April 10, 1956 C. B. KREKELER 2,741,139

PINTLE SECURING MEANS FOR CUTTER CHAINS

Filed March 22, 1954

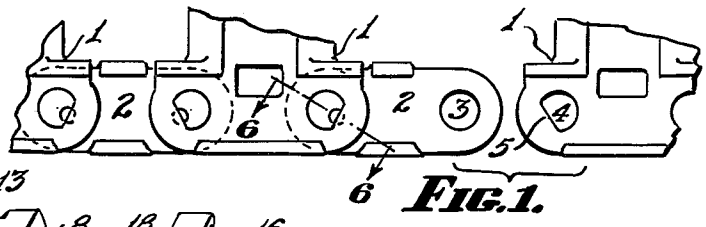


FIG. 1.

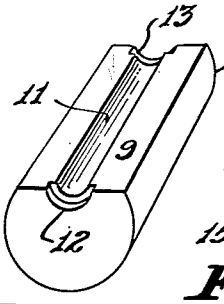


FIG. 2.

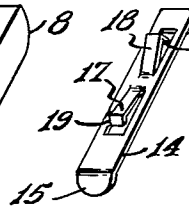


FIG. 3.

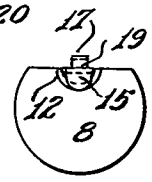


FIG. 4.

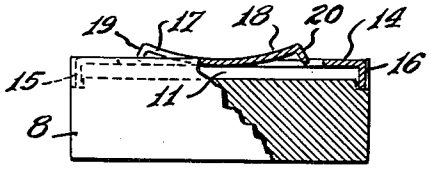


FIG. 5.

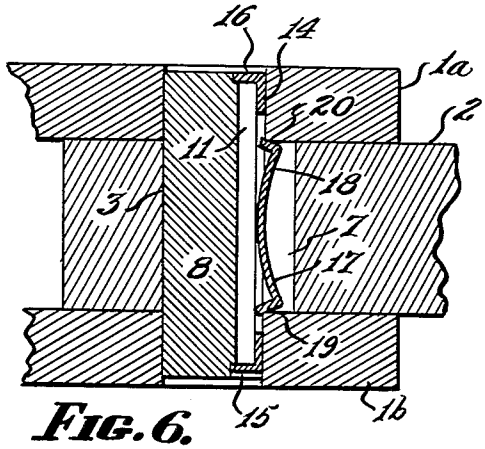


FIG. 6.

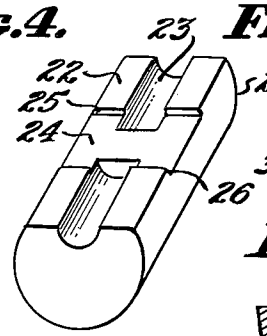


FIG. 7.

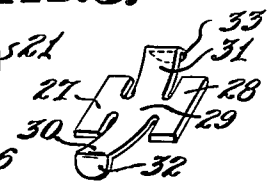


FIG. 8.

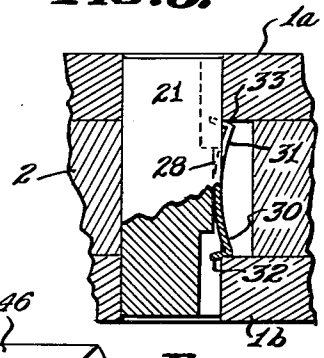


FIG. 9.

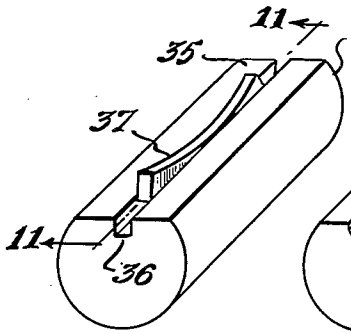


FIG. 10.

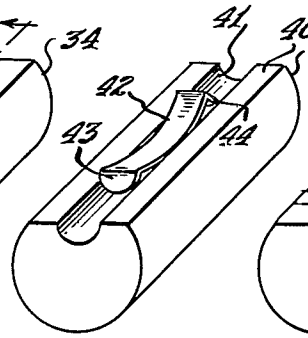


FIG. 12.

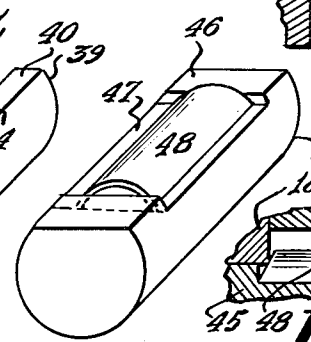


FIG. 13.

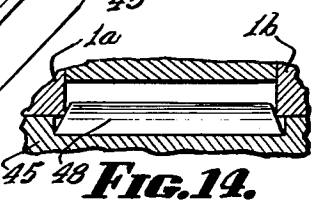


FIG. 14.

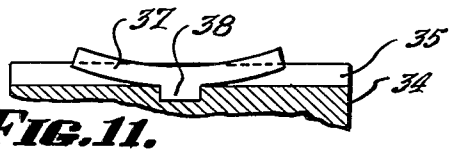


FIG. 11.

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PINTLE SECURING MEANS FOR CUTTER CHAINS

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10 Claims. (Cl. 74—254)

The cutter chains of mining machinery, such for example as that used for undercutting seams of coal, are made up of links pivoted together by means of pintle members. In a usual construction, double-cheeked links alternate with single-cheeked links, the double-cheeked links carrying socket members perforated to accept and hold the shanks of cutter bits or cutter bit holders. As is well known, the cutter chain passes about a cutter bar projecting from the body of the machine; and the chain is driven by a powered sprocket in the machine. Successive cutter bits are arranged at different angularities so that a cut is made of sufficient width to accept the cutter bar and chain assembly.

To minimize wear, it has been found that the pintles should be mounted non-rotatably with respect to one of the link members which they engage. To this end, the pintles (which are generally cylindrical in cross section) have hitherto been made with a flattened side or a configured end to engage in a non-circular hole in one or both of the outer cheek members of the double-cheeked link. The pintles must be held in assembly with the link members in such a way as to prevent axial displacement under the strains and vibration of cutting, and in such a way as to prevent looseness and lost motion. This has usually been done by the use of rivets, the flattened portion of the pintle being grooved to accept a portion of the cross section of the rivet, and the pintle ends and adjacent cheek portions of the links being recessed to accept the rivet heads. Rivets form a functionally satisfactory means for holding the pintles in place; but their installation is inconvenient, expensive and time-consuming, and their removal is equally so when it becomes necessary to disassemble the chain.

It is an object of this invention to provide a new means for holding pintles in place which greatly facilitates both their installation and removal.

It is an object of the invention to provide a pintle holding means of resilient character which nevertheless serves to maintain tight engagement and prevent lost motion.

It is an object of the invention in one aspect to provide a self-holding pintle not requiring separate parts for holding it in operative position.

It is an object of the invention in another aspect to provide a simple, effective and inexpensive pintle holding means which is readily replaceable, permitting reuse of the pintle.

It is an object of the invention to provide a pintle holding means for pintles which are non-rotatable with respect to one of the engaged link members and, in one aspect, to provide a pintle holding means which may be employed with pintles of standard construction.

It is an object of the invention to provide a pintle fastening means which simplifies the construction and lowers the cost of pintles.

These and other objects of the invention which will be set forth hereinafter or which will be apparent to one skilled in the art upon reading these specifications, are accomplished by that construction and arrangement of

parts of which certain exemplary embodiments will now be described. Reference is made to the accompanying drawings wherein:

Figure 1 is a partially exploded elevational veiw of a cutter chain section.

Figure 2 is a perspective view of a pintle of standard form.

Figure 3 is a perspective view of a resilient fastening means.

Figure 4 is an end elevation of the foregoing parts in assembly.

Figure 5 is a side elevation with a portion of the pintle broken away showing the parts in assembly.

Figure 6 is a sectional view taken along the line 6—6 of Figure 1.

Figure 7 is a perspective view of another form of pintle.

Figure 8 is a perspective view of a coacting resilient fastening means.

Figure 9 is a partial sectional view of a chain section showing in assembly the pintle and fastening means of Figures 7 and 8.

Figure 10 is a perspective view of a pintle and a modified fastening means.

Figure 11 is a partial sectional view taken along the line 11—11 of Figure 10.

Figures 12 and 13 are respectively perspective views of pintles fitted with modified fastening means.

Figure 14 is a partial sectional view showing the pintle and fastener of Figure 13 in assembly with link elements.

In the practice of the invention a pintle is provided having a generally cylindrical cross section with a flat formed at one side. With this there is associated, in any of the ways hereinafter set forth, a resilient fastening element. A portion of a cutter chain is illustrated in Figure 1 as comprising double-cheeked links **1** and intermediate single-cheeked links **2**. The cheeks of the first mentioned links lie outside the links **2**, in the portions pivoted together by the pintles; and whereas the links **2** are shown as having cylindrical bearing holes **3**, the holes in the cheeks of the links **1** are shown as having perforations **4** with a flattened side **5** so as to engage the pintle ends in a non-rotative manner. By reason of the flattened side of the pintle, when the parts are in assembly as shown in Figure 6, for example, the pintle ends snugly engage the correspondingly shaped holes in the cheeks **1***a* and **1***b* of the double-cheeked link member; but a space **7** is left between the flattened side of the pintle and the adjacent wall portion of the cylindrical hole **3** in the link member **2**.

The resilient fastening means is so associated with the pintle that all parts of it are depressible within the periphery of the pintle so that the pintle and fastening means can be inserted through a non-cylindrical hole **4**. The resilient fastening means is so construcetd, however, that once the parts are in assembly, portions of the fastening means can expand into the space **7** and, by engaging inward surfaces or corners of the cheeks **1***a* and **1***b*, maintain the assembly. This does not interfere with the relative rotation of the pintle and the link **2**.

In Figure 2, a pintle **8** of standard form has been shown. It has a cylindrical body with a flat **9** formed at one side. A semicircular groove **11** is formed centrally and longitudinally of the flat, this being the groove which, in the usual construction, would accept a portion of the cross section of a rivet. At the ends of the groove, recesses **12** and **13** are formed, which would accept portions of the heads of the rivet in the construction hereinabove described.

A form of fastening means adapted for use with this standard pintle is shown in Figure 3. It is formed of spring steel or other suitably strong and resilient metallic

stock. It has a body 14 of a width to lie in the groove 11, and bent-over semicircular ends 15 and 16 adapted to lie in the recesses 12 and 13. These bent-over ends prevent relative axial movement of the pintle and the fastening means, and they may be so configured as to grip the pintle ends to maintain the assembled relationship shown in Figure 5.

Intermediate the ends of the fastening means, the body 14 is provided with two oppositely directed tine elements 17 and 18 which are urged upwardly resiliently. The ends of these tine elements are bent over as at 19 and 20. The distance between the portions of the tines 17 and 18 at which the bends occur is equal to or slightly less than the distance between the cheeks 1*a* and 1*b* of the double-cheeked link; but as the tines 17 and 18 come upwardly in accordance with their resilient tendency, the bent-over portions 19 and 20 at their lower ends move outwardly. Consequently, as shown in Figure 6 they will bind against inner surfaces or corners of the cheeks 1*a* and 1*b*, preventing relative longitudinal movement of the fastening means and the cheeks of the link 1. In this way, the pintle is firmly and tightly held in assembled position.

The insertion of the pintle is simple. With the parts in the assembly shown in Figure 5 and assuming the pintle is to be inserted toward the left, it is only necessary to start the pintle into the hole in the cheek 1*a*, then depress the tine 17 to the level of the outer surface of the body 14, as may readily be done with pliers or the like, and move the pintle further until the end of the tine 17 enters the hole. Then the pintle may be driven home, the parts coming into the relationship shown in Figure 6.

When it becomes necessary to remove a pintle, this can be done simply by driving it out. Under sufficient force, as for example from the blows of a sledge on a driving pin, one or the other of the bent over portions 15 or 16 will bend sufficiently to release the pintle, or one or the other of the tines 17 or 18 will bend or break. The resilient fastening means are inexpensive, and can readily be renewed.

In Figure 7 there is shown a pintle having a cylindrical body 21 provided with a flat 22. Longitudinally of the flat there may be a continuous or interrupted groove 23. Transverse the central portion of the flat 22 there is provided a shallow recess 24 terminating in shoulders 25 and 26, which may be undercut if desired. A resilient fastening means of the type shown in Figure 8 may be used with this pintle. It has lateral portions 27 and 28 of a length to lie between or engage between the shoulders 25 and 26. These lateral portions are interconnected by a central portion 29 bearing two oppositely directed tines 30 and 31, the ends of which are bent over as at 32 and 33.

Figure 9 shows the pintle and fastening means of Figures 7 and 8 in assembly with a link 2 and the cheeks 1*a* and 1*b* of a link 1. The fastening means is held from relative movement with respect to the pintle by the engagement of the portions 27 and 28 of the fastener in the recess 24, and the fastener is held against movement with respect to the cheeks 1*a* and 1*b* by the engagement of the bent over portions 32 and 33 with inner surfaces or corners of the cheeks.

In Figure 10, the pintle 34 has a flat 35 which is traversed longitudinally by a narrow groove 36. An arcuate or bent resilient member 37 is located in the groove, and fastened therein in any suitable fashion, as by spot welding at its central part. Or, as shown in Figure 11, the resilient element 37 may be formed with a downwardly extending tongue 38 which can be received in a recess formed in the bottom of the groove 35. The end portions of the spring member 37 are designed to act in the same fashion as hereinabove described for the bent over portions 15 and 16 or 19 and 20 of the spring elements of Figures 3 and 8. To obtain this effect the end portions of the member 37 may be cut at other than a right angle to the immediately adjacent portions of the upper surface of the member 37.

In Figure 12 the pintle 39 has a flat 40 and a longitudinal continuous or discontinuous groove 41. A spring member 42, attached to the pintle at its center, may here be employed, the ends of which are bent over as at 43 and 44 to serve the binding function hereinabove set forth.

In Figure 13 the pintle 45 has a general flat 46 cut centrally by a transverse recess 47 demarked at its ends by shoulders. A spring member 48 is employed having an extreme length enabling it to fit between the shoulders of the recess 47. This spring member is of non-planar cross section, so that a central portion of it will be urged resiliently upward so as to extend above the level of the flat 46. In this position the central portion can engage the cheeks 1*a* and 1*b* of the outer link element. As illustrated in Figure 14, end portions of the resilient member 48 may be disposed slantwise so as to effect tight engagement with corner portions of the cheeks 1*a* and 1*b*.

Modifications may be made in the invention without departing from the spirit of it. The invention having been described in certain exemplary embodiments, what is believed to be new and is sought to be covered by Letters Patent is:

1. In a structure of the class described wherein a pintle is employed to pivot together the link elements of a chain, one of said elements having spaced cheeks and the other of said elements having a single cheek positionable between said spaced cheeks, a pintle having a flat at one side, the said spaced cheeks having perforations shaped to conform to the periphery of the flattened pintle, the link having the single cheek being provided with a circular pintle receiving perforation so that when said parts are in assembly a space is left within the confines of the saig single cheek between the wall of its perforation and the flat of said pintle, and resilient means associated with said pintle at the flat thereof, means to prevent relative longitudinal movement of said pintle and said resilient means, said resilient means having a pair of oppositely directed tines depressable to the level of said flat whereby said pintle and resilient means may be inserted through the openings in said spaced cheeks, said tines being resiliently urged away from said flat whereby they are capable of expanding into said space and preventing withdrawal of said pintle by engagement with inner portions of said spaced cheeks.

2. The structure claimed in claim 1 wherein said tines have at their ends portions lying at such an angle to the outer surfaces of said tines as to insure lateral engagement with inner corner portions of said spaced cheeks when said tines are resiliently urged away from said flat.

3. The structure claimed in claim 1 wherein said tines have at their ends portions lying at such an angle to the outer surfaces of said tines as to insure lateral engagement with inner corner portions of said spaced cheeks when said tines are resiliently urged away from said flat, said last mentioned portions constituting bent-over end portions of said tines.

4. The structure claimed in claim 1 wherein said pintle has a central groove formed longitudinally of said flat with recesses at its ends, and wherein said resilient member has a body of a width to lie in said groove and bent-over end portions to engage in said recesses.

5. The structure claimed in claim 1 wherein said pintle has a central groove formed longitudinally of said flat with recesses at its ends, and wherein said resilient member has a body of a width to lie in said groove and bent-over end portions to engage in said recesses, the said tines being struck up centrally from the body portion of said resilient member and having bent-over ends.

6. The structure claimed in claim 1 wherein said flat has a longitudinal central groove and a transverse central recess, and wherein said resilient member has a body portion fitting in said recess and engaging ends thereof whereby longitudinal relative motion of the pintle and resilient member is prevented, the tines of said resilient member

having bent-over ends adapted to lie to said longitudinal groove when said tines are depressed.

7. The structure claimed in claim 1 in which said pintle has a groove longitudinally of said flat and wherein said resilient member has a body portion lying in said groove, the central part of said body portion being affixed to said pintle, and outlying parts of said body portion being resiliently urged upwardly so as to tend to extend above said groove.

8. The structure claimed in claim 1 wherein said resilient member has a central portion lying within said groove and affixed to the pintle, and outlying portions forming said tines, end portions of said tines being bent-over, and said groove having deeper portions underlying the bent-over ends of said tines.

9. In a structure for the purpose described, a pintle having a flat, a recess transverse said flat and a resilient, flexible member of a length such that its ends will engage the ends of said recess, said resilient, flexible member being

non-planar in cross section with a longitudinally extending portion extending longitudinally of the pintles resiliently urged to a position above the outer surface of said flat.

10. In the structure of the class described, a pintle of generally cylindrical shape but having a non-cylindrical side, and a resilient, elongated, unitary fastening means having its central portion associated with said non-cylindrical side and having opposed end portions resiliently urged away from said non-cylindrical side.

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