April 21, 1942. E. P. STENGER 2,280,502

CUTTER CHAIN

Filed May 31, 1939



FIG. 3.

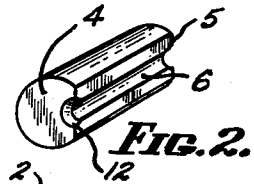


FIG. 2.

FIG. 1.

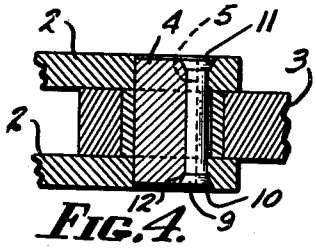


FIG. 4.

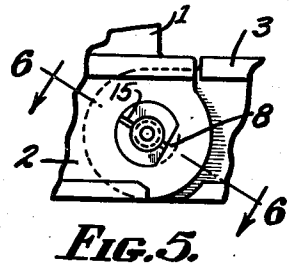


FIG. 5.

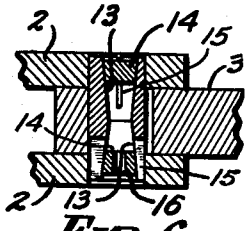


FIG. 6.

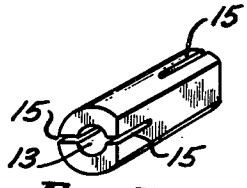


FIG. 7.

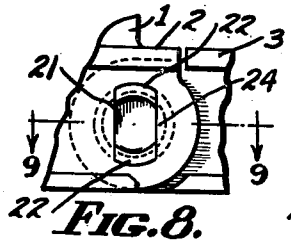


FIG. 8.

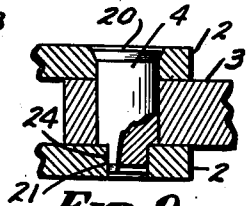


FIG. 9.

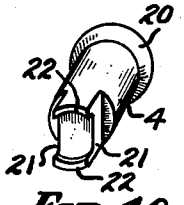


FIG. 10.

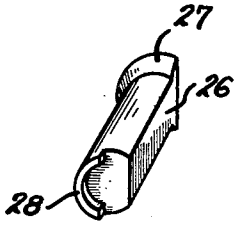


FIG. 11.

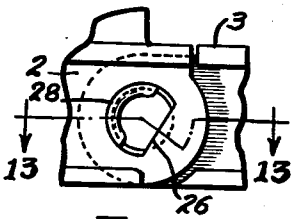


FIG. 12.

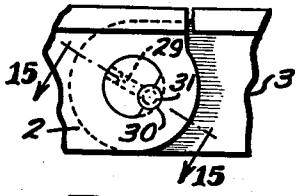


FIG. 14.

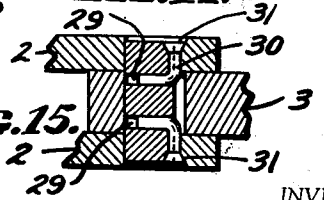


FIG. 15.

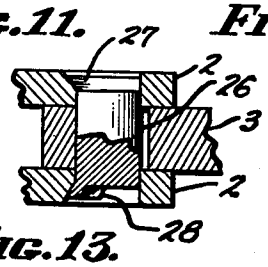


FIG. 13.

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CUTTER CHAIN

Edwin P. Stenger, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Company, Cincinnati, Ohio, a corporation of Ohio

Application May 31, 1939, Serial No. 276,516

2 Claims. (Cl. 74—251)

My invention relates to cutter chains for mining machines and particularly to the pintle means for fastening the same which joins the bit carrying link to the connecting links.

Inasmuch as cutter chains of the above type are subject to very heavy and rough wear, it has been found advisable to position the pintles in the side bars of the bit carrying link so that they will not revolve. It is also desirable to have these pintles so arranged as to be easily removable and insertable for repairs.

It is an object of my invention to provide a pintle positioned in the side bars of the bit carrying link which is not rotatable even under the heaviest kind of wear.

It is a further object of my invention to provide a pintle means which permit its easy insertion into position under the most unfavorable conditions normally met with in a coal mine.

These and other objects of my invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference is now made to the drawing which forms a part thereof and in which:

Figure 1 is a side elevation of a cutter chain including a bit carrying link and connecting links.

Fig. 2 is a perspective view of the pintle shown in Figure 1.

Fig. 3 is a perspective view of the rivet for holding the pintle against longitudinal movement in Fig. 1.

Fig. 4 is a section on the section line 4—4 of Fig. 1 on a slightly enlarged scale.

Fig. 5 is a side elevation showing the side bar of a bit carrying link and the connecting links joined by a modification of my novel pintle.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a perspective view of the pintle shown in Figures 5 and 6.

Fig. 8 is a side elevation of a side bar and connecting link showing other modifications of my novel pintle.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is a perspective view of the pintle shown in Figs. 8 and 9.

Fig. 11 is a perspective view of other modifications of my novel pintle.

Fig. 12 is a side elevation of a side bar and connecting link showing the modified pintle of Fig. 11.

Fig. 13 is a section on the line 13—13 of Fig. 12.

Fig. 14 is a side elevation of a side bar and connecting link showing other modified forms of my novel pintle.

Fig. 15 is a section on the line 15—15 of Fig. 14.

Briefly, in the practice of my invention, I provide a pintle having a cross section defined by a portion of a circle and joined by a cord. The aligned apertures in the side bars for receiving the pintle are similarly configured so that the pintle may not revolve. The pintle is so positioned that the circular portion of the surface is positioned against the pull of the circular aperture or journal in the connecting link; so that all of the friction between the pintle surface and the bearing of the connector link is carried by the circular portion of the pintle.

It will be noted that when a cutting chain is being pulled in a straight line the arc of contact between the pintle and the circular aperture in the connecting link is 180° maximum. As the chain leaves a straight path and passes around the sprocket, the connecting link rotates about the pintle, the amount of rotation depending on the number of teeth in the sprocket. With a four tooth sprocket, which is the smallest number of teeth ordinarily used for cutter chains, the arc of rotation is 45°. For sprockets with more than four teeth, the arc of rotation would be less.

The active wearing or bearing surface of the pintle therefore extends through an arc of not more than 180° plus 45°, leaving an inactive surface on the ordinary round pintle of at least 135°. It then becomes clear that this dormant surface need not be cylindrical and that it can be made otherwise to expedite locking of the pintle in the side bars or for preventing movement of the pintle along its longitudinal axis or both.

In order to prevent my pintle from sliding longitudinally out of the apertures in the side bars, I have shown numerous means such as rivets, etc. which will be described later.

Referring to the drawing, I provide the usual bit carrying link 1 having the side bars 2. Connecting the bit carrying links of the cutter chain is the usual connecting link 3 which has a circular bearing as is well known in the art. My pintle 4 consists of a circular rod with a flattened portion or cord 5. Running longitudinally through the face of flattened portion 5 of the pintle 4, is a channel 6.

The configuration of the aperture 7 in the side plate 2 is similar to the outline of the cross section of the pintle 4 and comprises a circular aperture with a filled in portion 8 which abuts the flattened portion 5 of the pintle when it is

in place. The filled in portion 8 has a groove which completes the groove 6 of the pintle 4 and forms a circular aperture when the pintle is in position. When the pintle 4 has been placed through the aligned apertures of the side bars and the bearing of the connecting link as in Fig. 1, a long shanked rivet 9 having a head 10 is inserted in the grooves 6 of the pintle and the complementary groove in the side bar 2. The opposite end 11 of the rivet is then flattened out which thus holds the pintle 4 against longitudinal movement in the side bars. The end of the groove 6 in the pintle 4 is countersunk at 12 as is the complementary groove on side bar 2. This permits the head 10 and the flattened end 11 of the rivet 9 to be countersunk flush with the end of the pintle 4 and the face of the side bar 2.

It is to be noted from the above that the shoulder 8 of the aperture in the side bar 2 contacting the face 5 of the pintle 4 prevents the pintle 4 from rotating in relation to the side bar; while the rivet 9 prevents the pintle from any longitudinal movement.

In Figs. 5, 6 and 7, I have shown a modified form of pintle where, in place of the rivet 9 and the groove 6 in the pintle 4, I provide tapered hollow channels 13 running longitudinally through the pintle and tapered plugs 14 which are insertable in the channels 13. In this case, the pintle is split as at 15 and I preferably place a channel 16 in one of the plugs 14. In this case when it is necessary to remove the pintle the solid plug is first knocked out by inserting a pin through the aperture 16 so as to contact the inner end of the opposite plug. After this plug has once been removed then the plug having a channel 16 may be driven out from the other side by the use of a rod. In this modification as well as in the former modification, the pintle may be inserted from either side of the side bars and is self-aligning. In the present modification, the pintle is inserted and the plugs 14 then hammered into the channels 13. Due to the tapering of the channels 13 and the splits 15, the plugs 14 spread apart the ends of the pintle and wedge them against the aperture in the side bars 2. In this modification while the shoulder 8 on the side bar prevents the revolving of the pintle the wedge of the pintle itself against the aperture in the side bar prevents any longitudinal movement of the pintle.

A further modification is shown in Figs. 8, 9 and 10. In this case the pintle 4 has a flange or head 20 at one end with flattened portions 21 at the other end. The shank of the pintle is circular while a ridge 22 is formed in the end of the pintle opposite the head 20. In this case the pintle is insertable from only one side of the side bars since one of the apertures in one side bar is circular to receive the shank of the pintle and the head 20 while the opposite side has the configuration including shoulders 24 to contact the flat portions 21. After the pintle is inserted the ridges 22 are flattened over and thus the pintle is held against longitudinal movement by the flange 20 and flattened portions 22 while the pintle is held against rotation by the flattened portions 21 abutting the shoulders 24.

In Figs. 11, 12 and 13, a modification of my pintle is shown. In this case the pintle has a flattened face 26 while the side bars have apertures defined by a portion of a circle joined with a cord. The pintle has a flange 27 on one end and a ridge 28 which may be flattened on the other end. This pintle may be insterted from either side of the side bar and after insertion the portion 28 is flattened to prevent the pintle from longitudinal movement while the flattened portion 26 abutting the shoulder on the side bar prevents the pintle from revolving.

In Figs. 14 and 15 another modified pintle is shown. This pintle is configured similar to the pintle in Fig. 2, but there are two apertures 29 in the pintle which receive the end of rivets 30. One of the rivets 30 has a projecting head which is no larger than the shank of the rivet until it is flattened. In this case the pintle may be inserted from either side of the side bars and the rivet head 31 flattened to prevent longitudinal movement of the pintle.

In all of the above pintles where there are flanges or heads or portions which are flattened to form heads, there is preferably a countersink or recessed portion in the side of the side bars so that the end of the pintle in all cases is flush with the outside surfaces of the side bars.

From the above it is apparent that I have provided a pintle which may be readily removed and inserted in a cutter chain under the most unfavorable conditions but which when once inserted will not slide out nor revolve and which will consequently promote long chain life and efficient performance.

It is to be understood that modification may be made in my invention without departing from the spirit thereof and I do not intend to limit myself otherwise than as pointed out in the claims which follow.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In combination with a bit carrying link of a mining machine cutter chain, and a connecting link, one of said links having spaced side bars permanently held in position between which the other link is introduced, said other link having a circular aperture, and a pintle mounted in opposite apertures in the side bars and passing through said circular aperture in the other link, said pintle having a flattened portion, and at least one of the side bars having an aperture for the pintle end which includes a shoulder to engage the flattened portion, thereby preventing the pintle from rotation, said pintle being longitudinally slidable through at least two of said apertures when links are in position for assembling, and means for securing the pintle against endwise movement comprising means engaging the pintle ends but not projecting longitudinally therefrom and passing through a channel in at least one of the side bars.

2. In combination with a bit carrying link of a mining machine cutter chain, and a connecting link, one of said links having spaced side bars permanently held in position between which the other link is introduced, said other link having a circular aperture, and a pintle mounted in the side bars and passing through said circular aperture, said pintle having a flattened portion, and at least one of the side bars having an aperture for the pintle end which includes a shoulder to engage the flattened portion, thereby preventing the pintle from rotation, said pintle being longitudinally slidable through at least two of said apertures when the links are in position for assembling, and means for securing the pintle against endwise movement comprising a rivet, and passageways in the pintle and in the shoulder in the side bar for the said rivet.

EDWIN P. STENGER.