June 9, 1959 W. SILKS 2,890,033

TRIMMER BARS FOR BORING TYPE MINING MACHINES

Filed July 3, 1957

3 Sheets-Sheet 1

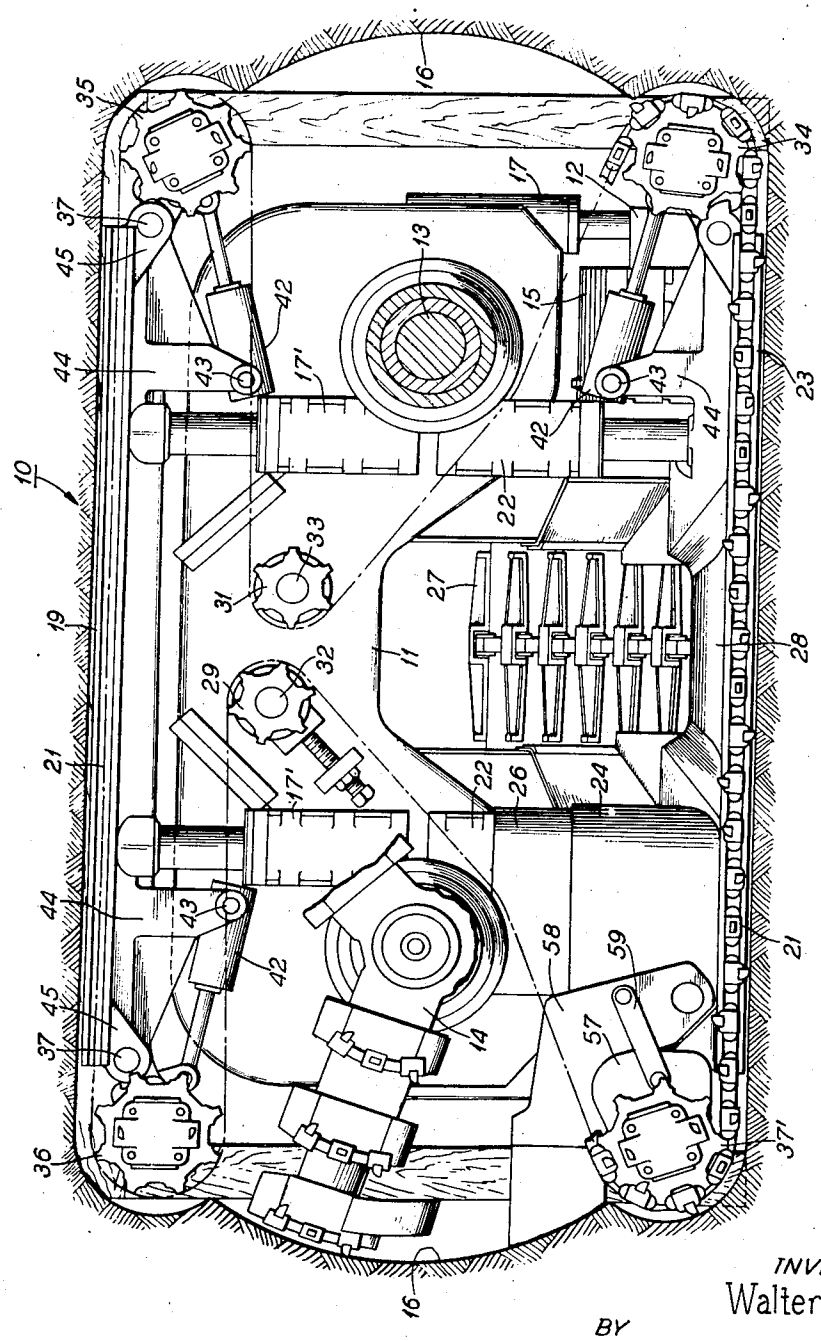


Fig. 1

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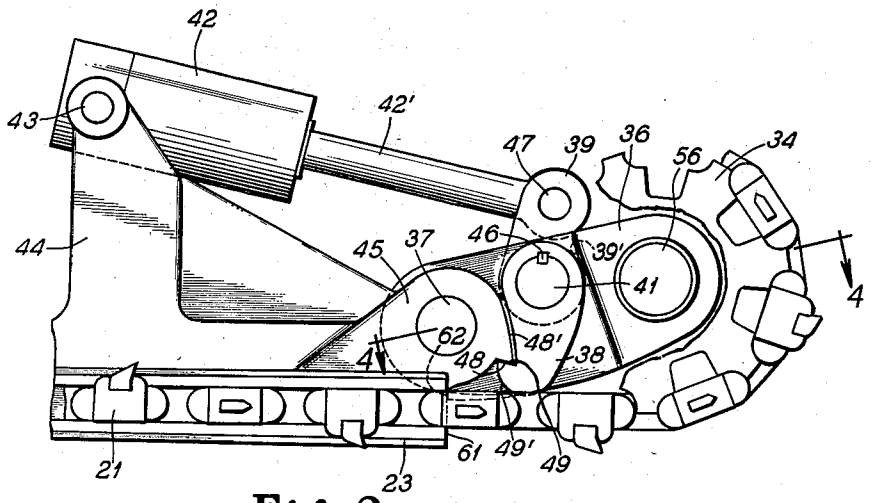


Fig. 2

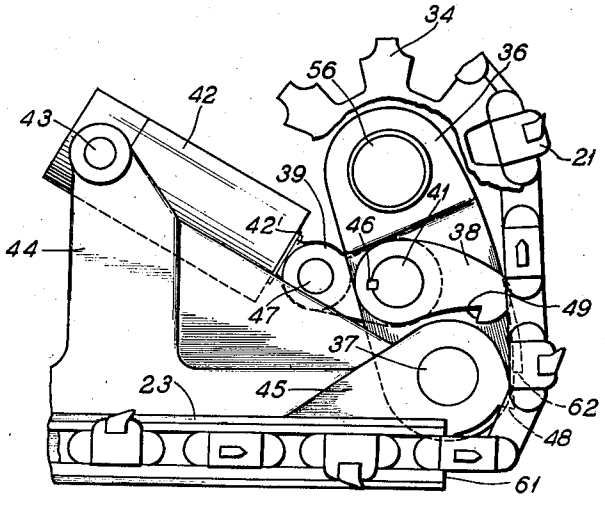


Fig. 3

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3 Sheets-Sheet 3

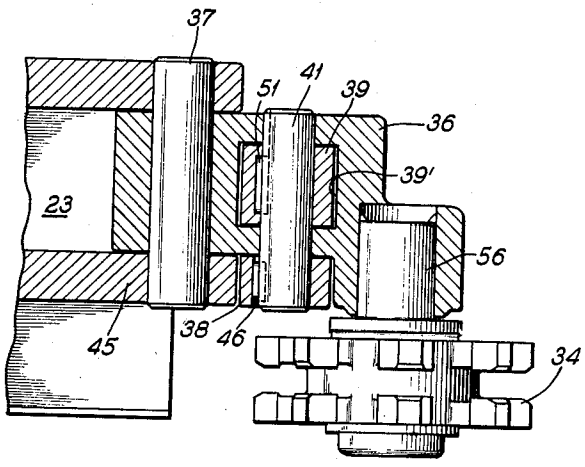


Fig. 4

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2,890,033

Patented June 9, 1959

2,890,033

TRIMMER BARS FOR BORING TYPE MINING MACHINES

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Application July 3, 1957, Serial No. 669,796

5 Claims. (Cl. 262—7)

This invention relates generally to trimmer bars for boring type mining machines, and more particularly to improved means for extending and retracting auxiliary cutter means at opposite ends of such trimmer bars.

In boring type mining machines which cut contiguous bores in a seam of coal or the like, it is customary to provide trimmer bars to define the roof and floor levels between adjacent boring heads. Such trimmer bars usually have an orbitally movable chain guided for movement in a grooved track along said bars. It is often desirable to extend the roof or floor surfaces beyond the outer boring heads. This extended cut is made at floor level to provide more room for maneuvering the machine, and the flat extension is cut at roof level to provide room for the placement of roof beams with their attendant supporting props.

Auxiliary extension means, pivotally mounted on the ends of the trimmer bar are commonly employed to produce the above-mentioned extended cuts. This extension means is preferably retractable to provide clearance at the side of a machine for maneuvering into a new cutting position or for withdrawing the machine from the working place.

In the past, it has been customary to operate the pivotal extension means by a system of toggle links which, in the extended position, form a column to resist the forces tending to collapse or retract the extension means. It is customary to provide some additional means, such as a jack, to hold the toggle links in columnar alignment.

In practice, however, the toggle links often tend to buckle while in use, and damage the jack or its connections.

The principal object of the present invention is to provide an improved and simplified form of pivotal extension, without the use of toggle links, but including a latch engageable to resist movement of the extension means out of extended position.

A further object is to provide power operating means for the extension means which also serves to engage and disengage the latch which holds the extension means in its extended position.

Other objects and advantages of the present invention will more fully appear as the following description proceeds.

In the drawings:

Figure 1 is a front view of an mining machine made in accordance with the present invention, with portions of the boring heads broken away to show parts of the trimmer bars and the extension means therefor;

Figure 2 is a detail fragmentary view on an enlarged scale showing the extension means on the end of the lower trimmer bar in extended or working position, but with the pusher plate means omitted;

Figure 3 is a view similar to Figure 2 but showing the extension means in retracted position; and

Figure 4 is a sectional view taken along line 4—4 of Figure 2.

Referring now to the embodiment of the invention shown in the drawings, the numeral 10 designates generally a boring type mining machine having a gear box 11 mounted upon a frame 12 by conventional means, including jacks 17. The frame 12 is mounted for movement on crawler treads 15. Parallel drive shafts 13 extend forwardly from the gear box 11 and have boring heads 14 at their front ends arranged to cut a pair of parallel bores in the seam of coal or mineral material, and leaving a generally semicircular wall or rib 16 on both sides of the machine. Such boring action also leaves upstanding cusps on the floor and depending cusps at the roof which are respectively cut off by an upper trimmer bar 19 and a lower trimmer bar 23. The upper trimmer bar 19 is mounted, as usual, on the gear box 11 for vertical movement relative thereto by a pair of laterally spaced jacks 17'. The lower trimmer bar 23 is similarly mounted on the gear box by jacks 22.

A chain flight conveyor 27 is mounted centrally of the frame and has an open throat 28 opening above the lower cutter bar for receiving the disintegrated material, as usual in machines of this type. Upright pusher plates 24 and 26 are mounted on the trimmer bar at each side of the conveyor throat 28 for directing the disintegrated material toward the throat 28.

The upper and lower trimmer bars 19 and 23 support an endless cutter-carrying cutter chain 21 which, in the form shown in Figure 1, travels from left to right along the lower cutter bar 23, thence around a corner sprocket 34 at one end of the lower bar to a drive sprocket 31 driven by a shaft 33 extending from the gear box 11. The chain 21 then travels from the drive sprocket to another corner sprocket 35 at the adjacent end of the upper cutter bar 19, and thence along the upper cutter bar 19, where it travels from right to left. Leaving the upper cutter bar 19, the chain passes around a third corner sprocket 36 to a take-up sprocket 29 mounted on a stub shaft 32 on gear box 11. From the take-up sprocket 29, the chain 21 travels to a fourth corner sprocket 37' and thence into the lower cutter bar 23. The corner sprockets 34, 35, 36 and 37' are movable with their respective extension means, as will presently be described.

Referring now to Figures 2, 3 and 4, the extension means is shown in greater detail. For convenience, the lower right hand extension means will be described inasmuch as the four extension means are essentially similar.

The cutter bar 23 has an upstanding support 44 having a pivot pin 43 at its upper end for one end of a jack 42. The cutter bar 23 also has a terminal support 45 at its right end which carries a pivot pin 37. A rock arm 36 is pivotally mounted on pin 37 and has a stub shaft 56 at its outer end on which the corner sprocket 34 is rotatably mounted for moving the cutter chain 21 into and out of working engagement with the coal. The rock arm 36 also has a pin 41 intermediate its ends to which is keyed an upwardly and inwardly extending latch lever 39 by key 51 and a depending latch arm 38 by key 46. Latch lever 39 has a pivot pin 47 at its outer end which engages the piston rod 42' of jack 42, thus establishing a connection between the cutter bar support 44 and the latch lever 39.

The terminal support 45 on the cutter bar has a downwardly facing locking shoulder 48 which is adapted to be engaged by a matching locking shoulder 49 on the latch arm 38. When the rock arm 36 is in its fully extended position as seen in Figure 2, the locking shoulders 48 and 49 are adapted to be moved into mutual engagement to resist upward swinging movement of said rock arm.

The rock arm 36 has a stop shoulder 62 adapted to engage the adjacent end surface 61 of the cutter bar 23

to limit the outward swinging movement of the rock arm in its fully extended working position.

Outward and downward movement of the latch lever 39 relative to the rock arm 36 is limited by engagement of the outer face of said latch lever against an abutment 39' on the rock arm 36, as seen in Figure 2.

As seen at the left end of the lower cutter bar in Figure 1, auxiliary telescopic pusher plates 57 and 58 connected by link 59 may also be mounted for movement with the rock arm 36, but for convenience, such pusher plates are omitted from Figures 2, 3 and 4, as they form no part of the present invention.

In operation, the machine 10 may be brought to the working place or room with the cutter bars 23 and 19 retracted and the rock arms 36 folded inwardly. The cutter bars 23 and 19 are first extended vertically to their proper working height, and each rock arm 36 carrying corner sprocket 34 is then swung by its jack 42 to set the cutter chain 21 in extended working position. Extension of the jack 42 first pushes the rock arm 36 outwardly about pin 37, with the outer face of the latch lever 39 engaging the abutment 39' on said rock arm. During the initial outward swinging movement of the rock arm 36, the arcuate surface 49' on the outer end of the latch arm 38 beyond the locking shoulder 49 rides on a cam surfaces 48' which terminates at the locking shoulder 48 on the terminal support 45, until the locking shoulders 48 and 49 register with each other. Further extension of the jack 42 then causes the latch arm 38 to swing inward to engage the locking shoulders 48 and 49 in locking position.

Conversely, retraction of the jack 42 first swings the latch arm 38 and latch lever 39 outwardly to disengage the locking shoulders 48 and 49, and then causes the rock arm 36 to pivot about pin 37 into retracted position, as seen in Figure 3.

Thus, the jack 42 serves dual functions of extending and retracting the entire extension means, and engaging and disengaging the latch means.

While I have herein shown and described each trimmer bar 19 and 23 as having retractable corner sprockets at each end thereof, it should be understood that each corner sprocket need not be retractable and that for certain conditions a single retractable corner sprocket for each cutter bar is all that is necessary and for certain other conditions a single retractable corner sprocket may be provided for either the upper or lower trimmer bar.

Although I have shown and described a certain embodiment of my invention, it will be understood that various changes and modifications may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In a boring type mining machine, a mobile frame, a plurality of boring heads carried by the frame and rotatable about parallel axes extending forwardly of said frame for cutting contiguous bores in advance of the machine, a cutter chain carrying trimmer bar supported by said frame rearwardly of said boring heads and generally tangential thereto, an arm pivotally mounted on at least one end of said trimmer bar for movement toward and away from said frame, chain guide means carried by said arm, power means on said trimmer bar for moving said arm between extended and collapsed positions, said arm having a latch member pivotally connected thereto intermediate its ends, the inner end of said latch member being pivotally connected to said power means and the outer end of said latch member having a shoulder adapted to engage a shoulder fixed on said trimmer bar when the arms are in extended position, whereby said power means is effective to move the locking shoulder into and out of locking engagement while swinging said arm into extended and retracted positions respectively.

2. The structure of claim 1, wherein the power means consists of a jack pivotally mounted on the cutter bar adjacent its outer end.

3. The structure in accordance with claim 1, wherein the latching arm has limited outward movement relative to the extension arm.

4. In a boring type mining machine, a mobile frame, a plurality of boring heads carried by said frame for rotation about parallel axes extending forwardly of said frame for cutting contiguous bores in advance of the machine, a cutter chain carrying trimmer bar supported by said frame rearwardly of said boring heads and generally tangential thereto, an extension arm pivotally mounted on at least one end of said trimmer bar for movement toward and away from said frame, a chain direction changing member carried by said arm, power means mounted on said trimmer bar for moving said arm between extended and collapsed positions including an extensible power member, latch means connecting said power member with said arm and cooperating with said trimmer bar to hold said arm in extended position upon extensible movement of said power member, said latch means being operable in response to retractable movement of said power member to release and retract said arm.

5. In a boring type mining machine, a mobile frame, a plurality of boring heads carried by said frame and rotatable about parallel axes extending forwardly of said frame for cutting contiguous bores in advance of the machine, a cutter chain carrying trimmer bar supported by said frame rearwardly of said boring heads and generally tangentially thereto, an extension arm pivotally mounted on at least one end of said trimmer bar for movement toward and away from said frame, a chain direction changing member carried by said arm, power means on said trimmer bar for moving said arm between extended and collapsed positions including an extensible power member, latch means pivotally connecting said power member to said arm and having interengagement with said trimmer bar to hold said arm in said extended position upon extensible movement of said extensible power member, and a camming connection between said trimmer bar and said latch means limiting pivotal movement of said latch means with respect to said arm and accommodating full extensible movement of said arm during movement of said latch means into an engaged position.

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