Aug. 1, 1944. C. E. STOLTZ 2,354,781

CUTTER CHAIN AND BITS

Filed Oct. 30, 1943

Fig. 1

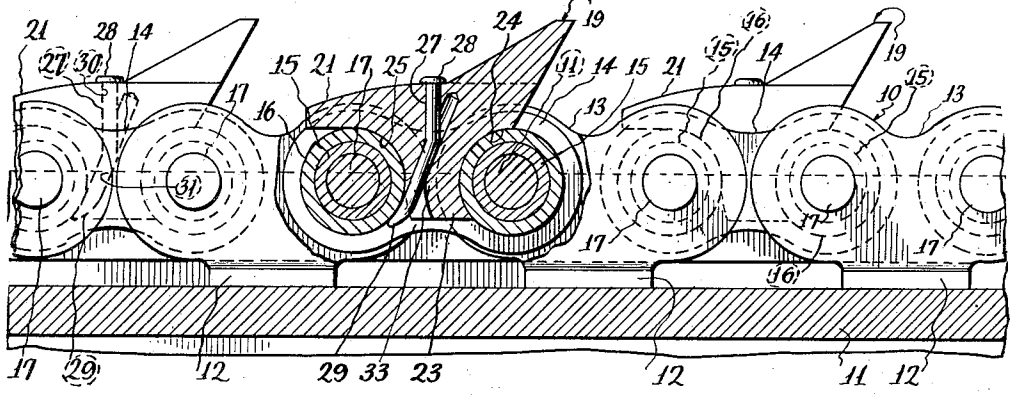


Fig. 2

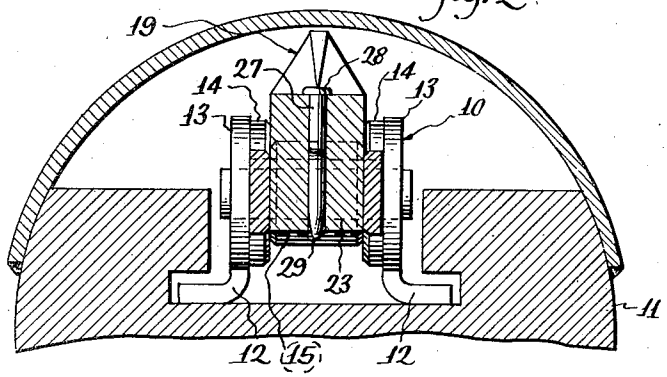
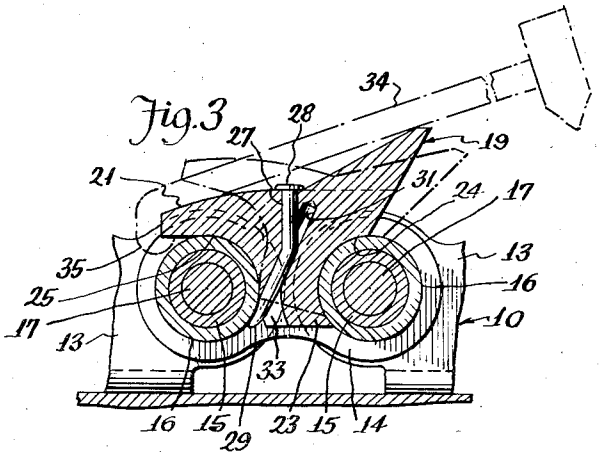


Fig. 3



INVENTOR

Charles E. Stoltz

Clarence F. Poole

ATTORNEY

Patented Aug. 1, 1944 2,354,781

UNITED STATES PATENT OFFICE

2,354,781

CUTTER CHAIN AND BIT

Charles E. Stoltz, Chicago, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application October 30, 1943, Serial No. 508,314

21 Claims. (Cl. 262—33)

This invention relates to improvements in cutter chains and bits adapted for use in cutting coal in mines.

The cutter chain of my present invention is somewhat similar to that shown and described in application Serial No. 467,080, filed by me on November 27, 1942, but differs therefrom in the form of the cutter bit and in the method of holding the cutter bit in the chain.

The principal objects of my present invention are to provide a novel form of cutter bit and chain of a simplified construction, for efficiently cutting thin kerfs and drilling round holes in a mine wall, including a new and improved form of cutter bit which may readily be inserted between the side straps of a chain, and having a simplified form of holding means for detachably holding the bit in the chain.

Other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawing wherein:

Figure 1 is a plan view of a cutter chain constructed in accordance with my invention, shown as being guided in a cutter bar, with one of the links of the chain and its cutter bit shown in section;

Figure 2 is a fragmentary transverse sectional view taken through a cutter bar and chain constructed in accordance with my invention; and

Figure 3 is a partial fragmentary sectional view taken through a link of the cutter chain and illustrating by broken lines, one means for removing the bit from the chain.

In the embodiment of my invention illustrated in the drawing, a chain 10, which may be a roller type of chain of a well known form, is shown as being guided for movement along a cutter bar 11 having a usual form of guide formed therein, which is adapted to be engaged by gibs 12, 12, extending laterally from the inner ends of outer side straps 13, 13 of the chain.

The endless chain 10 includes the outer side straps 13, 13 pivotally connected adjacent their ends to inner side straps 14,14. Said inner side straps are connected together by sleeves 15, 15, which may be riveted thereto, and having rollers 16, 16 rotatably mounted thereon. Said outer side straps are pivotally connected to said inner side straps by means of pins or rivets 17, 17, extending through said sleeves and said outer side straps, and suitably held in position, to form pivotal connections between said inner and said outer side straps.

A plurality of cutter bits 19, 19 are herein shown as being mounted between opposite inner side straps of the chain. Each cutter bit 19 has a reduced forwardly projecting outer end, formed to define a cutting point, and has a rearwardly projecting portion 21, extending over and engaging the rear roller 16 of the link of the chain within which said bit extends. Said bit also has an inwardly extending tongue 23, extending between the links of the chain and having a recessed advance engaging portion 24 of an arcuate formation, which is formed to conform to the outer periphery of and to engage the forward roller 16 of an associated chain link. Said tongue also has a recessed retreating engaging portion 25, formed to conform to and engage the rear roller 16 of the same link of the chain. Said rear recessed engaging portion has an inner or end portion formed on an arc struck from the center of the advance roller 16, to permit pivotal movement of the bit about said advance roller, so the bit may be inserted in or removed from the chain by pivotal movement about said advance roller.

The means for positively holding the bit 19 to its respective link of the chain includes a pin 27. Said pin may be made from a relatively ductile metal, such as brass, and as herein shown, has a head 28 at one of its ends, and has a point 29 at its opposite end. Said bit is herein shown as being drilled from its outer side substantially perpendicular to the direction of travel of the cutter chain, into the tongue 23, as indicated by reference character 30. Said bit is then drilled along said tongue from the inner rear side of said tongue, at an advance angle to the direction of travel of the chain, as indicated by reference character 31, so said drill hole will intersect said first mentioned drill hole. As herein shown, said last mentioned drill hole opens to the inner rear side of said bit, so the rear side wall of said drill if extended would be substantially tangential to the outer periphery of the roller 16. The two drill holes thus provide a bent aperture extending through the bit, for receiving the pin 27.

When locking the bit 19 to its respective link of the chain, the pin 27 is inserted in the drill hole 30 and is driven therein and into and through the angularly disposed drill hole 31 until its head bears against the outside of said bit. The point 29 of said bit will then be engaged with the outer periphery of the roller 16. The bend in the aperture, formed by the drill holes 30 and 31, is so formed that it will place a bend in said pin and will also bend the end thereof to

extend along and firmly engage the outer periphery of the rear roller **16**, to positively hold said cutter bit in position in the chain, it being understood that the bend in the central portion of said pin, placed therein by driving said pin through said bent aperture, serves to lock said pin in position in said bit.

The retreating end of the tongue **23** is provided with a slotted portion **33** communicating with the drill hole **31**, the inner advance face of which is shown as being struck on an arc, the center of which is the pivotal axis of the sleeve **15** (see Figure 3). This slot is provided to permit the pin to be bent back along said arcuate surface, so the bit may readily be removed from the chain by pivotal movement about the forward roller **16**, when desired.

A tool **34** having a hooked end **35** may be used to remove the bit from the chain. The hooked portion of the hooked end of said tool may be engaged with the rear end of the rearwardly projecting portion **21** of said bit. Said tool may extend forwardly from the rear end of said bit and engage said bit adjacent its cutting point, so that pressure exerted on the free end of said tool will pivot the bit about the advance roller **16** and bend the end of the pin **27** into the apertured portion **33** and permit the end of said pin to clear the rear roller **16** so the bit may be removed from the chain by pivotally moving with the advance roller **16** about the advance sleeve **15**.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted in said chain, each of said cutter bits extending within a link of said chain and having engagement therewith, and means for positively holding said cutter bit in engagement with said link including a pin adapted to be driven through said bit from the outside thereof and positively engage said link at its inner end.

2. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted in said chain, each of said cutter bits extending within a link of said chain and having opposite engaging faces adapted to have engagement therewith, and a pin adapted to be driven through said bit from the outside thereof and engage said link at its inner end, for positively holding said bit to said link, and adapted to bend to permit removal of said bit from said link upon the exertion of pressure on said bit in a direction opposite to the force exerted thereon during cutting.

3. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted in said chain, each of said cutter bits engaging a link of said chain at longitudinally spaced points and having a tongue extending within said chain link with opposite engaging faces having engagement with said link, and a pin adapted to be driven through said bit from the outside thereof so as to extend through said tongue and have engagement with said link, for positively holding said bit in said link.

4. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted within said chain, each of said cutter bits extending within a link of said chain and having a tongue extending between the side straps of said chain, said tongue having opposite recessed engaging faces adapted to engage said link of said chain, said bit having an apertured portion extending from the outside thereof through said tongue, and a pin adapted to be driven through said apertured portion of said bit from the outside thereof and have engagement with said associated link, for positively holding said bit to said chain.

5. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted in said chain, each of said cutter bits engaging a link of said chain at longitudinally spaced points and having a tongue extending within said chain link with opposite engaging faces having engagement with said link, said bit having an apertured portion extending from the outside of said bit through said tongue and said apertured portion having a bend therein, and a pin adapted to be driven through said apertured portion of said bit from the outside thereof and have engagement with said link adjacent its inner end, for positively holding said bit in said link.

6. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, and a plurality of cutter bits detachably mounted in said chain, each of said cutter bits engaging a link of said chain at longitudinally spaced points and having a tongue extending within said chain link with opposite engaging faces having engagement therewith, said bit having an apertured portion extending from the outside of said bit through said tongue and said apertured portion having a bend therein, and a pin adapted to be driven through said apertured portion of said bit from the outside thereof and have engagement with said link adjacent its inner end, for positively holding said bit in said link, and said tongue having a slotted portion communicating with said apertured portion, to permit said pin to be bent therein by movement of said bit in a direction opposite to the direction of the force reactions imparted thereto during cutting, to permit removal of said bit from said link.

7. In an endless cutter chain, a roller chain including a plurality of spaced side straps with rollers mounted at the points where said side straps are connected together, a plurality of cutter bits mounted between certain of said side straps and having engagement with said rollers, each of said bits having an apertured portion, and a pin adapted to be driven through said apertured portion and have engagement with one of said rollers, for locking said bit to said chain.

8. In an endless cutter chain, a roller chain including a plurality of spaced side straps with rollers mounted at the points where said side straps are connected together, a plurality of cutter bits mounted between certain of said side straps and having engagement with said rollers, each of said bits having an apertured portion, and a pin

adapted to be driven through said apertured portion and have engagement with one of said rollers, for locking said bit to said chain, said apertured portion having a bend therein to bend said pin when driven through said bit, to lock said pin in said bit.

9. In an endless cutter chain, a roller chain including a plurality of spaced side straps with rollers mounted at the points where said side straps are connected together, a plurality of cutter bits mounted between certain of said side straps and having engagement with said rollers, each of said bits having an apertured portion, and a pin adapted to be driven through said apertured portion and have engagement with one of said rollers, for locking said bit to said chain, said apertured portion having a bend therein to bend said pin when driven through said bit, to lock said pin in said bit, and the inner portion of said bit having a slotted portion formed therein, communicating with said apertured portion, to permit said bit to be removed by turning movement about the axis of the advance roller of said associated chain link, to bend the end of said pin into said slot by engagement with the rear roller of said chain link.

10. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, each of said links including a pair of parallel spaced side straps, sleeves connecting certain of said side straps together, and pins extending through said sleeves and certain other of said side straps, disposed on the outer sides of said first mentioned side straps, for pivotally connecting said links together, to form an endless chain, rollers encircling said sleeves, cutter bits extending between said side straps which are connected together by said sleeves, and adapted to have engagement with said rollers, and a pin adapted to extend through an apertured portion formed in said bit and have engagement with one of said rollers, and be locked in said bit by the form of said apertured portion, for holding said bit in said chain.

11. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, each of said links including a pair of parallel spaced side straps, sleeves connecting certain of said side straps together, rollers encircling said sleeves, and pins extending through said sleeves and certain other of said side straps disposed on the outer sides of said first mentioned side straps, for pivotally connecting said links together, to form an endless chain, cutter bits extending between said side straps which are connected together by said sleeves and having a pair of oppositely facing recessed engaging faces conforming to and adapted to engage said rollers, each of said cutter bits having an apertured portion disposed to the rear of its cutting point and extending from the outer to the inner side of said bit, and a pin adapted to be driven from the outside of said bit, through said apertured portion into engagement with one of said rollers, for holding said bit in said chain.

12. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, each of said links including a pair of parallel spaced side straps, sleeves connecting certain of said side straps together, rollers encircling said sleeves, and pins extending through said sleeves and certain other of said side straps disposed on the outer sides of said first mentioned side straps, for pivotally connecting said links together to form an endless chain, cutter bits extending between said side straps which are connected together by said sleeves and having a pair of oppositely facing recessed engaging faces conforming to and adapted to engage said rollers, each of said cutter bits having an apertured portion disposed to the rear of its cutting point and extending from the outer to the inner side of said bit, and a pin adapted to be driven from the outside of said bit, through said apertured portion into engagement with one of said sleeves at its end, for holding said bit in said chain, said apertured portion being so formed as to bend said pin in such a manner as to lock said pin within said bit, when driven therein.

13. In an endless chain particularly adapted to cut coal in mines, a plurality of links pivotally connected together, each of said links including a pair of parallel spaced side straps, sleeves connecting certain of said side straps together, rollers encircling said sleeves, and pins extending through said sleeves and certain other of said side straps disposed on the outer sides of said first mentioned side straps, for pivotally connecting said links together to form an endless chain, cutter bits extending between said side straps which are connected together by said sleeves and having a pair of oppositely facing recessed engaging faces conforming to and adapted to engage said rollers, each of said cutter bits having an apertured portion disposed to the rear of its cutting point and extending from the outer to the inner side of said bit, and a pin adapted to be driven from the outside of said bit, through said apertured portion into engagement with one of said sleeves at its end, for holding said bit in said chain, said apertured portion being so formed as to bend said pin in such a manner as to lock said pin within said bit, when driven therein, and the inner portion of said bit having a slotted portion communicating with said apertured portion, to permit said pin to be bent therein upon pivotal movement of said bit about the axis of said front roller, so said bit may be removed from said chain by pivotal movement about said axis.

14. A cutter bit adapted for cutting coal in mines having an outer end formed to define a cutting point, a tongue extending inwardly from said outer end and adapted to extend within a link of a chain, said bit having an apertured portion extending from its outer portion through said tongue and opening at the inner end of said tongue, and a pin adapted to be driven through said apertured portion, for locking said bit to a chain link.

15. A cutter bit adapted for cutting coal in mines having an outer end formed to define a cutting point, a tongue extending inwardly from said outer end and adapted to extend within a link of a chain, an apertured portion extending from its outer portion through said tongue and opening at the inner end of said tongue, and a pin adapted to be driven through said apertured portion, for locking said bit to a chain link, said apertured portion being bent, to bend said pin and lock said pin to said bit.

16. A cutter bit adapted for cutting coal in mines having an outer end formed to define a cutting point, a tongue extending inwardly from said outer end and adapted to extend within a link of a chain, shouldered portions extending from opposite sides of said tongue and adapted to engage a link of the chain, said bit having an apertured portion, having a bend therein, extending from the outer end of said bit through said tongue and opening at the inner end of said tongue, and a pin adapted to be driven through said apertured portion and locked in position by

the form of said apertured portion, to lock said bit in position in a chain.

17. A cutter bit adapted for cutting coal in mines having an outer end formed to define a cutting point, a tongue extending inwardly from said outer end and adapted to extend within a link of a chain, shouldered portions extending from opposite sides of said tongue and adapted to engage a link of the chain, said bit having an apertured portion, having a bend therein, extending from the outer end of said bit through said tongue and opening at the inner end of said tongue, and a pin adapted to be driven through said apertured portion and locked in position by the form of said apertured portion, to lock said bit in position in a chain, and said tongue having a slotted portion at its inner end communicating with said apertured portion, to permit the end of said pin to be bent to extend therein, so the bit may be removed from said chain.

18. In an endless cutter chain, a plurality of pivotally connected links including a plurality of side straps with cross members extending therebetween, a plurality of cutter bits mounted between certain of said side straps and having engagement with said cross members, each of said bits having an apertured portion, and a pin adapted to be driven through said apertured portion and have engagement with one of said cross members, for locking said bit to said chain, said apertured portion having a bend therein, to lock said pin in said bit.

19. In an endless cutter chain, a plurality of pivotally connected links including a plurality of side straps with cross members extending therebetween, a plurality of cutter bits detachably mounted in said chain, each of said cutter bits having engagement with said cross members at longitudinally spaced points and having a tongue extending between said side straps having opposite faces engaging said cross members, each of said bits having an apertured portion having a bend therein extending from the outside of said bit through said tongue, and a pin adapted to be driven through said apertured portion of said bit from the outside thereof and to be locked therein by the bend in said apertured portion, and to have engagement adjacent its inner end with one of said cross members, to positively hold said bit to said link.

20. In an endless cutter chain, a plurality of pivotally connected links including a plurality of side straps with cross members extending therebetween, a plurality of cutter bits mounted between certain of said side straps and having engagement with said cross members, each of said bits having an apertured portion, and a pin adapted to be driven through said apertured portion and have engagement with one of said cross members, for locking said bit to said chain.

21. In an endless cutter chain, a plurality of pivotally connected links including a plurality of side straps with cross members extending therebetween, a plurality of cutter bits detachably mounted in said chain, each of said cutter bits having engagement with said cross members at longitudinally spaced points and having a tongue extending between said side straps having opposite faces engaging said cross members, each of said bits also having an apertured portion extending from the outside of said bit through said tongue, and a pin adapted to be driven through said apertured portion of said bit from the outside thereof and to have engagement adjacent its inner end with one of said cross members, to positively hold said bit to said link.

CHARLES E. STOLTZ.