of the lower block, the liner of the upper block and the cover of each proximate lower block having means for permitting the movement of the links on the pivots within the respective blocks when moving the blocks of the chain to expand it without exposing the toggle joint parts.

4. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of the alining rows being staggered with relation to one another, each block of either row comprising a liner having rising walls and a dome-shaped cover enclosing the walls of its liner, a spring actuated toggle joint pivoted in the sides of the liner of the upper block transversely of its longitudinal axis, and having its links extending out of the bottom of the upper liner into the proximate end of the lower block through the cover thereof, and a pivot connecting the entering link within the liner of the lower proximate block so that the links are unexposed when the chain is extended, the liner of the upper block and the cover of each proximate lower block having slots for the links of the toggle, and the proximate superimposed surfaces thereof having co-axial curves, convex and concave respectively, to permit a relative movement of the blocks by the toggle joint.

5. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of the alining rows being staggered with relation to one another, each block of either row comprising a liner with side walls and a dome-shaped cover enclosing the sides of its liner, a spring actuated toggle joint pivoted in the sides of the liner of the upper block transversely of its longitudinal axis, and having its links extending out of the bottom of the upper liner into the proximate end of the lower block through the cover thereof so as to be invisible from the upper face of the chain when the same is extended, and a pivot connecting the entering link within the liner of the lower block disposed transversely of the longitudinal axis of said block, the dome-shaped covers of the blocks of the upper and lower rows forming abutments for the toggle joint pivots in the corresponding blocks to prevent an axial movement of said pivots within their liners.

6. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of the alining rows being staggered in relation to one another, each block of either row comprising a liner having rising side walls and a dome-shaped cover with said walls engaging the side walls of the liner when enclosing its liner, the liner of the upper block being U-shaped in cross-section with a longitudinally curved bottom substantially cylindrical with the outer curved surface convex and a transverse median portion of the bottom rising within between the side walls, said side walls each having a recessed edge in the median part thereof and sloping from said median part to the bottom of the liner, said dome-shaped cover for said upper liner having a longitudinally curved cylindrically shaped top with a concave inner surface and a median portion thereof depressed inwardly to engage the depression formed in the walls of the liner, said upper cover sides extending along the corresponding sides of the upper liner and having the edges of the sides thereof flush with the bottom of said liner, a spring actuated toggle joint pivotally mounted in the sides of the upper liner in proximity of the depression of the edges in the sides thereof, said bottom of the upper liner having longitudinal slots through which the links of the toggle pass and which slots permit the articulation of the toggle links within the upper block, said projecting ends of the toggle links from the upper liner through the slots thereof entering through the proximate end of the lower blocks so that no part of said links is visible from the upper surface of the chain when the chain is extended, said lower cover having cut-outs in the top thereof for said links near the ends thereof to bring the ends of said links into the lower liner, channel-shaped in cross-section, and a pivot connecting each entering link of the toggle to the side walls of the channel near the ends thereof, said lower cover having sides for engaging the sides of the channel, whereby the pivots in the channel are prevented from axial displacement, the proximate surfaces of the bottom of the upper liner and that of the adjacent top of the lower cover having spaced cylindrical curvatures, the common axis of which being substantially parallel to the pivotal axis of the toggle joint.

7. An expanding chain for wrist bands comprising a pair of superimposed rows of alining blocks, the blocks of the alining rows being staggered with relation to one another, each block of either row comprising a liner having rising side walls, a dome-shaped cover with side walls

enclosing its liner with the sides of the cover engaging the side walls of the liner, a spring actuated toggle joint pivoted in the side walls of the liner of the upper block and having its links extending out of the bottom of the upper liner into the proximate end of the lower block through the cover thereof, said upper liner having abutments in the side walls thereof whereby the spring of the toggle may be properly tensioned, and a pivot connecting the entering link with the liner of the lower block, the liner of the upper block and the cover of each proximate lower block having means for permitting the movement of the links on the pivots within the respective blocks without exposing any part of the

toggle joins when moving the blocks to expand the chain.

RICHARD JACCARINO.
ALFRED PINSON.

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