

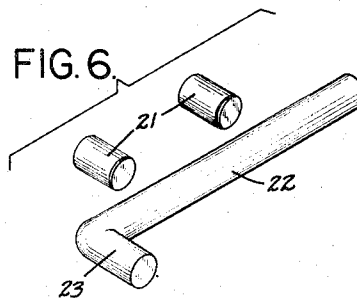
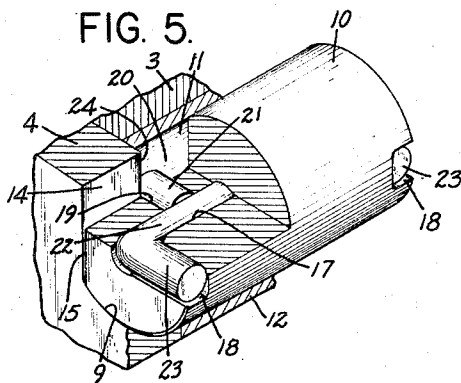
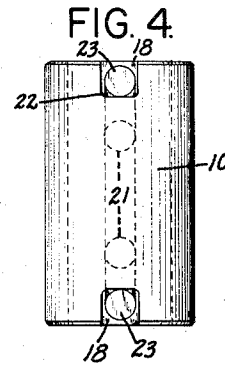
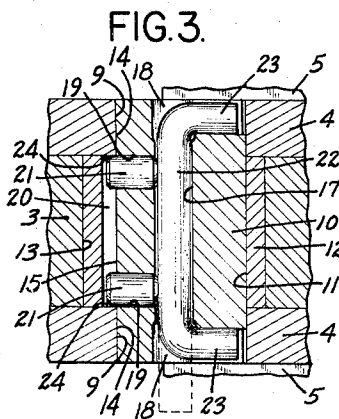
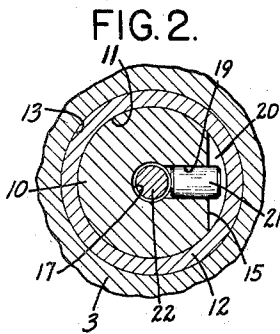
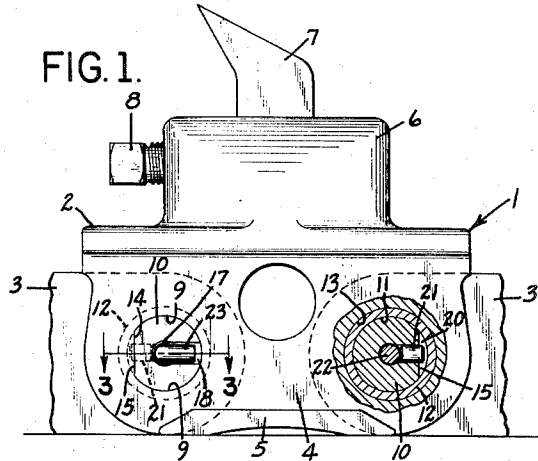
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HINGE PIN LOCK

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2,802,368

HINGE PIN LOCK

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This invention relates to pivoted link chains and more particularly to locking means for the hinge pins of such chains for locking the pins against axial displacement.

In pivoted link chains, the chain links are usually pivotally connected together by hinge pins and, particularly in mining machine cutter chains, the hinge pins are locked against rotation relative to the chain blocks or cutter links and are held against axial displacement from the blocks or cutter links. Various known types of pin locking devices have been provided, and the present invention contemplates improvements over such known types of devices in that the pin locking means is relatively simple, durable and inexpensive in design and may be applied to a conventional chain with a minimum of change.

An object of the present invention is to provide an improved pivoted link chain. Another object is to provide improved locking means for the hinge pins of a pivoted link chain. Yet another object is to provide an improved hinge pin lock for holding the hinge pin of a chain against axial displacement. A further object is to provide an improved pin locking means which is relatively simple, durable and inexpensive in design and which may be readily assembled and disassembled. A still further object is to provide an improved hinge pin lock including a deformable lock-positioning and holding element. Another object is to provide a hinge pin lock including a locking pin and a removable positioning and holding element for moving the locking pin into and for holding the same in locking position. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing:

Fig. 1 is a fragmentary side view of a cutter chain in which an illustrative form of the invention is embodied, with one of the hinge pins and its associated lock shown in section.

Fig. 2 is an enlarged section taken on the plane of the section of Fig. 1, showing details of the hinge pin lock.

Fig. 3 is an enlarged horizontal section taken on line 3-3 of Fig. 1.

Fig. 4 is a plan view of one of the hinge pins and its associated locking means.

Fig. 5 is a fragmentary perspective view of a hinge pin and its associated locking means and chain links.

Fig. 6 is a perspective view of the holding or positioning rod and the associated locking pins.

The cutter chain in which the invention is embodied is generally designated 1 and, as shown in the drawing, comprises a chain block 2 pivotally connected to connecting links 3. The block has parallel base portions 4 provided with lateral gibs 5 adapted to engage the usual guideways of a cutter bar or guide frame, and projecting laterally from the block base is a lug 6 which is socketed to receive a cutter bit 7 held in position on the lug by a conventional set screw 8.

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The parallel base portions 4 of the block have aligned transverse bores 9 and hinge pins 10 are fitted transversely in these bores and extend through the bores 11 of wear bushings 12 fitted within openings 13 in the connecting links 3. The bores 9 have flat, plane side surfaces 14 and the pins are flattened at 15 longitudinally along one side and the flattened surfaces 15 engage the plane surfaces 14 for holding the pins against rotation within the bores 9 of the block, all in a well-known manner.

Now referring to the improved locking means for the hinge pins, it will be noted that the pins each has a longitudinal bore or opening 17 and communicating lateral end recesses or grooves 18. A pair of parallel apertures or bores 19 in each pin extend radially of the pin at right angles to the longitudinal openings 17 with the bores 19 opening out through the plane side 15 of the pin and communicating with the longitudinal bore 17 and with a space 20 provided within the bore of the bushing 12 of each connecting link by the flattening off of the hinge pin. Reciprocally mounted in the parallel openings or bores 19 are locking pins or plungers 21. A generally L-shaped, preformed, holding and positioning member or rod 22 may be positioned in the pin-bore 17 with its bent end 23 seated in the groove 18 at one end of the hinge pin and this rod, as it is inserted longitudinally into the bore 17, engages the inner ends of the locking pins 21 and forces the locking pins radially outwardly to project their outer ends into the space 20 (Fig. 3) in engagement with the inner plane surfaces 24 of the parallel side portions 4 of the block-base, thereby to lock the hinge pin against axial displacement in either direction from the block bores 9. The other end of the positioning rod 22 is then suitably deformed or bent laterally over, as by hammering, into the other end groove 18 of the pin, thereby firmly locking the holding and positioning rod in position. Evidently, by straightening out one bent end of the positioning and holding rod the latter may be removed from the pin opening to release the locking pins, thereby to permit endwise removal of the hinge pin from the chain.

While the parallel bores 19 are shown opening out through the plane sides 15 of the hinge pins, evidently they may, if desired, be located at any points circumferentially about the hinge pins and further, if desired, the holding and positioning rod 22 may be in the form of a straight rod and may be bent over at both ends to secure the same in position on the hinge pin.

As a result of this invention, an improved pivoted link chain is provided having improved locking means for firmly securing the hinge pins against axial displacement while permitting ready release of the hinge pins when desired. By the provision of parallel locking pins and the associated holding and positioning rod the hinge pins may be quickly locked in place and may be readily released when desired. The improved locking means is of a relatively simple, durable and inexpensive design, well adapted for its intended purpose. These and other advantages of the invention will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting the adjacent ends of said links together, and means for locking said hinge pin against axial displacement in one direction with respect to one link comprising a longitudinal opening in said

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hinge pin and a radial opening communicating with said longitudinal opening and extending outwardly through the exterior periphery of the pin between the ends thereof, a releasable locking pin guided in said radial opening and a releasable rod element positioned within said longitudinal opening and engaging the inner end of said locking pin for projecting the outer end of the latter outwardly beyond the periphery of said hinge pin into locking contact with said one link and for holding said locking pin in locking position in engagement with said one link, said one link having an inwardly facing surface and the other link having a recess at the inner side of said surface outwardly of the hinge-pin-periphery, said locking pin as it is projected outwardly entering said recess for engagement with said inwardly facing surface.

2. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting the adjacent ends of said links together, and means for locking said hinge pin against axial displacement in one direction with respect to one link comprising a longitudinal opening in said hinge pin and a radial opening communicating with said longitudinal opening and extending outwardly through the exterior periphery of the pin between the ends thereof, a releasable locking pin guided in said radial opening and a releasable rod element positioned within said longitudinal opening and engaging the inner end of said locking pin for projecting the outer end of the latter outwardly beyond the periphery of said hinge pin into locking contact with said one link and for holding said locking pin in locking position in engagement with said one link, said hinge pin having an end groove extending laterally from and communicating with said longitudinal opening in said hinge pin and said rod element being provided with a bent end received in said groove.

3. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting the adjacent ends of said links together, and means for locking said hinge pin against axial displacement in one direction with respect to one link comprising a longitudinal opening in said hinge pin and a radial opening communicating with said longitudinal opening and extending outwardly through the exterior periphery of the pin between the ends thereof, a releasable locking pin guided in said radial opening and a releasable rod element positioned within said longitudinal opening and engaging the inner end of said locking pin for projecting the outer end of the latter outwardly beyond the periphery of said hinge pin into locking contact with said one link and for holding said locking pin in locking position in engagement with said one link, said hinge pin having a second radial opening communicating with said longitudinal opening with said openings disposed in parallelism and at points spaced apart longitudinally of said hinge pin and an additional locking pin mounted in said second radial opening and positioned and supported by said locking element, said second locking pin locking said hinge pin against axial displacement in the opposite direction.

4. A pivoted link chain as set forth in claim 3 wherein said hinge pin has an end groove at the opposite end thereof and said rod element has the other end bendable for reception in said last mentioned groove.

5. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting the adjacent ends of said links together, and means for locking said hinge pin against axial displacement in one direction with respect to one link comprising a longitudinal opening in said hinge pin and a radial opening communicating with said longitudinal opening and extending outwardly through the exterior periphery of the pin between the ends thereof, a releasable locking pin guided in said radial opening and a releasable rod element positioned within said longitudinal opening and engaging the inner end of said locking pin for projecting the outer end of the latter outwardly beyond the periphery of said hinge pin into locking contact with said one link and for holding said locking pin

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in locking position in engagement with said one link, said hinge pin having a flattened surface extending longitudinally along one side thereof and said one link having a plane surface with which said plane pin surface engages for holding said pin against rotation relative to said one link and said radial pin surface and said locking pin when in locking position projecting outwardly beyond said plane pin surface.

6. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting the adjacent ends of said links together, and means for locking said hinge pin against axial displacement from one link comprising a movable releasable locking element guided on said hinge pin said one link having an inwardly facing surface and the cooperating link having a recess inwardly of said surface, said locking element having its outer end movable into said recess into contact with said inwardly facing surface, and a releasable positioning element movable in position on said hinge pin for moving said locking element relative to said hinge pin into locking position with respect to said one link.

7. A pivoted link chain as set forth in claim 6 wherein said positioning element for said locking element has a deformable end portion and said hinge pin has a recess for receiving said deformable portion as it is deformed into its locked position with respect to said hinge pin.

8. In a pivoted link chain, cooperating chain links, one of which has parallel portions provided with inner surfaces, a hinge pin for pivotally connecting said links together, said parallel link bores having aligned portions in which said hinge pin is positioned, and means for locking said hinge pin against axial displacement from said bores comprising a longitudinal opening in said hinge pin, parallel radial openings in said hinge pin and communicating with said longitudinal opening and extending outwardly through the exterior periphery of said hinge pin, locking pins movably mounted in said radial bores and a holding and positioning element inserted in said longitudinal pin-opening for moving said locking pins radially outwardly in said radial bores into locking relation with said inner surfaces of said parallel link portions.

9. A pivoted link chain as set forth in claim 8 wherein said hinge pin has lateral end recesses communicating with said longitudinal opening and said holding and positioning element has bent ends received in said end recesses.

10. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting said links, and means for locking said hinge pin against axial displacement with respect to one link comprising movable locking elements guided within and spaced apart longitudinally of said pin, one for holding said hinge pin against displacement in one direction and the other for holding said hinge pin against displacement in the opposite direction, and a releasable moving and positioning element insertable within said hinge pin for moving said locking elements relative to said hinge pin into and for holding the same in locking position.

11. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting said links, and means for locking said pin against axial displacement with respect to one link comprising releasable oppositely acting locking elements movable relative to said hinge pin, one for holding said hinge pin against displacement in one direction and the other holding said pin against displacement in the opposite direction, and a releasable element engageable with both locking elements for moving the latter relative to said one link into and for holding the same in pin locking position.

12. A pivoted link chain as set forth in claim 11 wherein said one link has opposed inwardly directed surfaces at its opposite sides and said movable locking elements when in locking position respectively engage said opposed surfaces.

13. In a pivoted link chain, cooperating chain links, a hinge pin for pivotally connecting said links, and means

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for locking said pin against axial displacement with respect to one link comprising separately movable shiftable locking elements spaced longitudinally of and guided within said pin, one locking element when in locking position acting in one direction and the other acting in the opposite direction whereby said pin is held against displacement in opposite directions, and a single releasable moving and positioning element disposable within said pin and engaging said locking elements for moving the latter into and for holding the same in locking position, said moving and positioning element being releasable from said pin to permit release of said locking elements.

14. A pivoted link chain as set forth in claim 13 wherein said locking elements are arranged with their axes disposed at right angles to the longitudinal axis of said moving and positioning element.

15. In a pivoted link chain, a chain block having parallel base portions provided with aligned bores, a hinge pin fitted in said bores, said pin being flattened along its length at one side and said bores having flattened walls engaging said flat pin surface to hold said pin against rotation relative to said block, a connector link having a bore and pivotally engaging said hinge pin, said flat side of said pin as it passes through said connector-link-bore providing a space, and means for locking said hinge pin against axial displacement in one direction from said bores in said parallel base portions of said block comprising a shiftable locking element engaging said hinge pin and projectable relative to said hinge pin into said space within said connector-link-bore in contact with the inwardly facing surface of one of said base portions of said block.

16. A pivoted link chain as set forth in claim 15 wherein said locking means includes another shiftable locking element engaging said hinge pin and projectable relative

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to said hinge pin into said space into engagement with the inwardly facing surface of said other base portion of said block for locking said hinge pin against axial displacement in the opposite direction.

17. In a pivoted link chain, a chain link having parallel base portions provided with aligned bores, said base portions having inwardly facing surfaces at their inner sides, a hinge pin fitted in said bores, a connector link having a bore and pivotally engaging said hinge pin, said pin passing through said connector-link-bore, said connector link having a recess therein intermediate the inner sides of said parallel base portions and beyond the exterior surface of said hinge pin, and means for locking said hinge pin against axial displacement from said bores in said parallel base portions comprising shiftable locking elements engaging said hinge pin and projectable relative to said hinge pin into said recess within said connector-link-bore with their projecting portions respectively in contact with said inwardly facing surfaces of said parallel base portions.

18. A pivoted link chain set forth in claim 2 wherein said locking means has a deformable portion engageable with said hinge pin for locking said projecting portions of said locking elements in locking position.

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