May 4, 1954 A. PINSON 2,677,230

EXPANDING CHAIN

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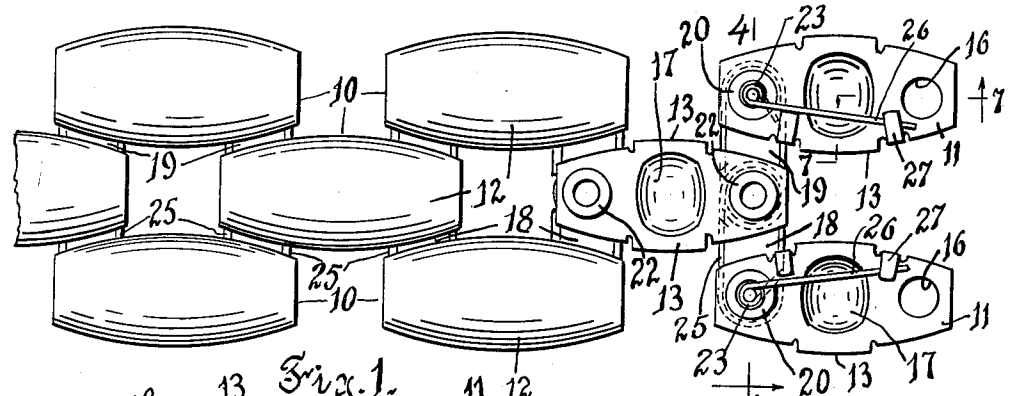


Fig. 1.

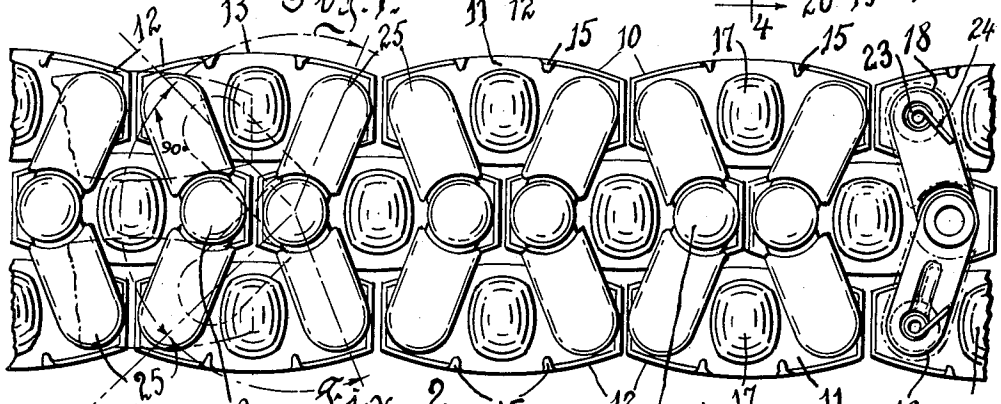


Fig. 2.

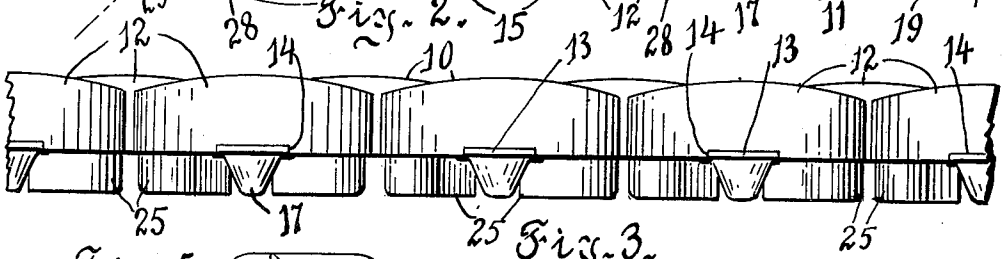


Fig. 3.

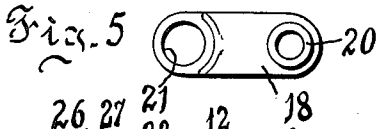


Fig. 5

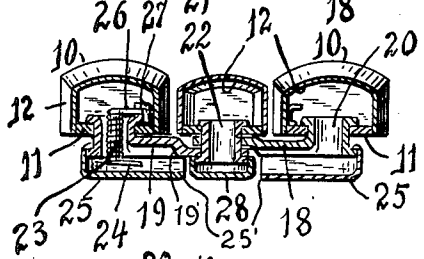


Fig. 4.

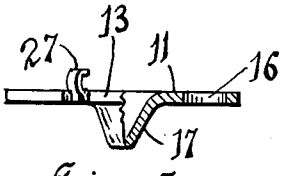


Fig. 7.

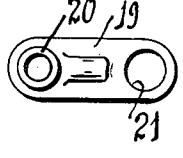


Fig. 6

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EXPANDING CHAIN

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4 Claims. (Cl. 59—79)

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My invention relates to expanding chains suitable for wrist bands and the like and the object is to provide a chain the expansion of which is limited without undue strain on the chain's retracting means.

Another object of the invention is to provide a chain formed of an odd number of rows of blocks of the same size in all rows.

A further object of the invention is to provide a chain formed of rows of blocks in which the ends of the blocks of the middle or even numbered row are yieldingly coupled to the adjacent ends of the blocks of the outer or odd numbered rows by spring actuated toggle joints.

A further object of the invention is to permit assembly of the toggle joints of the chain without the ornamental tops or covers of the blocks.

In the appended drawing forming part of this application:

Figure 1 is an enlarged plan view of a length of my chain partially extended and with block tops removed from some of the block units to illustrate the structure;

Figure 2 is a bottom-up view of a similar length in retracted or normal condition with caps removed from one of the toggle joints;

Figure 3 is a side elevation of a length of the chain in retracted or normal condition;

Figure 4 is a section on line 4—4, Figure 1, in which one of the coil springs is removed.

Figures 5 and 6 are plan views from the eyelet side of the links forming the toggle joint; and

Figure 7 is a side elevation of a base of an outer block partially in section as indicated at 7—7, Figure 1.

Referring to the drawing:

The chain is formed of three rows of alining blocks 10, each block being formed by a base 11 and a dome-shaped top 12. To aline properly the top with the base 11, the base has lateral projections 13, preferably located on the transverse axis of the base, for which the cover 12 has edge notches 14 at the bottom edges.

In addition, the top 12 engages the edges of the base when it is tied thereto by means of prongs 15 at its bottom opening. The tops as shown are preferably of greater length than width and have convex outer lateral surfaces for closer grouping of the rows while permitting extension and retraction of the blocks by the toggle joints without interference. The taper of the sides of the covers from the middle toward the end permits a closer grouping of the blocks of the adjacent rows while the chain expands or contracts.

The peripheral surface of the tops is generally ornamented, but is not so shown in the drawing.

Each base 11 has an opening 16 near each end and on the longitudinal axis of the base. Between the openings the base has an outward protuberance 17 to add rigidity to the base and to

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fill the space between links 18 and 19 of the toggle joints. The said links connect the ends of the outer rows of the blocks with the proximate ends of the inner row of blocks. Thus, the outer rows are staggered with respect to the inner row.

Each of the links 18 and 19 has an eyelet 20 rising from one face thereof near one end of the link and an aperture 21 near the other end of the link. The links 18 and 19 at the aperture 21 are arranged to overlap with the link 19 being offset at 19' leaving the major part of the link 19 extending from the overlap substantially coplanar with the link 18, as best shown in Figures 2, 4, 5, and 6. The overlapping links 18 and 19 when registered with an opening 16 of a base 11 of a block of the middle row are coupled thereto pivotally by means of an eyelet 22. In consequence the angular movement between the links 18 and 19 on their common pivot is limited by the abutment of the offset 19' with the proximate edge of link 18 at an angle of about 90° when the chain is extended. The eyelets 20 of the links 18 and 19 are then engaged respectively in the openings 16 of the adjacent bases 11 of the outer rows and are connected thereto by rolling over the respective eyelets of the links, as best shown in Figures 1 and 4. In consequence, each end of an outer base is coupled by a three-pivot toggle joint to the adjacent end of an inner base.

To render each toggle joint self-restoring, a coil spring 23 is housed in each of the eyelets 20. The shorter end 24 of the coil spring is housed within a cap 25, there is a cap for each link 18 and 19. See Figures 2 and 4. In Figure 2 the caps 25 are removed on the right-hand side of the figure to illustrate the engagement of the shorter ends of the spring with the side of the cap. A cap 26 is also provided for the outer head of the eyelets 22. The longer end 26 of the spring 23 extends longitudinally of the base 11 in which the spring is housed to engage a hook-shaped abutment 27, best shown in Figures 1 and 4. As there is a spring for each link, each outer base carries two hooked abutments, as best illustrated in Figure 1. The spring is set in each eyelet to proper tension and then the extremity of the longer end 26 is made to engage the corresponding abutment 27. Thus, the chain is assembled without the tops 12, which tops can then be mounted on the corresponding bases and alined therewith through the registration of the notches 14 with the lateral projections 13 and clamped to the bases by the prongs 15 as previously mentioned.

As shown in Figure 4 the cap end 25' on link 19 extends beyond the offset 19' thereof, in consequence the proximate ends of caps 25 on the coplanar parts of links 18 and 19 of the same toggle joint will engage before the offset 19' contacts the proximate edge of link 18 when the two links are moved angularly from the retracted to the extended position of the chain; that is from

an angular position of the toggle links which is in excess of 180° (see Figure 2) to the angular position of same links of about 90°. The contact of the proximate end of the caps takes place when the links 18 and 19 form an angle of about 90°. Slippage between the proximate end edges of the caps 25 is arrested by the immediate engagement of the offset 19' with the proximate edge of the link 18 the same toggle joint.

From the description, it will be seen that each outside block end of an outer or odd numbered row is connected to the adjacent end of the block of an inner or even numbered row by spring actuated toggle joints, each joint being formed by the two links 18 and 19 having a common pivot in the end of a block of the middle or even numbered row, and each other end of the link having a pivotal connection with a corresponding adjacent end of a block of an outer or odd numbered row.

It will be noted that the coil springs 23 are housed in the links 18 and 19 respectively and that the longer ends 26 of each spring are anchored in the bases 11 of the outer or odd numbered rows within the dome-shaped top thereof of outer rows of blocks 10 only. Therefore, the bases 11 of the inner blocks do not need the abutments shown in the bases of the outer blocks. The shorter end of each spring 23 is anchored within the cap 25 provided for each link.

These three pivot toggle joints have their common pivots 22 in the longitudinal axis of the blocks of the even numbered row, therefore in the longitudinal axis of the band, with the links 18 and 19 of the toggle joint disposed on opposite sides of the said longitudinal axis of the band and in symmetry therewith, and along which axis the action takes place when the toggle joints are tensioned by pulling the band longitudinally to extend the band. The recoil of the toggle joints restores the blocks of each row to their normal position.

The extension of the chain may be limited by either the engagement of the proximate edges of the caps 25 fitted on the links 18 and 19 of the same toggle joint near the overlapping of said links or by the engagement of the offset 19' of link 19 with the proximate edge of the link 18. In the said position of the caps 25 of the toggle joint or the links of said toggle joint an angle of about 90° is formed.

From the description it will be seen that the structure permits the assembling of a chain length without the dome-shaped tops; the dome-shaped tops being of elongated shape and provided with a convex outer surface permits a closer assembling of the rows of blocks, as it permits expansion and retraction of the chain blocks without interference because of the convexity of the outer surface.

I claim:

1. An expanding chain comprising three rows of aligning blocks, the middle row of blocks being staggered with respect to the outer row of blocks, a link extending from each end of a block of the outer row to the adjacent end of a block of the inner row, each pair of links converging to the same end of the block of the inner row and overlapping thereat, said links beyond the overlapping parts lying in a substantially common plane, a pivot connecting the overlapping ends of the links to the corresponding end of the block of the inner row, a pivot connecting the other end of each link to an adjacent end of a block of the outer row, and coil springs to actuate the links, each of said pair of links at the overlapping thereof forming thereat a toggle joint, the links of which normally forming an obtuse angle of more than 180° under the action of said springs, said links having abutting portions on the coplanar parts thereof adapted to interengage and arrest the further angular movement of the links when said angle between the toggle links is substantially reduced to 90° in extending the chain against the resistance of the springs.

2. An expansible band comprising an intermediate series of elongate bases and a series of side bases normally arranged at each side of the middle bases and in longitudinally staggered relation thereto, a single pivot at each end of each middle base, a pair of outwardly extending links concentrically pivoted at their inner ends upon each of said single pivots and pivoted at their outer ends to opposite ends of adjacent side bases, springs biasing the links toward positions transverse with respect to the longitudinal axis of the middle bases while permitting them to be yieldingly separated to a limited extent, said links carrying caps that contact and restrict divergence of the links to approximately 90°, and separate circular caps covering each of the said single pivots upon which the links are concentrically pivoted.

3. An expansible band comprising an intermediate row of middle bases and marginal rows of side bases disposed in longitudinally staggered relation with respect to the middle bases, all of said bases having covering tops, a pair of links concentrically pivoted upon each middle base adjacent to each end thereof and being separately connected at their outer ends at separate points to the adjacent ends of different side bases, springs carried by the side bases and tending at all times to swing said links in directions to hold all of the bases in end-to-end contact, and caps secured to said links that contact and limit the divergence of the links to approximately 90° and thereby restrict the separation of the bases of the band.

4. An expanding chain comprising three rows of aligning bases, the middle row of bases being staggered with respect to the bases of the outer rows, a pivoted link extending from each end of a base of the outer rows to the adjacent end of a base of the middle row, each pair of links converging to the same end of a base of the middle row overlapping thereat, a common pivot for the overlapping ends of the links in the ends of the base of the middle row, and springs for the links to normally draw the bases together, one of the links of the pair having an offset, at the overlapping of the links, to bring major portions of said pair of links, extending toward the proximate end of the outer base, into a substantially common plane, and a cap for each link of the pair on the coplanar portion thereof, said caps adapted to engage when the links are moved to an angle of about 90°.

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