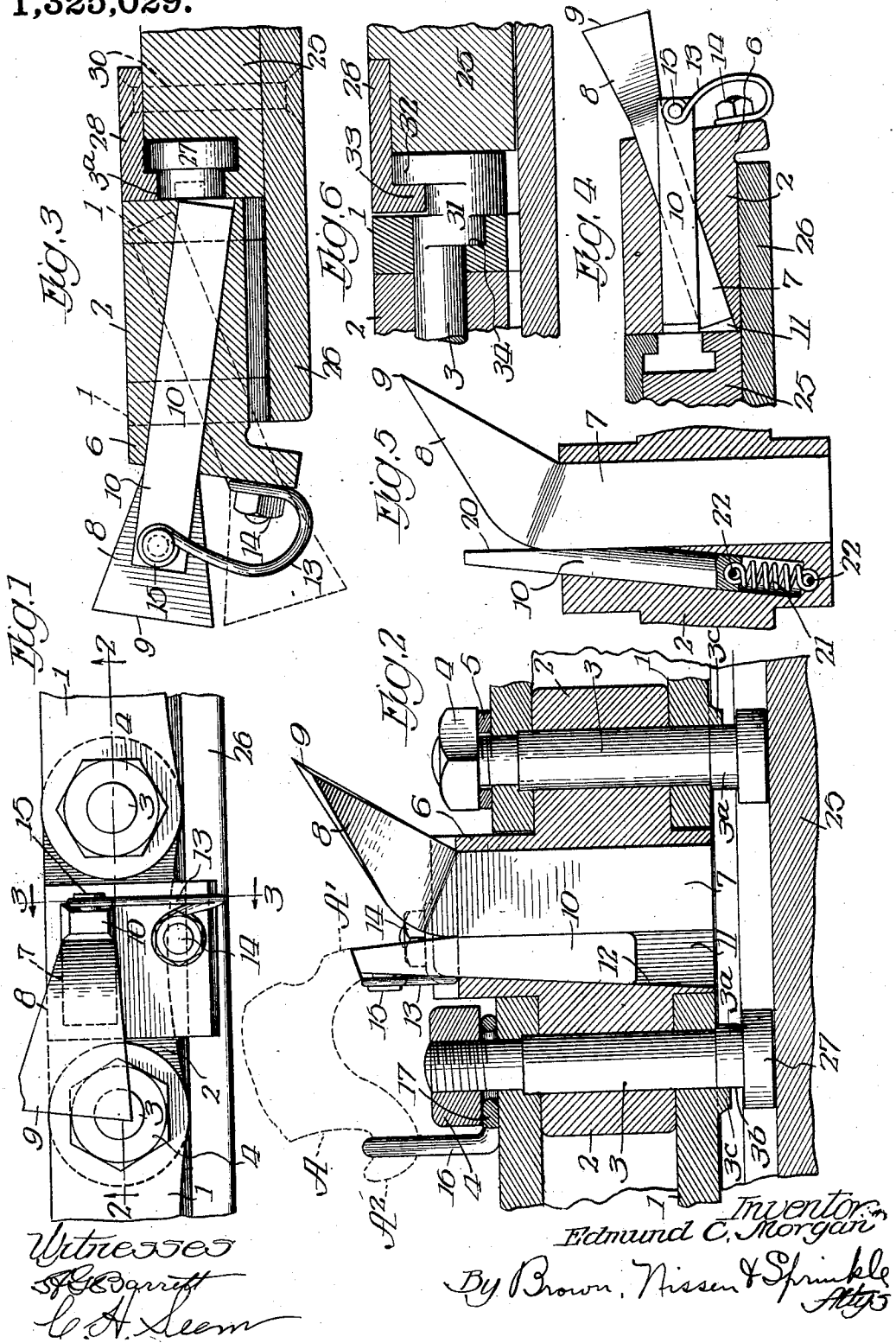
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CUTTING CHAIN FOR MINING MACHINES.

APPLICATION FILED SEPT. 5, 1914.

1,325,029.

Patented Dec. 16, 1919.



Witnesses

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CUTTING-CHAIN FOR MINING-MACHINES.

1,325,029. Specification of Letters Patent. **Patented Dec. 16, 1919.**

Application filed September 5, 1914. Serial No. 860,371.

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cutting-Chains for Mining-Machines, of which the following is a specification.

My invention relates to improvements in cutting chains and has more particular reference to improvements in cutting chains of the type used in mining machines. One of the objects of my invention is to provide an improved device of this character which will be simple, durable and reliable in construction, and effective and efficient in operation. Other objects of my invention will appear hereinafter.

Referring to the accompanying drawings:

Figure 1 is a side elevation of a portion of a cutting chain embodying my invention.

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view similar to Fig. 3 illustrating a modified form of my invention.

Fig. 5 is a sectional view illustrating still another modification, and

Fig. 6 is a sectional view illustrating still another modification.

It is desirable in mining machines to use chains having a plurality of cutting bits or parts carried thereby so that as the chain travels the bits progressively cut into the mine wall. The bits however are likely to become damaged or broken or become dull from use, and it is desirable therefore that the bits be quickly and conveniently removable and replaceable. In the drawings I have shown several structures which embody my invention and which provide for the convenient removal of cutting bits. In the construction shown the chain is of the side cutting type, that is to say the cutting bits project laterally at intervals from the side of the chain and in operation the chain enters the wall of the mine in a direction transverse to the line of travel of the chain itself. This chain is made up of a plurality of spaced side links 1 and intermediate links 2. The intermediate links are positioned not only intermediate the ends of two pair of side links but also in position between the two side links of each pair, as clearly shown in the sectional view of Fig. 2. The links are fastened together by means of bearing bolts 3 passed through suitable holes in the intermediate and side links to make up a complete chain. These bolts are threaded at one end and are provided with nuts 4 thereon for the purpose of holding them in position. At their other ends the bolts are slightly enlarged as at 3^a and a portion of this enlargement is flattened as at 3^b and engages lugs 3^c on the side links to prevent the rotation of the bolts with respect to the links. Interposed between the nuts and the side links of the chain are washers 5, preferably of the locking type although they may be of any suitable construction for the purpose. The intermediate links in the present construction have lateral extensions 6 at one side projecting preferably to a point substantially flush with the nut ends of the bolts. These extensions 6 together with the main portions of the intermediate links 2 are provided with holes or openings, preferably extending entirely therethrough, to provide sockets for holding the shanks of the cutting bits. The shanks 7 of the cutting bits are preferably of rectangular section so as to prevent the rotation of the bits, and the sockets or openings in the intermediate links are preferably of corresponding sectional shape so that the bits may readily be inserted or removed therefrom. These bits have cutting knives 8 which at one end have transverse cutting edges 9. The knife portions 8 of the cutting bits are inclined at an angle to the longitudinal axes of their shanks and these cutting portions 8 are generally positioned in the chain so that they point in the direction in which the chain travels. The sockets in the intermediate links are also inclined or angularly disposed so that they hold the bits in position to cut a kerf which is wider than the thickness of the chain, thereby readily admitting the chain into the kerf. Alternate bits are preferably staggered or inclined in opposite directions as shown clearly in Fig. 3 so as to secure the proper width of kerf. In the construction shown I provide fastening means which removably hold these bits in place. In the structure shown in Figs. 1 and 3 the fastening means is in the form of a wedge shaped or tapered member 10 which is inserted in a socket 11 alongside the bit. One of the walls 12 of the socket is tapered

corresponding to the taper of the wedge member and it will be observed that the socket 11 and the wedge shaped member converge in the direction of removal of the bit. In order to maintain the wedge member tightly in clamping position against the shank of the bit, I provide means which has a tendency to constantly draw or pull the wedge member toward the converged or smaller end of its socket 11. This means, in Figs. 1, 2, and 3, consists of an elastic or spring member 13. One end of the spring member is fastened to the end of the extension 6 of the intermediate link by means of a bolt and nut 14. The other end of the spring is bent around a small headed projection 15 on the end of the wedge member 10. This spring exerts a force upon the wedge member 10 tending to pull it out of its socket; consequently it holds the bit firmly in place. It will be noted that during the operation of the chain any force which tends to pull the bit out of its socket acts upon the wedge in such a manner as to cause it to increase its clamping effect upon the bit. Hence the greater the force tending the pull the bit out, the greater clamping effect the wedge will have upon the bit. In Fig. 2 I have indicated means by which the bit may be quickly and conveniently released. A tool A, such as indicated in dotted lines in Fig. 2, has a heel A^1 arranged to press upon the outer end of the wedging member 10. This tool may have a long handle for operating it and in order to give the proper leverage it is provided with a hooked portion A^2. This hook is intended to engage a loop member 16 carried by the chain adjacent each bit. In the construction shown this loop may be in the form of a piece of rod bent in the form of a loop and having a portion 17 positioned between the nut 4 and one of the side links in the place of the washer 5 for clamping the loop in position. To release the bit it is thus simply necessary to hook the portion A^2 of the tool into the loop and operate the handle portion so as to press upon the end of the wedge or clamping member 10. The clamping member 10 can thus be held in a non-clamping position until a bit has been removed and another one inserted. The ends of the spring 13 can also be fastened in such a manner as to prevent the loss of the wedging member in case there is no bit in its socket. In Figs. 1, 2, and 3, it will be noted that the longitudinal axis of the socket 11 is inclined in the same direction as the longitudinal axis of the socket for holding the bit. In Fig. 4 this is slightly modified in that the longitudinal axis of the socket 11 and the wedging member 10 is at right angles to the line of travel of the chain itself so that each clamping member 10 occupies a position at an angle with respect to the shank of the bit. Furthermore this clamping member is positioned in front of the cutting bit instead of the rear thereof as is the case of the construction of Figs. 1, 2 and 3. In Fig. 5 the construction is still further modified in that the wedging member is in the form of a rod which is circular in section. A portion of this rod is cut to form a flat face 20 which bears against one of the faces of the bit shank. The socket in which this member is positioned is also circular in section but the longitudinal axis of the socket is inclined or positioned at an angle to the axis of the bit shank the degree being such as to press the flat face 10 of the flattened member against the bit. This member, like in the construction in Figs. 1 and 3, is also forced outwardly in the direction of removal of the bit but in this case a compression spring 21 is positioned between the inner end of the clamping member 10 and the bottom of its socket. The ends of the spring may be attached to the end of the socket and to end of the member 10 respectively by means of pins 22 or otherwise so as to prevent the loss of the member 10 in case there is no bit in position. The chain, in order to hold it substantially rigid while it is cutting along its proper lines, is adapted to be supported by a frame or guiding member. In this construction this frame 25 as shown in Figs. 1 to 5 has a flange or extension 26 on one side forming, in a sense, a runway in which the chain may travel. This however does not prevent the chain from becoming separated from the frame and on this account I provide the bearing bolts 3 with heads 27 preferably circular in form. The edge of the frame 25 is provided with a continuous channel or groove in which these heads may travel. One side of the undercut groove may be formed in the frame itself and the other side formed by a flanged strip or plate 28 secured to the frame by means of the bolts 30 or otherwise. This construction is clearly shown in Fig. 3 and operates to prevent the relative displacement of the chain and frame while it is operating. In Fig. 6 the construction is slightly modified in that the bolt has an offset portion 31 at one end and this offset portion carries a lateral extension or head 32 which engages the flange 33 on the holding plate 28. The side link 1 may have a correspondingly shaped socket 34 to hold the offset portion 31 of the bolt and in this manner the bolt may be positively locked against rotation on its own axis while the chain is traveling.

The specific form of guiding mechanism herein described and shown in the drawings, is covered by claims in my copending application Ser. No. 848,726, filed July 3, 1914, for an improvement in cutter chains for mining machines.

Obviously those skilled in the art may make various changes in the details and

arrangement of the parts without departing from the spirit and scope of my invention as defined by the claims hereto appended, and I wish therefore not to be restricted to the precise construction herein disclosed.

I claim:

1. In a chain cutter for mining machines, the combination with a plurality of links and transverse pivotal connections between said links, of guiding mechanism on one side of the chain at the inner ends of such pivotal connections, a plurality of cutting tools removably mounted in some of said links and extending into the same substantially parallel with said pivotal connections and projecting from such links into cutting position on that side of the chain opposite the guiding mechanism, and means extending longitudinally of each of said cutting tools for holding the same in cutting position during the travel thereof parallel to the plane of drive and spaced therefrom.

2. In a chain cutter for mining machines, the combination with a link having a socket therein, of spaced-apart pivot pins for pivotally connecting said link to the next adjacent links, said pivot pins extending in the direction of feed of the chain cutter and said socket being substantially parallel to said pivot pins, mechanism extending substantially parallel to said pivot pins and located between the same in said socket to hold said cutting tool for travel parallel to the plane of drive and spaced therefrom, said plane of drive being substantially perpendicular to said pivot pins and intermediate the ends thereof, and means connected to said holding mechanism to cause the same to automatically lock said tool in said socket after said tool has been inserted in said socket.

3. A chain cutter for mining machines comprising a link having a transverse socket with straight walls where engaged by the tool shanks, a cutting tool having a shank adapted to be inserted into said socket and engage such straight walls, a fastening wedge in said link in position to engage the back of the tool shank relative to the direction of cutting travel of the tool, means yieldingly urging said fastening wedge in a direction approximately longitudinal of said socket and against said shank when inserted in said socket to permit free insertion of said shank and lock it automatically against withdrawal whether fully or partially inserted in said socket, said shank having flat plane faces for engaging the walls of said socket at various depths relative to said link, and an extension projecting from said wedge in position to receive a hammer blow to quickly release said wedge and permit quick withdrawal of said tool.

4. In a chain cutter for mining machines, the combination with a chain comprising side links and intermediate links, said side links being in spaced-apart parallel planes parallel to the plane of drive, said intermediate links having sockets therein extending transversely of such plane of drive, cutting bits inserted in said sockets in position for a cutting path of travel parallel to the plane of drive and spaced therefrom, said bits being removable from the outer edge of said intermediate links, wedging members extending transversely of said links back of the cutting bits relatively to their cutting path of travel and in position to permit free and quick insertion of said bits in said sockets, resilient means for forcing said members in wedging positions along said bits to lock said bits against removal from said sockets, and projections from said wedging members in position to receive hammer blows against the action of said resilient means to release said wedging members quickly and also release said bits for quick withdrawal from their sockets.

5. In a chain cutter for mining machines, the combination with a chain having a plane of drive transverse to a plane extending through the chain and the line of cutting travel, of guiding mechanism for said chain along a path parallel to said plane of drive and spaced therefrom on one side of said chain, said chain embodying side links and an intermediate link having a tool socket extending substantially at right angles to the plane of drive, said chain also comprising parallel spaced-apart pivotal connections extending in the direction of feed at right angles to the plane of drive and between the intermediate link and the side links, a cutting bit inserted in the socket in said intermediate link to extend from the side of the chain opposite the guiding mechanism in position to have a path of travel parallel to the plane of drive and spaced therefrom, a wedge member coöperating with the walls of said socket to clamp said cutting bit in position and resilient means connected to said wedge to automatically replace said wedge in locking position when released.

6. In a chain cutter for mining machines, the combination with a chain link having a tool socket therein, of a cutting bit inserted in said socket, a wedge member coöperating with the walls of said socket to clamp said cutting bit in position, spaced apart pivotal bearings each substantially parallel to said wedge member, and means for yieldingly holding said wedge member in contact with said cutting bit.

7. In a chain cutter for mining machines, the combination with a chain embodying flat side links and an intermediate cutter holder link having a transverse socket relatively to said flat side links, pivot pins extending through holes in the end portions of said side links and through end portions

of said intermediate link also transversely of said intermediate link and said side links, means for holding said pivot pins in position, a cutting bit having a shank extending into said socket in substantial parallelism with said pivot pins, and means for automatically clamping said cutting bit in operating position.

8. In a chain cutter for mining machines, the combination with a cutter holder link having a socket therein, of a cutting tool having a shank extending into said socket, a wedge in said socket engaging said shank, said wedge having an exteriorly extended portion, and a spring mounted on said cutter holder and connected to the extended portion of said wedge to act thereon to constantly urge said wedge against said shank to clamp the latter in position during the operation of said tool.

9. A traveling chain cutter comprising a plurality of links and parallel pivotal connections between the same and extending transversely of the chain and in the direction of feed thereof, the plane of drive being between the ends of the pivotal connections and at right angles thereto, some of said links having sockets extending transversely to said plane of drive, cutting tools each having a shank extending into one of said sockets and a cutting member extending from one side of said chain for travel along a path parallel to said plane of drive and spaced therefrom, wedges each extending transversely of the plane of drive and each in position to hold one of said tools in cutting position during the lineal travel of said chain, and guiding mechanism for that side of the chain opposite the side from which the cutting end is projected, said cutting mechanism extending along a path substantially parallel to the plane of drive and spaced therefrom.

10. A traveling chain cutter comprising a link having spaced-apart pivotal bearings substantially parallel to each other and an intermediate socket substantially parallel to said bearings and substantially perpendicular to the plane of drive, a cutting tool extending into said socket and having a cutting path of travel spaced from the plane of drive and substantially parallel thereto, a member extending into said socket together with said tool to hold the latter in cutting position during lineal travel of said tool and during the feed thereof in the direction of said pivotal bearings transversely of the plane of drive, and a spring connected to said member to move the same to holding position when said member is released after inserting said tool into said socket.

11. A traveling chain cutter comprising a link having a socket extending into the same transversely of the chain, pivotal connections for the next adjacent links spaced apart on opposite sides of said socket and extending transversely of the chain, a cutting tool extending into said socket directly between said pivotal connections, a device extending into said socket and engaging said tool, and a spring acting on said device for holding the same against said tool during lineal travel thereof.

12. A traveling chain comprising a link having a socket extending into the same along the direction of feed and transversely of the plane of drive of said chain, pivotal connections between said link and said adjacent links, said pivotal connections extending in the direction of feed and substantially at right angles to the plane of drive and spaced apart on opposite sides of said socket, a cutting tool extending into said socket transversely of the plane of drive and between said pivotal connections and extending from one side of said chain to cut during lineal travel of said chain along a path spaced from and parallel to said plane of drive, and a clutch embedded in said link back of said tool relatively to the cutting travel thereof to prevent withdrawal of said tool during lineal cutting travel thereof but said clutch having an extension from said socket for permitting quick substitution for said tool of another tool exteriorly of said link and the socket therein.

13. A traveling chain comprising a chain link having a socket extending transversely of the chain, a cutting tool capable of being freely inserted directly into the socket in said link from the outer side of said chain without altering the connections between said tool holder and other parts of said chain, and automatic mechanism carried directly by said link and extending transversely thereof in position to coöperate with such socket to permit free insertion of said cutting tool but locking it against removal therefrom.

14. A traveling chain cutter comprising a cutting tool, a holder therefor, a locking device extending exteriorly of said holder, and a spring connected to the extended portion of said locking device and acting thereon to automatically hold said locking device in locking position to prevent withdrawal of said cutting tool during operation thereof.

15. In a chain cutter for mining machines, the combination with a chain having spaced-apart flat links in parallel planes and in parallelism with the plane of drive between them, said chain also having an intermediate link with a tool socket extending therein in the direction of feed of said chain and transversely of the plane of drive, a pair of pivot pins extending transversely to end portions of said intermediate link

and end portions of said side links, means for holding said pivot pins in position for relative pivotal movement between said intermediate link and said side links, said side links having a lineal travel in their own planes, a cutting tool extending into said transverse socket transversely of the plane of drive and extending from such socket in position for a cutting path of travel spaced from the plane of drive and parallel thereto, a wedge in said socket for engaging said cutting tool to hold the latter in said socket during lineal cutting travel of the chain and the feed of the latter in the direction of said pivot pins, a guide frame, and interlocking mechanism between said guide frame and that side of the chain opposite the side from which the cutting tool projects for guiding the chain along said frame but preventing it from moving away therefrom when said guide frame is withdrawn from the kerf produced by said cutter.

16. In a chain cutter for mining machines, the combination with a link having a tool socket extending transversely thereof and transversely of the plane of drive of the chain cutter, of a cutting tool extending into said socket and extending from one side of said chain for a path of cutting travel parallel to said plane of drive and spaced therefrom, a key located in said socket to engage said tool and projecting from said socket on the same side of said chain from which said cutting tool projects, and a spring carried directly by said link and connected to said key for yieldingly holding the latter against said tool to lock the latter in position during the cutting travel thereof but permitting free and quick removal of said tool when said key is released by striking it a blow on that portion projecting from said socket.

17. In a chain cutter for mining machines, the combination with a link having a socket, of a tool having a shank extending into said socket, a wedge-shaped key in said socket engaging said shank, and yielding means exteriorly of said link for holding said key against said shank to lock the cutting tool in said socket during cutting operation thereby but permitting free removal of said cutting tool when said key is released.

18. In a chain cutter for mining machines, the combination with a link having a socket extending in the direction of feed and transversely to the plane of drive, of a cutting tool having a shank embedded in said socket, means for limiting the extent of movement of the shank into said socket to hold the cutting member of said tool in position for a path of cutting travel spaced a predetermined distance from the plane of drive, a key embedded in said socket extending along one edge of said shank back of the tool relatively to its lineal cutting travel and projecting from said socket in position to be struck a hammer blow to release the cutting tool quickly, and means acting on said key for releasably holding said key against said shank.

19. In a chain cutter for mining machines, the combination with a link having pivotal connections at its end portions and a socket extending transversely of said link between said pivotal portions, of a cutting tool having a shank extending directly into said socket between said pivotal portions, a key mounted longitudinally of said shank directly in said link and projecting from said socket back of the cutting tool relatively to its cutting path of travel, and yielding means for holding said key against said tool to lock the latter in cutting position, the exposed end of said key being adapted to be struck against the action of said yielding means to release said tool from its socket to permit quick withdrawal and the quick insertion of another tool.

20. In a chain cutter for mining machines, the combination with a link, of a tool having a shank mounted in a socket extending directly into the link itself, a key in the link itself extending approximately longitudinally of said shank, and means urging said key against said tool to lock the same in cutting position, said key being exteriorly extended and adapted to receive a hammer blow to quickly release said tool for withdrawal from said socket, thereby permitting quick replacement of the withdrawn tool by another tool, such replacement being effected against the action of such urging means and the latter acting automatically to lock the new tool in position.

21. In a chain cutter for mining machines, the combination with a chain comprising a plurality of socket links, of guiding mechanism associated with one edge of said chain, cutting tools mounted in said socket links with their shanks in the plane of travel of said chain but extending transversely thereof, keys extending longitudinally of said shanks, and yielding means exteriorly of said chain for holding said keys against said shanks.

22. In a chain cutter for mining machines, the combination with a socket link, of a cutting tool having a shank mounted in said socket link, and a self-acting clamp associated with said shank and extending longitudinally thereto and back thereof relatively to the lineal cutting travel of said cutting tool to lock the latter rigidly in position relatively to said link.

23. In a chain cutter for mining machines, the combination with a socket link, of a traveling cutter having a shank extending transversely of said link, and an automatic gripping clamp mounted in said socket link

back of said cutter relatively to the cutting path of travel thereof to permit insertion of said cutting tool into said socket link but preventing withdrawal thereof.

24. In a chain cutter for mining machines, the combination with a link having a tool socket extending transversely thereof directly between the pivotal end portions of said link, of a cutting tool mounted directly in said socket to extend transversely of said link between the pivotal portions thereof, and means comprising a yieldingly mounted clamping member extending transversely of said link between the pivotal portions thereof in position to permit free and quick insertion from the exterior of the link of said cutting tool but gripping said tool upon attempted withdrawal of said tool from said socket, and an exterior extension on said member adapted to receive a hammer blow to release said tool from its socket to permit quick withdrawal thereof.

25. In a chain cutter for mining machines, the combination with a link having a cutting tool socket extending entirely through said link and transversely to the plane of drive of the chain cutter, of a cutting tool having a shank embedded in said socket and a cutting member extending into position for a cutting path of travel spaced from said plane of drive, and means also embedded in said socket back of said shank relatively to the cutting path of travel of said cutting tool for holding the tool in cutting position and taking the direct thrust of said tool during its cutting operation, said means extending from said socket longitudinally of said cutting tool in position for receiving a hammer blow to release the same quickly, the embedded portions of said cutting tool and said holding means being entirely inclosed.

26. In a chain cutter for mining machines, the combination with a chain comprising a tool socket link, of a cutting tool extending directly into the socket of said link, clamping mechanism extending along the said tool in the link itself for holding said tool firmly in position to move bodily with said link without movement relatively thereto, and a shoe having a toe adapted to step on a part of said chain while its heel engages said clamping mechanism for the application of force longitudinally of said clamping mechanism to release said clamping mechanism.

27. In a chain cutter for mining machines, the combination with a link socket member, of a cutting tool mounted therein, clamping mechanism for said cutting tool and comprising a member extending into said socket and an exterior projection, a hooked device having a heel engaging said exterior projection, and a seat mounted on said chain to receive the hooked portion of said member.

28. In a chain cutter for mining machines, the combination with a plurality of alternate socket links and alternate intermediate links, of cutting tools mounted in the socket links, yieldingly mounted wedges in the socket links acting as clamping mechanism for said cutting tools, said wedges having exterior projections, a seat mounted on an intermediate link, and a releasing device having a heel engaging said exterior projection and a toe mounted on said seat.

29. In a chain cutter for mining machines, the combination with a plurality of alternate socket links and alternate intermediate links, of pivot bolts extending transversely through end portions of said alternate socket links and transversely through end portions of said intermediate links, cutting tools mounted in the socket links transversely thereof, yieldingly mounted wedges in the socket links acting as automatic clamping mechanism for said cutting tools, each of said wedges having an exterior projection, seats, nuts on alternate bolts for holding said seats against the corresponding outer intermediate links, nuts for holding the other bolts in position, and a releasing shoe having a heel engaging said exterior projection and a toe stepping on said seats.

30. In a chain cutter for mining machines, the combination of a plurality of side links and intermediate links, said intermediate links having transverse sockets, cutting tools removably positioned in said sockets, clamping devices positioned in said intermediate links, and means exterior of said intermediate links for yieldingly urging said clamp- and devices toward said cutting tools in a direction approximately longitudinally thereof.

31. In a chain cutter for mining machines, the combination with a link having a tool socket extending entirely through the same and transversely thereof, of means for pivotally connecting said link with the next adjacent links on pivotal axes extending transversely of said link, a cutting tool extending into said socket, a key in said socket and engaging said cutting tool, and a spring mounted on said link exteriorly thereof for yieldingly holding said key against said tool to lock the same in position during cutting operation but permitting free removal of said tool when said key is released by a sufficient endwise pressure thereon.

32. In a chain cutter for mining machines, the combination with a socket link, of a cutting tool having a shank extending into said socket link transversely thereof, said shank having straight plane surfaces on all four sides, means for pivoting said socket links to next adjacent links on axes extending transversely of said socket link, and a self-acting clamp extending transversely of said socket link and acting on said cutting tool

shank to hold the same in adjusted position during the cutting operation of said cutting tool.

33. In a chain cutter for mining machines, the combination with a link having spaced-apart perforations in its end portions for pivoted connections to the next adjacent links on parallel axes extending transversely of said link and in the direction of feed, said link having a tool socket extending transversely of said link in said perforations and having a forward plane wall and spaced-apart side walls, a cutting tool having a shank with a straight plane forward face to engage the forward wall of said socket, and straight plane side faces to engage the side walls of said socket, and means in said socket back of said shank relative to the direction of travel of the cutting tool to hold the cutting tool automatically in adjusted position after said shank has been inserted into said socket partially or fully to engage the forward wall and side walls of said socket.

34. In a chain cutter for mining machines, the combination with a plurality of tool socket links, of intermediate connecting links, pivot rods extending transversely of said tool socket links and of said intermediate links to pivotally connect said tool socket links to said intermediate links on axes extending transversely of said tool socket links, a guide frame, extensions from said pivot rods, mechanism on said guide frame to co-act with said extensions to guide said links over linear travel, cutting tools mounted in said socket links and extending transversely thereof between said pivot rods, said cutting tools extending into cutting position on the side of the links opposite the guiding mechanism, wedges in said sockets approximately in parallelism with said pivot rods, and springs acting on said wedges for continually holding the same in locking positions.

35. In a chain cutter for mining machines, the combination with a chain comprising a link having spaced-apart parallel bearings extending in the direction of feed of the cutter and intersecting the plane of drive thereof, of a cutting tool extending into a socket in said link transversely of said plane of drive between said spaced-apart bearings and projecting from said link in position for a cutting path of travel spaced from the plane of drive and substantially parallel thereto, automatic clamping mechanism carried by said link in position to permit quick insertion of said tool in said socket and prevent withdrawal thereof by locking said tool in rigid connection with said link, said clamping mechanism being releasable from the outer side of said chain to permit withdrawal of said tool from such side and the substitution therefor of another tool, pivot pins extending through said spaced-apart bearings, a guide frame following the chain cutter relatively to the feeding direction thereof, mechanism between said guide frame and said pivot pins for guiding the chain to cause the cutting tool to describe its aforesaid path of travel and lock said chain against movement from said guide frame in the direction of feed of said guide frame in the opposite direction from said chain, and mechanism for holding said pivot pins in fixed relation to said guide frame in the plane thereof and projecting in the direction of feed to confine the movement of the cutter to a lineal path.

36. In a chain cutter for mining machines, the combination with a plurality of pairs of side links and having a tool socket extending transversely thereof and transversely of the plane of drive, clamping mechanism on said intermediate link for holding said tool rigidly in position relatively to said intermediate link for bodily travel therewith, spaced-apart pivot pins extending through said pairs of links and through the end portions of said intermediate link in feeding direction substantially at right angles to the plane of drive, means for preventing the turning of said pivot pins relatively to the inner side links, a supporting frame for the chain and movable bodily therewith in feeding direction, and mechanism between said supporting frame and the inner ends of said pivot pins for guiding said chain to cause the cutting tool to have a path of travel spaced from the plane of drive and parallel thereof while confining the cutting tool to such path of travel by preventing tilting of said chain transversely to said frame and relatively thereto.

37. In a chain cutter for mining machines, the combination with a chain comprising two pairs of spaced-apart side links, of an intermediate socket link, pivotal connections between the respective pairs of side links and the end portions of said intermediate link, a tool extending into the socket of said intermediate link transversely of the plane of drive and projecting from said intermediate link into position for a path of travel spaced from said plane of drive and parallel thereto, clamping mechanism extending into the socket of said intermediate link back of the cutting tool for holding the latter rigidly in position relatively to said intermediate link, said clamping mechanism extending outwardly and being releasable exteriorly to permit quick replacement of the cutting tool by another, a supporting frame, and mechanism between said pivotal connections and said supporting frame for guiding said cutting tool along such path of travel and confining said tool to such path of travel by preventing movement thereof

transversely of such path of travel, said mechanism between said pivotal connections and said supporting frame guiding the chain along the forward portion of said frame in a direction transverse of the feeding direction and holding said chain in alinement with said frame.

38. In a chain cutter for mining machines, the combination with a chain comprising a plurality of pairs of side links, of an intermediate socket link, pivotal connections between the side links and socket links, a cutting tool extending into the socket of said intermediate link, clamping mechanism extending into the socket back of said cutting tool and having an outer projection for receiving a hammer blow to release said cutting tool from the forward side of said chain and the quick insertion of another tool from such side, a supporting frame extending from the other side of said chain in position to move along the kerf produced by the cutters, and interlocking guiding mechanism between said pivotal connections and said frame for preventing tilting of said chain relatively to said frame and also preventing movement of said chain away from said frame to confine the path of movement of said cutter to a lineal path spaced from the plane of drive at right angles to said pivotal connections and parallel to such plane of drive and the forward end of said frame.

39. In a chain cutter for mining machines, the combination with side links and an intermediate socket link, of pivotal connections between said side links and said intermediate socket link extending in feeding direction at right angles to the plane of drive, a tool extending into the socket of the intermediate link transversely to the plane of drive and between said pivotal connections, clamping mechanism extending into the socket of the intermediate link in position for releasably holding said cutting tool rigidly in connection with said socket link, a grooved supporting frame extending back from the chain along the line of said pivotal connections, and mechanism between the inner side of the chain and said frame and comprising members extending from said pivotal connections into the grooved frame for preventing tilting of the chain relatively to said frame while guiding the chain along said frame to cause said cutter to have a path of travel conforming to the contour of the forward edge of said frame and in alinement therewith in the direction of feed.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 2d day of September, A. D. 1914.

EDMUND C. MORGAN.

Witnesses:

CHARLES H. SEEM,

EDGAR FRANCIS BEAUBIEN.