

[54] **LINK CHAIN**

[75] Inventor: **Louis Pompeo**, Bloomfield, N.J.
 [73] Assignee: **Duchess Mfg. Corp.**, Hoboken, N.J.
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[52] U.S. Cl. **59/85**
 [51] Int. Cl. **F16g 15/04**
 [58] Field of Search.....59/80, 82, 78, 85,
 59/84, 90; 63/4; 224/4 B, 4 D, 4 H

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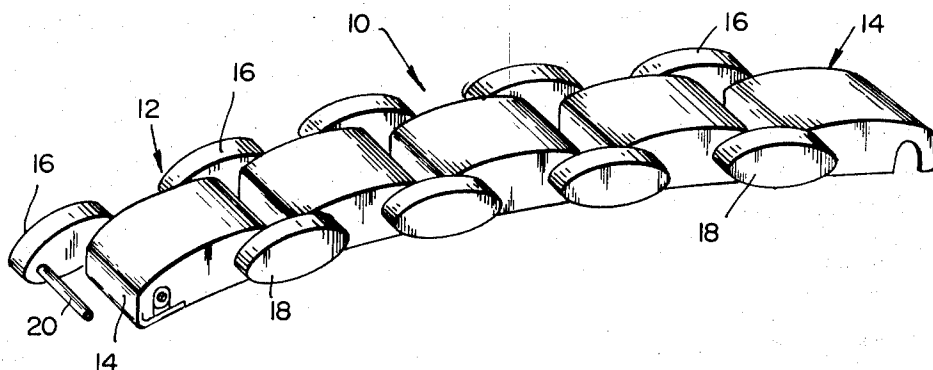
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Primary Examiner—Charles W. Lanham
Assistant Examiner—Gene P. Crosby
Attorney—Kirschstein, Kirschstein, Ottinger & Frank

[57] **ABSTRACT**

A link chain utilized for wrist watch bands, bracelets, necklaces, and other items of jewelry. The link chain includes a series of readily detachable and removable end links so that the length of the chain can readily be adjusted. Each link of the series has a twin rod link-half and a central link-half. The twin rod link-half has a pair of spaced rods positioned between and permanently fixed in a pair of end lugs. The central link-half of each link of the series joins the rod link-halves of adjacent links and fits between the end lugs of the twin rod link-halves. The central link-half is essentially a hollow box which forms one closed bearing and one selectively closable bearing. The selectively closable bearing of the central link-half is closed or latched to captively engage one of the twin rods of a twin rod link-half of the adjacent link by means of a sliding panel or door. When an end link is to be removed, the panel of the second from the end central link-half is shifted to its open or disconnect position to remove or disconnect the rod of the twin rod link-half of the adjacent end link from this central link-half.

10 Claims, 15 Drawing Figures



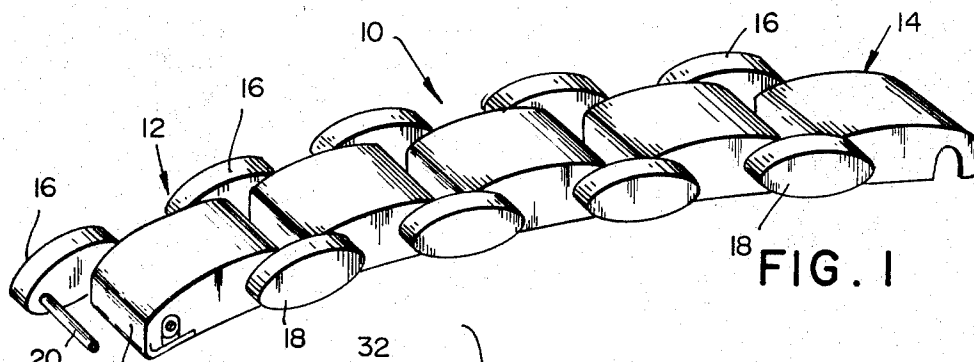


FIG. 1

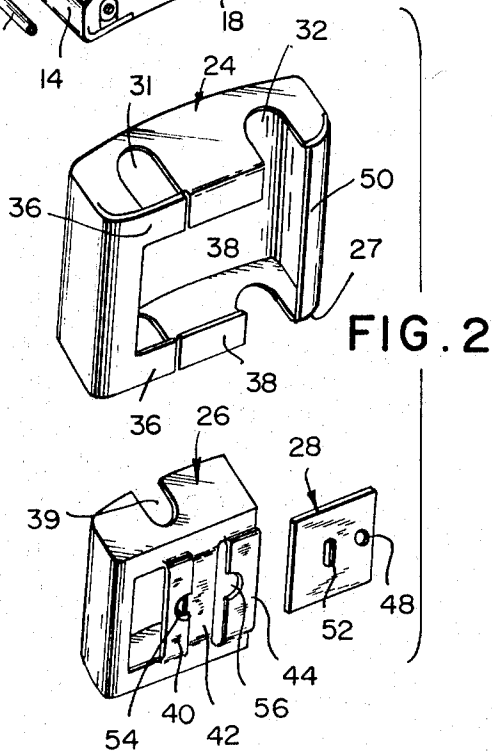


FIG. 2

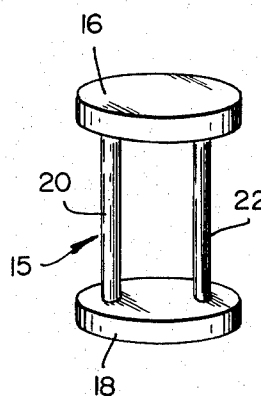


FIG. 3

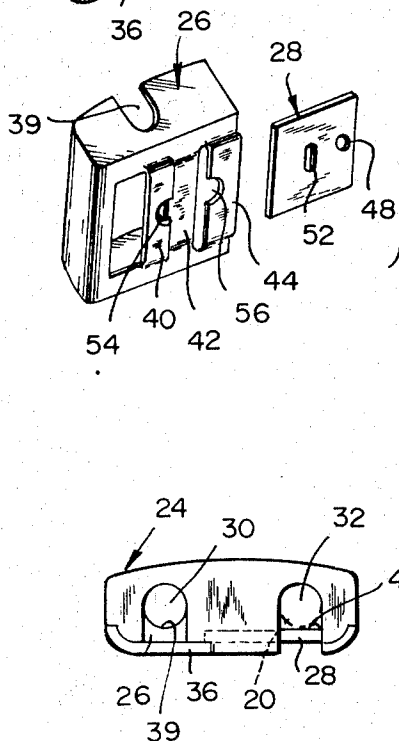


FIG. 4

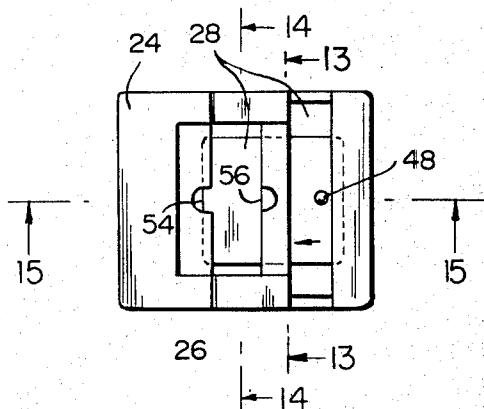


FIG. 5

INVENTOR.

LOUIS POMPEO

BY

Amber, Kunkin, Off + Frank

ATTORNEYS

FIG. 6

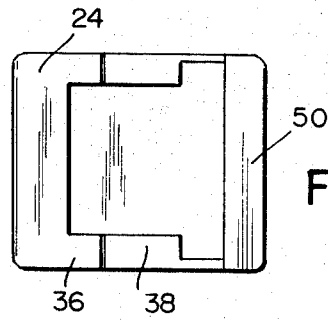
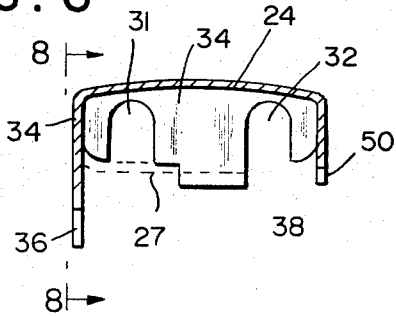


FIG. 7

FIG. 8

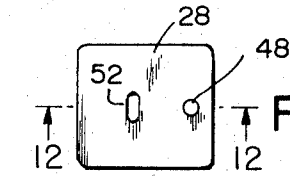
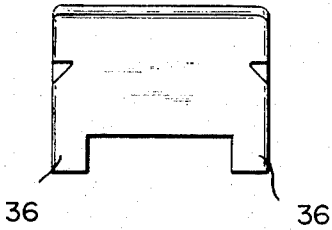


FIG. 11

FIG. 9

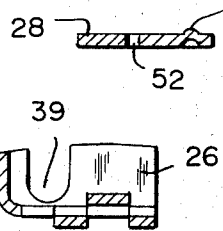
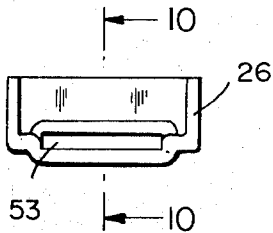


FIG. 12

FIG. 10

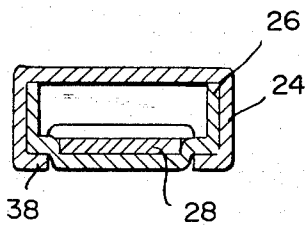


FIG. 13

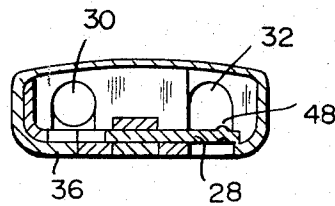


FIG. 15

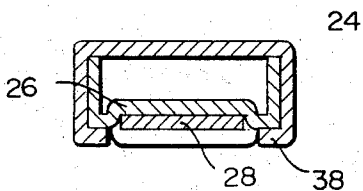


FIG. 14

INVENTOR.

LOUIS POMPEO

BY

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ATTORNEYS

LINK CHAIN

BACKGROUND OF THE INVENTION

1. Field of the Invention

Flexible link chains for watches and other jewelry having readily removable end links so as to facilitate lengthening or shortening of the chains.

2. Description of the Prior Art

Conventional link chains for wrist watches are composed of two types of link-halves which are hingedly connected. One link-half includes two rods or posts which are parallel and joined at their ends by end lugs. The adjacent rods of two of the twin rod link-halves are joined by a center or central link-half which forms parallel spaced bearings for receiving the rods. In conventional chains most of the link-halves are permanently and hingedly connected to one another and cannot be disconnected. In order to provide some means for shortening or lengthening the chain, some of the end links have been of somewhat different construction so as to be detachable. Heretofore, detachable end links have been provided in which some of the fixed rods are replaced by spring rods or pintles. The spring rod or pintle is fitted in a through-bore through the end lugs of the detachable link and can be removed utilizing a jeweler's pick. The provision of a through-bore is undesirable in that a long hole of small diameter is required through tough metal which may be, for example, stainless steel or inconel. Drilling these holes is time consuming and increases correspondingly the cost of fabricating such detachable end links. Moreover, the spring pintles are long and thin and accordingly inherently weak and tend to break and open the chain link. The through-bores which are visible on the sides of the end links appear as small black dots which are aesthetically undesirable. The present invention overcomes these difficulties by providing a chain link including a series of detachable and rugged end links which are aesthetically attractive, yet easily manipulatable.

SUMMARY OF THE INVENTION

1. Purposes of the Invention

It is an object of the invention to provide an adjustable link chain in which any one of the end links can readily be removed.

It is another object of this invention to provide an aesthetic and detachable end link which avoids the need for removable spring rods or pintles.

It is a further object of this invention to provide a chain link in which any end link can readily be removed by manipulating the link without removing any part therefrom.

It is another object of this invention to provide a link chain which is rugged and reliable and does not require excessive service to maintain it in satisfactory condition.

It is another object of this invention to provide a link chain which does not require through-bores or the removal of any component to open the chain or remove any end link.

It is still another object of this invention to provide a bracelet or link chain which enables the end links of the chain to be detachably hinged together in a simple and inexpensive manner permitting flexing of the chain and ensures that these links are normally positively

retained, interconnected, and held against separation but can be readily detached from one another.

Further objects and features of this invention will become apparent to those skilled in the art upon consideration of the following description of a preferred embodiment of the invention when read in conjunction with the drawings.

2. Brief Description of the Invention

The present invention relates to a link chain for use with wrist watches, necklaces and the like. The link chain includes interconnected replaceable chain end links. Each such link includes a central or box link-half which has one permanently closed bearing and one bearing which can be laterally opened. The open bearing forms a cradle which can be closed by a slidable plate or door. Each such link further includes a second link-half which is a twin rod link-half that comprises two spaced end lugs connected by parallel rods that are permanently affixed to the end lugs. The central link-half is composed of three pieces, two of which are solidly joined together to form a hollow box with one permanently closed bearing enclosing one rod of the rod link-half of the same link and one selectively closable bearing. The third piece of the center link-half is a slidable panel which slides in a passageway formed by one of the other two pieces of the central link-half. The panel can be reciprocated between a position in which it leaves the closable bearing or cradle open for receiving a rod from the next link, and a position in which the closable cradle is closed to captively engage a rod received therein. The center link-half includes means for maintaining the slideable panel in either of its two positions.

To remove a link at the end of the chain, one central link-half is opened. The removal of an end link is accordingly achieved in a simple manner utilizing rugged, positively latching links providing a flexible chain.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the link chain of this invention;

FIG. 2 is an exploded perspective view of a center link-half utilized in the link chain;

FIG. 3 is a perspective view of the twin rod link-half utilized in the link chain;

FIG. 4 is an end view of the center link-half of the link chain;

FIG. 5 is a bottom view of the center link-half of the link chain;

FIG. 6 is a sectional view of the top shell of the center link-half before assembly;

FIG. 7 is a bottom view of the top shell of the center link-half after bending such as it is subjected to for assembly;

FIG. 8 is an end view of the top shell of the center link-half taken substantially along the line 8—8 of FIG. 6;

FIG. 9 is a side view of the bridge of the center link-half of this invention;

FIG. 10 is a sectional view of the bridge of the center link-half taken substantially along the line 10—10 of FIG. 9;

FIG. 11 is a top view of the sliding panel of the center link-half;

FIG. 12 is a sectional view of the sliding panel of the center link-half taken substantially along the line 12—12 of FIG. 11;

FIG. 13 is a sectional view of the center link-half taken substantially along the line 13—13 of FIG. 5;

FIG. 14 is a sectional view of the center link-half taken substantially along the line 14—14 of FIG. 5; and

FIG. 15 is a sectional view of the center link-half taken substantially along the line 15—15 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, a link chain 10 is made which includes a series of connected end links 12 that are readily detachable or disconnectable from each other. Each such link 12 includes a central link-half 14 and a twin rod link-half 15 which are hingedly connected to each other. As shown particularly in FIG. 3, the twin rod link-half 15 has two end lugs 16 and 18 which are connected to each other by means of parallel rods 20 and 22. The rods 20 and 22 are force-fitted into and permanently engage the end lugs 16 and 18. The diameter of the rods 20 and 22 may illustratively be 0.062 inches. The central link-half 14 includes a top shell 24 which partially encloses a bridge 26 and supports a slidable panel 28. The top shell 24 and the bridge 26 fit together to form functionally a box having a closed bearing 30, shown in FIG. 4, and a selectively closable bearing or cradle 32. Illustratively, the overall dimensions of the center link-half 14 may be 0.35 inches long by 0.30 inches wide. The thickness of the center link-half 14 may be 0.14 inches.

The top shell 24, as shown in FIG. 2 and also in FIGS. 6, 7, and 8, is made in the form of a shallow tray having its bottom 27 open. The side walls 34 of the shell 24 extend downwardly as shaped tabs 36 and 38 which, when folded into position as depicted in FIG. 2, hold the bridge 26 in place partially enclosed thereby. FIG. 6 depicts the top shell 24 before the bridge 26 is positioned therein and before the tabs 36 and 38 are bent over the bridge 26 locking it in place against the top shell 24.

As shown in FIG. 2, the bridge 26 has a slotted opening 39 which is aligned with the opening 31 in the top shell 24 to together form the closed bearing 30. As shown particularly in FIG. 4, when the bridge 26 is in position engaged by the tabs 36 and 39, its slotted opening 39 is aligned with the bearing 31 of the top shell 24 to provide for a circular-shaped cradle 30. The upper portion of the bearing cradle 30 is formed by the top shell 24 and the bottom portion is formed by the bridge 26. The bridge 26 does not close off or complete the cradle 32 of the top shell 24.

The bridge 26 has three tabs 40, 42, and 44 which conjointly define a passageway 53, shown in FIG. 9, that extends transverse to the longitudinal axis of the openable cradle or bearing 32. The straps 40 and 44 are raised and the strap 42 is depressed to form the passageway 53 which is utilized for the sliding panel 28. The panel 28 can be reciprocated between a position in which it leaves the openable cradle 32 uncovered to receive one of the rods 20 or 22 of a twin rod link-half 16, and a position in which it closes the cradle 32 and thereby holds any rod 20 or 22 received therein captive.

The panel 28 has an abutment or a tit 48 which extends inwardly and is adapted to cross over the center of a rod 20 of the rod link-half so that the abutment 48 holds the panel 28 in its cradle closing position. The panel 28 can be pulled back or withdrawn sufficiently into the passageway 53 to fully expose, i.e., open, the cradle 32 so as to permit the rod 20 previously held captive therein to be readily removed. FIG. 4 shows the rod 20 by a dash-line circle to illustrate its cooperative relationship with the abutment 48 in captive position. The panel 28 has a slot 52 adapted to be engaged by a jeweler's pick, not shown, when the panel 28 is to be shifted in either direction. The tabs 40 and 44 are notched in opposition at 54 and 56 respectively to provide for the exposure of the slot 52 in both open and closed positions of the sliding panel 28.

When a link 12 is to be removed, the sliding panel 28 of the center link-half 14 of such link is moved to open the cradle 32 so that the rod 20 of the associated twin rod link-half 15 supported therein can be lifted out. This action disconnects two adjacent links 12. In order to remove an end link 12, the next adjacent inner center link-half 14 is opened. To shorten a chain link 10 utilized with a wrist watch (not shown), one or more of the end links 12 is removed with the remaining end link 12 then engaging the wrist watch.

When the chain link 10 is first assembled, the tabs 36 and 38 and the tab 50 of the shell 24 are not yet inturned, such position being shown in solid lines in FIG. 6. One rod 20 or 22 of a twin rod link-half 15 is fitted into the half-bearing defined by the slot 31. The bridge 26 with the sliding panel in position in the passageway 53 formed by the straps or panels 40, 42, and 44 is then fitted into the shell 24. The slot 39 of the bridge mates with the slot 31 of the shell to form the permanently closed bearing 30 around the rod in the slot 31. The bridge now is ready for engagement by the tabs 36 and 38. The tabs 36 and 38 are bent into position (inturned) around the bridge 26 as depicted particularly in FIGS. 4 and 5 and in dotted lines in FIG. 6.

With the panel 28 in position and the bridge engaged by the tabs 36 and 38, the tab 50 is moved from its position indicated in FIG. 6 to the position indicated in FIGS. 2, 4, 5, and 7. The tab 50 limits the closing movement of the panel 28, holding it captive in the passageway 53 formed by the straps 40, 42, and 44. Accordingly, the panel 28 cannot be removed. As indicated above, the panel 28 may be reciprocated between a release, i.e., open, position and a closed, i.e., latching, position. In order to latch or lock the panel 28, it is necessary for the bearing 32 to seat a rod 20 or 22 of the twin rod link-half 15 shown in FIG. 3. The reason for this is that the abutment 48 rides over the center of the rod 20 and then snaps back as it reaches the closed position shown in FIG. 4. The panel 28, when moved to the open position freeing the bearing 32, does not lock into place.

In this manner, a link chain 10 is provided which is flexible, with links 12 being hingedly pivoted to each other, and with end links 12 being readily detachable. Aesthetically, the chain 10 is attractive because there are no screws or side indentations, and the top view of the chain is smooth. When used as a band for wrist watches, only the upper and sides of the links 12 are visible. The bottom of each link 12 including the bridge

26 and the panel 28 are hidden because they face the wrist of the user. The top of the center link-halves 14 may be smooth as shown or may have suitable decorative designs thereon.

It thus will be seen that there is provided a link chain which achieves the various objects of the invention and which is well adapted to meet the conditions of practical use.

As various other possible embodiments may be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described the invention there is claimed as new and desired to be secured by Letters Patent:

1. A link chain including a plurality of connected links, at least an endmost one of said links having a center link-half and a twin rod link-half pivotally connected to said center link-half, said center link-half having a permanently closed bearing and an openable rod-receiving bearing, said twin rod link-half having a pair of parallel spaced rods with one of said rods being enclosed in said permanently closed bearing.

2. A link chain in accordance with claim 1 wherein said center link-half includes a sliding panel having a first position in which said openable bearing is closed, and a second position in which said openable bearing is open.

3. A link chain in accordance with claim 2 wherein said center link-half defines a passageway for said sliding panel.

4. A link chain in accordance with claim 1 wherein said center link-half consists of three components, the first one of said components constituting a hollow shell and defining said openable bearing, the second one of said components being partially enclosed by said first component and forming in cooperation with said first component said permanently closed bearing, the third one of said components being arranged to selectively close said openable bearing.

5. A link chain in accordance with claim 4 wherein said second component defines a passageway in which said third component is slidable.

6. A link chain in accordance with claim 5 wherein said third component of said center link-half has a first position for closing said openable bearing and a second position for opening said openable bearing, said chain further including means for maintaining said third component in said first position.

7. A flexible articulated linkage comprising a plurality of discrete links pivotally connected in a chain, at least an endmost one of said links having means for releasing the next adjacent one of said links in the chain of said plurality of discrete links, said releasing means including a closable bearing for pivotally engaging said next adjacent one of said links in the chain of said plurality of discrete links, the releasable means further including a sliding panel having a first position for closing said closable bearing to engage said adjacent one of said links, and a second position for releasing said adjacent one of said links for detachment from said plurality of links.

8. A flexible articulated linkage comprising a plurality of discrete links pivotally connected in a chain, each of said links including a twin rod link-half having two rods and a link-half having bearings at the opposite ends thereof, one of said bearings on at least one link-half with bearings being a closed bearing pivotally receiving one of said rods of the twin rod link-half next adjacent said closed bearing and the other of said bearings on said at least one link-half with bearings being a closable bearing for pivotally releasably receiving a rod of a twin rod link-half of the link next adjacent said releasably closable bearing.

9. A flexible articulated linkage in accordance with claim 7 wherein each of said links has a rod link-half including a rod pivotally engaging said closable bearing of an adjacent one of said plurality of links, said sliding panel having a latch operative when said panel is in said first position for engaging said rod of said rod link-half to maintain said panel in said first position whereby said rod is captured in said closable bearing.

10. A flexible articulated linkage in accordance with claim 7 wherein each of said links includes means for limiting the movement of said panel in both directions whereby said panel is movably captured as part of said link by said limiting means.

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