Feb. 14, 1933. B. F. RASSIEUR ET AL 1,897,331

MINING MACHINE BIT AND BIT HOLDER

Filed June 20, 1932 2 Sheets-Sheet 1

Fig. 1.

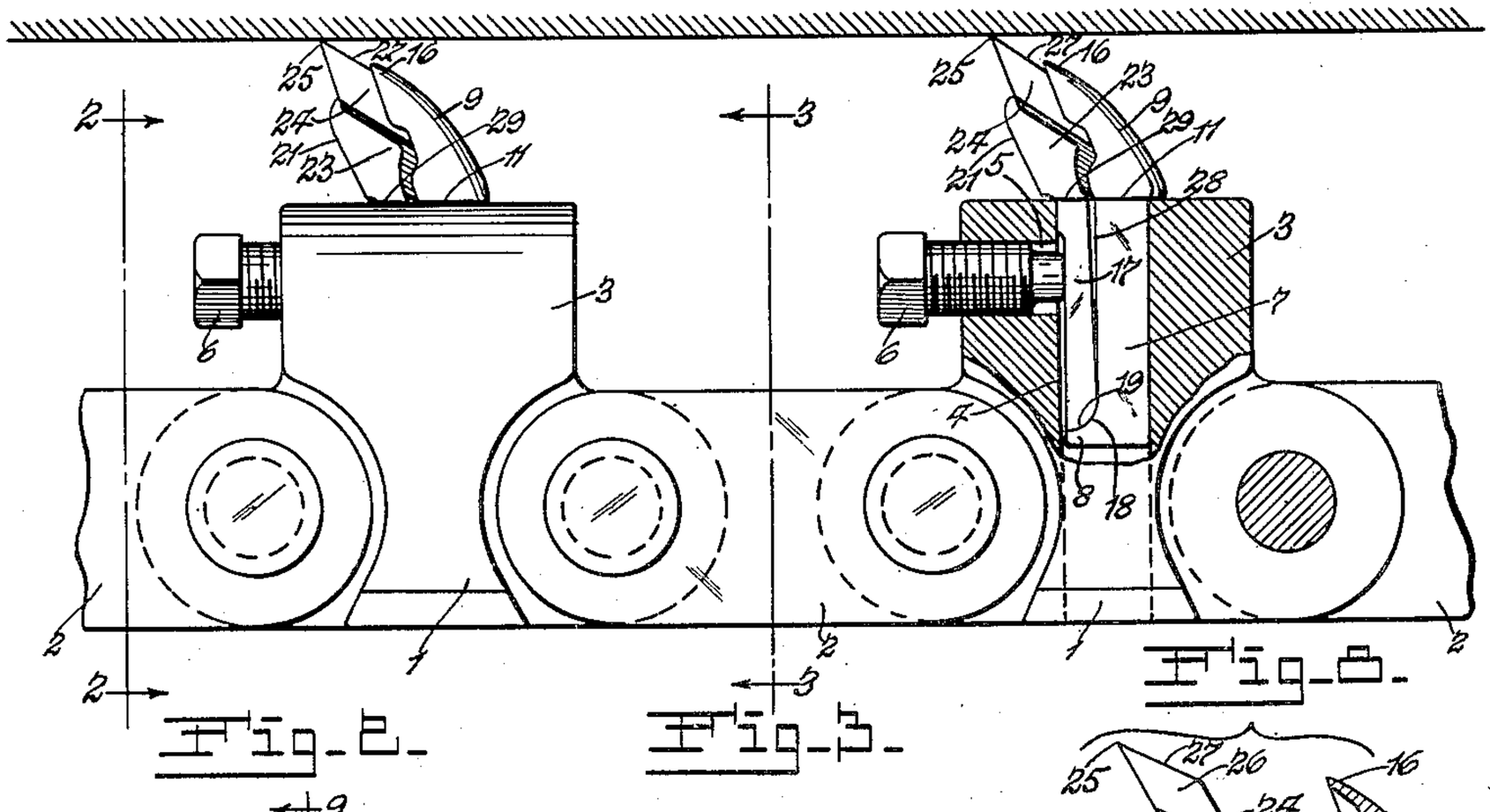


Fig. 2.

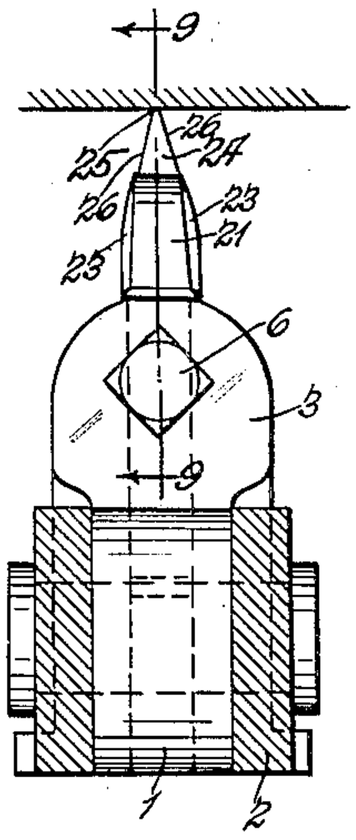


Fig. 3.

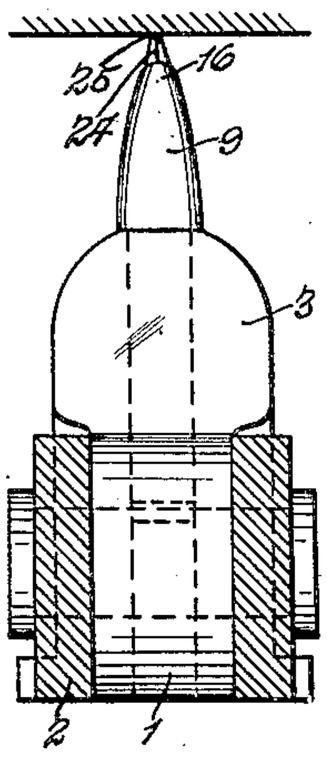


Fig. 4.

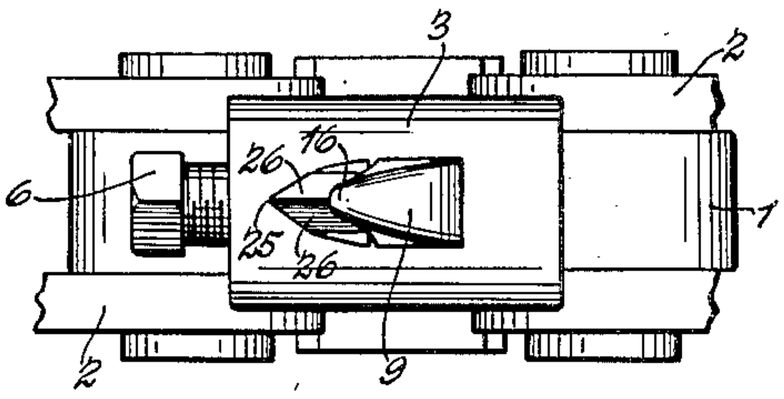


Fig. 5.

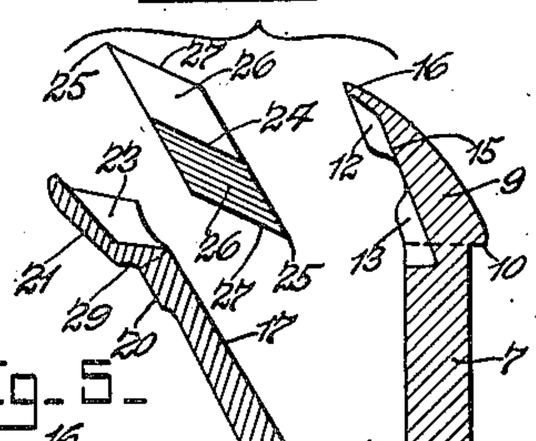


Fig. 6.

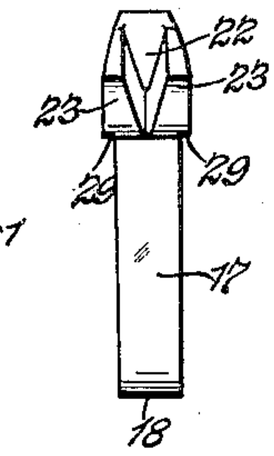


Fig. 7.

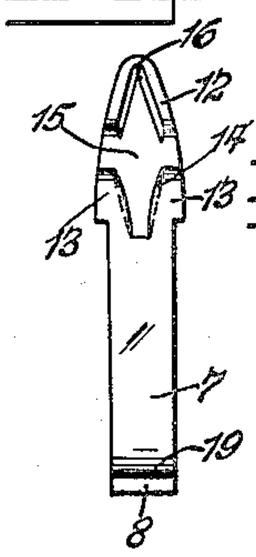


Fig. 8.

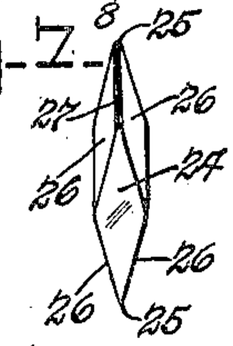
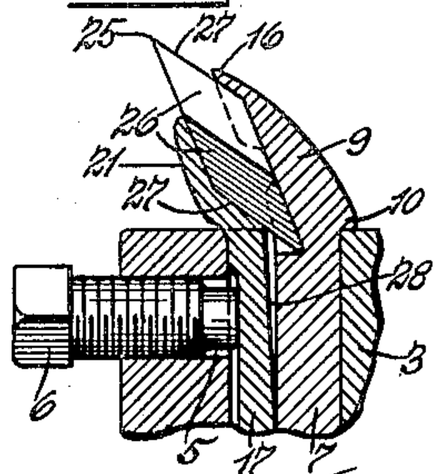


Fig. 9.



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MINING MACHINE BIT AND BIT HOLDER

Filed June 20, 1932 2 Sheets-Sheet 2

Fig. 10.

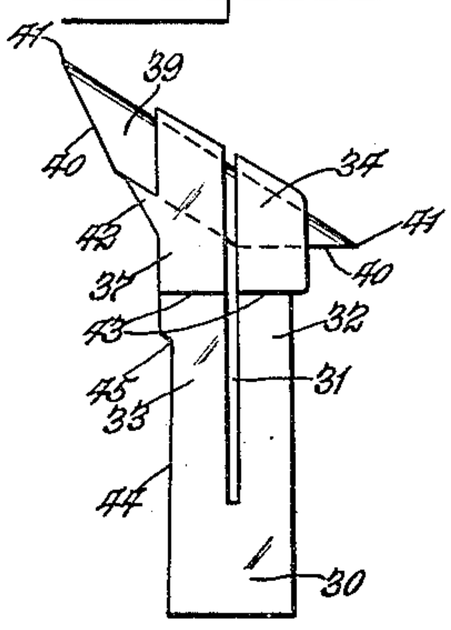


Fig. 11.

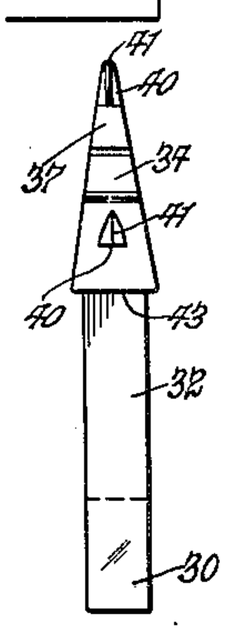


Fig. 12.

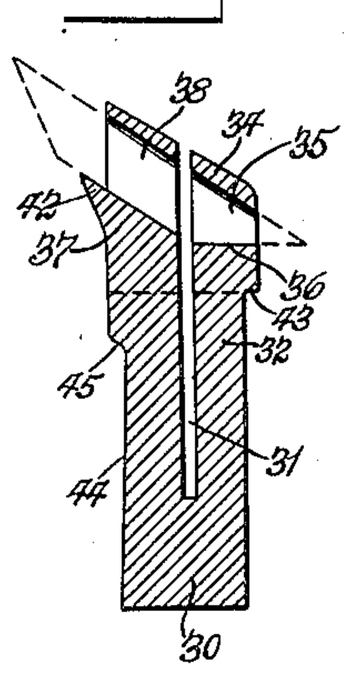


Fig. 13.

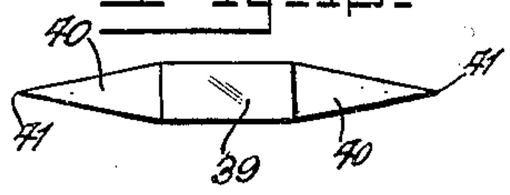


Fig. 14.

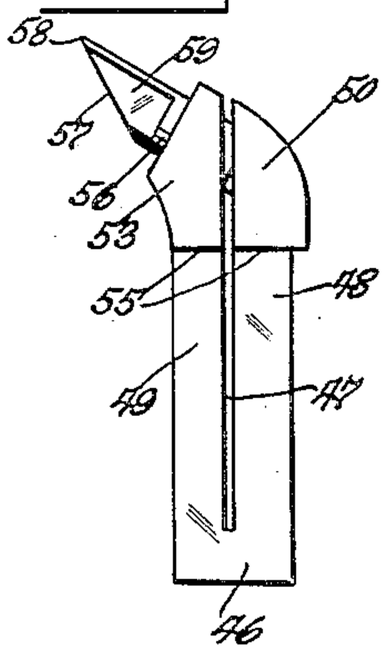


Fig. 15.

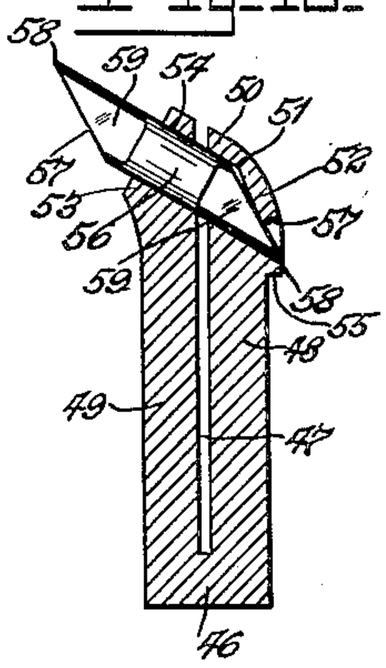
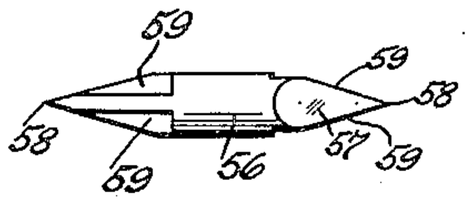


Fig. 16.



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Patented Feb. 14, 1933 1,897,331

UNITED STATES PATENT OFFICE

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MINING MACHINE BIT AND BIT HOLDER

Application filed June 20, 1932. Serial No. 618,262.

This invention relates to mining machine bits and bit holders.

An object of the invention is to provide an improved holder designed and adapted to engage in the usual rectangular holes of standard cutting machine chain lugs and thereby dispense with the necessity of providing specially constructed chain lugs for the holder. This feature of the present invention makes the holder applicable to a large majority of cutting machines at present in use, and avoids the necessity of acquiring and using special chains. Accordingly, the present invention may be readily tested and adopted for use in connection with usual cutting machine chain lugs without using special chains.

Another object of the invention is to provide an improved type of bit of a design such that the bits can be cut from rolled stock and provided with duplicate oppositely facing cutting edges at their ends, so that the bit can be reversed in the holder and used until both ends are worn off, whereupon the bit can be removed and thrown away without any considerable loss. These bits are preferably made of special alloy steels to obtain performance superior to that obtained with cheaper steel of inferior quality. The superior performance is due to the shape of the bit and the quality of the steel and consists in the greater durability of the bits, faster performance, less time devoted to setting the bits, and other advantages.

Another object of the invention is to provide a bit holder having improved means for engaging and holding the bit in connection therewith and designed and adapted to cooperate with the clamping wedge member, whereby the bit is secured in position and held from moving or vibrating in the holder.

Another object of the invention is to provide an improved clamping wedge member characterized by a degree of resiliency to withstand any load exerted thereon by the clamping device and constructed and arranged so as to utilize the resiliency to exert pressure against the clamping device at all times, whereby the clamping wedge member serves both as a lock to the clamping means and a stop to the withdrawal of the wedge member and the holder from the chain lug.

Various other objects and advantages of this invention will appear from the following description, reference being made to the accompanying drawings, in which—

Fig. 1 is a side elevation of a portion of a mining machine chain showing two lugs having my improved machine bit and bit holder in connection therewith, one of said lugs being in section.

Fig. 2 is a cross sectional view approximately on the line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1.

Fig. 4 is an end elevation of the bit holder and bit mounted in the chain lug.

Fig. 5 is an inner side view of the holder member.

Fig. 6 is an inner side view of the clamping wedge member that cooperates with the holder member shown in Fig. 5.

Fig. 7 is a view of the bit detached from the holder.

Fig. 8 is a view showing the holder member and the clamping wedge member in section and spaced apart and the bit in elevation.

Fig. 9 is a sectional view on the line 9—9 of Fig. 2.

Fig. 10 is a side elevation of an alternative form of bit holder having a bit mounted in connection therewith.

Fig. 11 is a rear elevation of the bit holder shown in Fig. 10.

Fig. 12 is a longitudinal sectional view of the bit holder shown in Figs. 10 and 11.

Fig. 13 is a side edge elevation of the bit used in connection with the bit holder of Fig. 10.

Fig. 14 is a side elevation of a bit holder and bit of a slightly different construction.

Fig. 15 is a longitudinal sectional view of the bit holder shown in Fig. 14.

Fig. 16 is a side elevation of the bit used in connection with the bit holder of Figs. 14 and 15.

The endless power driven chain comprises a series of links 1 pivoted to connecting links 2, whereby an endless chain is formed. The links 1 have laterally extended lugs 3, and

each of these lugs is provided with a hole 4 extending through the lugs and forming sockets for the bit holders. Each lug 3 is also provided with a threaded hole 5 in which a clamping set screw 6 is screwed. These holes 5 are in the forward sides of the lugs 3 and open into the socket holes 4, so that the ends of the clamping set screws 6 may extend into the socket holes 4 and obtain clamping engagement with the clamping wedge members forming parts of the bit holders.

The bit holder shown on Sheet 1 of the drawings is composed of two separate and unattached members, one of which we have designated as the holder member and the other of which we have designated the clamping wedge member. Both are of novel construction and are arranged in a novel cooperative relationship in order to engage and hold and support a bit and to cooperate with the clamping set screw 6 to prevent displacement of the bit holder with respect to the lug 3 and to prevent relative displacement of the members forming the bit holder.

The holder member comprises a body 7, rectangular in cross section, having a shoulder 8 extending forwardly at its inner end, and a bit receiving and supporting socket in integral connection with its outer end. The bit receiving and supporting socket comprises a portion 9 extended rearwardly beyond the rear side of the body 7 to provide a shoulder 10 and extended laterally beyond the sides of the body 7 to form shoulders 11. These shoulders 10 and 11 are designed and adapted to engage and abut against the end of the lug 3 when the bit holder is mounted in connection with said lug.

The portion 9 inclines forwardly from the body 7 and is formed in its front side with a bit receiving socket defined by outwardly converging walls 12 at the outer end of the portion 9 and by inwardly converging walls 13 at the inner end of the portion 9 and extending downwardly in the front side of the body 7 beyond the shoulders 10 and 11. Each of the walls 13 is provided with an inwardly extended flange 14 under which the inner end of the bit mounted in the socket 15 formed by these walls is designed and adapted to extend and engage. The outer end of the socket 15 is defined by an abutment wall 16 formed integral with and in continuation of the walls 12 and which positively prevents outward slipping movement or displacement of the bit when the clamping wedge member is clamped in connection with the bit and the holder member.

The clamping wedge member comprises an outwardly tapered resilient body 17 having a rounded inner end 18 designed and adapted to abut and engage against the rounded wall 19 formed at the union of the body 7 with the shoulder 8 so as to hold the holder member and the clamping wedge member in proper longitudinal relationship and to facilitate and expedite their assembly and placement of the bit holder in the socket 4.

The outwardly tapered resilient body 17 is provided with a thickened portion 20 on its front side extended into integral connection with a bit clamping portion 21. The bit camping portion 21 inclines forwardly from the outer end of the body 17 and is formed with a bit receiving socket 22 bordered by outwardly diverging and rearwardly flaring walls 23 (Fig. 6).

The bit shown is rhomboidal in shape and is specially designed and adapted to be received in the sockets 15 and 22 and clampingly engaged by the walls of said sockets. The bit comprises a rhomboidal body 24 formed by cutting diagonally an approximately diamond shaped bar. This provides cutting points 25 at opposite ends of the bit defined by the flaring walls 26, the corners 27 and the walls formed by cutting the bar diagonally.

This bit is mounted in the socket 15 with one point 25 extending into the space between the walls 13 and the flaring walls 26 engaging under the walls 13 so as to resist the strains and stresses exerted upon the bit when in use and to prevent the inner end of the bit from moving forwardly. The clamping wedge member is then applied to the holder member and to the bit by placing the end 18 of the clamping wedge member against the wall 19 and the socket 22 against the bit. The end of the socket 22 is short of the end of the socket portion 9, leaving the bit extending well beyond said socket portion 22. The bit also extends sufficiently beyond the end wall 16 of the socket 15 and will effectively perform its intended cutting operations.

For use, the bit is seated in the socket 15 and extended under the flange 14. The clamping wedge member is located against the holder member and against the bit which holds the outer portion of the clamping wedge member separated from the holder member by a space 28 (Figs. 1 and 9). This leaves the end 18 of the clamping wedge member seated against the curved wall 19. The bit holder thus assembled is extended into the socket 4 until the shoulders 10 and 11 on the holder member and the similar shoulders 29 on the clamping wedge member are extended against the outer end of the lug 3. Then the clamping set screw 6 is screwed inwardly until its inner end engages the front side of the body 17 opposite the space 28. The clamping set screw is operated until the socket 22 is clamped rigidly against the bit, and until the resilient body 17 is bent somewhat in opposition to the resiliency of said body. Thus, the resiliency of the body 17 is utilized to cooperate with the clamping set screw 6 to maintain rigid clamping engagement upon and

against the bit and to prevent the two-part bit holder from moving longitudinally outwardly. This is because the inner end of the two-part bit holder is somewhat wider than the part of the bit holder engaged by the clamping set screw 6, particularly since the body 17 is bent toward the body 7 by the clamping engagement of the set screw.

When the outer end of the bit becomes worn, the bit may be easily reversed in the bit holder by releasing the clamping set screw 6 and withdrawing the bit holder from the socket 4. The holder member and the clamping wedge member may then be separated, the bit removed and changed end for end in the socket 15, the wedge member again applied in cooperative relationship to the holder member, and the two-part bit holder reinserted in the socket 4, after which the set screw 6 is again tightened.

The device shown in Figs. 10, 11 and 12 is a bit holder of alternative construction. The bit holder comprises a body 30, which is substantially rectangular in cross section and which is split inwardly from its outer end to provide a space 31 between the parts 32 and 33 separated by said space. These parts 32 and 33 are resilient. The outer end of the part 32 is formed with a socket portion 34 having therein an inclined socket 35 provided on its rear end with an abutment shoulder 36. The outer end of the part 33 is formed with a socket portion 37 having therethrough an inclined opening 38 in continuation of the adjacent portion of the socket 35. These sockets 38 and 35 are designed and intended to receive and retain a bit comprising a triangular body portion 39 having beveled ends 40 inclining from intersection with one of the side walls of the body 39 to intersection with the opposite corner of said body to provide points 41.

This bit is inserted in the socket 38—35 until one of the inclined walls 40 is seated against the abutment wall 36, leaving one of the cutting points 41 extended forwardly beyond the outer end of the socket portion 37. A shoulder 42 on the front side of the socket portion 37 extends forwardly and forms a seat for the adjacent wall of the bit.

The socket portions 36 and 37 are defined from the parts 32 and 33 by shoulders 43 extending beyond the surfaces of the parts 32 and 33 and designed and intended to seat against the outer end of a lug 3 in the manner that the shoulders 10, 11 and 29 seat against the outer end of the lug 3.

The front wall 44 of the body 30 and the part 33 inclines toward the space 31 until said wall 44 intersects a shoulder 45 on the front side of the part 33.

In use, the body 30 and the parts 32 and 33 are extended into a socket 4 until the shoulders 43 seat against the outer end of the lug 3. Then the clamping set screw 6 is tightened to obtain clamping engagement against the wall 44 and bend or flex the part 33 toward the part 32, thus clamping the socket portions 34 and 37 in rigid clamping engagement with the bit. When the outer point of the bit becomes worn, the set screw 6 is released, thereby permitting the parts 32 and 33 to spread apart out of tight clamping engagement with the bit. The bit may then be removed and changed end for end, after which the clamping set screw 6 is again tightened and the bit in its changed position is ready for use.

The device shown in Figs. 14 and 15 includes a bit holder comprising a body 46 having a longitudinal split to provide a space 47 separating the parts 48 and 49. The part 48 is formed on its outer end with a socket portion 50 having therein a socket 51 provided at its rear portion with an abutment 52. The part 49 has on its outer end a socket portion 53 provided with a socket 54 in continuation of the socket 51. The socket portions 50 and 53 are formed with shoulders 55 designed and adapted to abut against the outer end of a lug 3 when the bit holder is inserted in the socket 4. The bit here shown comprises a cylindrical body 56 having beveled ends 57 to provide point 58. The ends of the cylindrical body 56 are cut away on the sides and diverge from the beveled walls 57, providing diverging walls 59. This formation produces the cutting points 58. When the bit is inserted properly in the socket 54—51, one of the cutting points 58 extends well beyond the outer end of the holder while the wall 57 at the opposite end of the device engages the abutment wall 52.

This bit holder is extended and secured within a socket 4 with the shoulders 55 lying against the outer end of the lug 3 in a manner which will be well understood from the preceding description. The clamping set screw 6 is operated to flex or bend the part 49 toward the part 48 and cause the socket portions 50 and 53 to clamp rigidly upon and hold the bit by virtue of the consequent disalignment of the socket portions 54—51. This clamping action is very effective because of the comparatively close fit of the bit in the socket. When one point 58 of the bit becomes worn, the position of the bit may be easily reversed in the holder in the manner previously indicated in describing the reversal of the other bits.

It is now clear that this invention is a simplified one and is designed and adapted to be used in connection with the ordinary cutting chain lugs and may be also used with equal satisfaction with some chain lugs of special or different construction. The invention obtains all of its intended objects and purposes efficiently and satisfactorily and may be manufactured and sold at comparatively low cost. The construction and arrangement of

the parts comprising the invention may be varied otherwise than as specifically described without departure from the nature and principle thereof. We do not restrict ourselves unessentially, but what we claim and desire to secure by Letters Patent is:

1. A device of the character described comprising a pair of clamping members, one of which is resilient and tapers outwardly from its inner end, clamping jaws on the outer ends of said clamping members adapted to engage and clamp a bit between them, and means for preventing inward longitudinal displacement of said tapered and resilient member.

2. A device of the character described comprising an elongated rigid member, a lateral projection rigid with said member, an elongated resilient member having its inner end abutting against said projection, and clamping jaws on the outer ends of said members adapted to engage and clamp a bit between them.

3. A bit holder composed of two unattached members, one of which is rigid and one of which is resilient, means preventing said resilient member from moving longitudinally inwardly with respect to said rigid member and permitting free swinging movement of the outer end of said resilient member away from said rigid member, and jaws on the outer ends of said members adapted to engage and clamp a bit between them.

4. A device of the character described comprising an elongated rigid member, an abutment near the inner end of said member having an outer wall curving outwardly from the side of said rigid member toward the end of said abutment, an elongated resilient member having its inner end mounted and fitting against said curved wall, and clamping jaws on the outer ends of said members adapted to engage and clamp a bit between them.

5. A device of the character described comprising a pair of clamping members, one of which is resilient and tapers outwardly from its inner end and one of which is rigid, clamping jaws on the outer ends of said clamping members adapted to engage and clamp a bit between them, and inwardly extended flanges in connection with the clamping jaw on said rigid member arranged to extend across a portion of the inner end of a bit mounted between said clamping jaws.

6. A device of the character described comprising an elongated rigid member, walls on the outer end of said member forming a socket adapted to receive a bit and hold said bit from outward longitudinal movement, an elongated resilient member having abutting contact at its inner end with a portion of said rigid member whereby inward longitudinal movement of said resilient member is prevented, and a clamping socket on the outer end of said resilient member adapted to engage and clamp the bit in said socket on said rigid member.

7. A device of the character described comprising two unattached members, one of which is rigid and the other of which is resilient, means preventing outward longitudinal movement of said rigid member with respect to said resilient member and preventing inner longitudinal movement of said resilient member with respect to said rigid member and permitting outward longitudinal movement of said resilient member with respect to said rigid member, walls on the outer end of said rigid member forming a socket adapted to receive and prevent outward longitudinal movement of a bit, and walls on the outer end of said resilient member forming a socket adapted to engage and hold the bit in said socket on said rigid member.

8. A device of the character described comprising an elongated rigid member, walls on the outer end of said member forming approximately a diamond shaped socket adapted to receive and retain an approximately diamond shaped end of a rhomboidal bit, a resilient member having the inner side of its inner end engaging the adjacent side of said rigid member and its outer portion spaced from said rigid member, and walls on the outer end of said resilient member forming a socket adapted to receive a portion of the opposite end of said bit and clamp said bit in said socket on said rigid member.

9. A device of the character described comprising a pair of clamping jaws having sockets, body portions extending from said jaws and adapted to extend into a socket in a chain lug, shoulders on said jaws arranged to seat against the end of the chain lug, a bit mounted between the outer ends of said jaws and holding the outer portions of said body portions spread apart, socket walls in connection with one of said jaws partly surrounding and preventing outward movement of said bit, and a device supported by said chain lug for engaging and bending one of said body portions.

10. A device of the character described comprising a pair of members adapted to extend in a rectangular socket in a standard chain lug and one of which members has a curved inner end wall, an abutment rigid with one of said members and having a curved outer wall engaged by said curved inner end wall of said other member and preventing inner longitudinal movement and permitting outward longitudinal movement of said other member, walls rigid with the outer ends of said members forming sockets adapted to receive and support a bit and preventing outward longitudinal displacement of said bit, and means for utilizing the resiliency of one of said members to clamp said

sockets firmly upon the bit mounted therein.

11. A device of the character described comprising an elongated body member, a socket portion in connection with the outer end of said member, a resilient member having a socket in its outer end for cooperating with said first named socket to receive and support a bit, and means for supporting and clamping said sockets rigidly on said bit.

12. A device of the character described comprising an elongated body member, a socket portion in connection with the outer end of said member, a resilient member having a socket in its outer end for cooperating with said first named socket to receive and support a bit, means for supporting and clamping said sockets rigidly on said bit in a position in which the outer end of said bit extends beyond said sockets, and means for preventing said bit from being forced beyond a predetermined position in said sockets.

13. A device of the character described comprising a pair of clamping jaws having spaced projecting portions one of which is resilient and both of which are adapted to extend into a socket in a chain lug, a rigid body integrally uniting the inner ends of said projecting portions, and a bit mounted in said clamping jaws and being clamped therein when said resilient projecting portion is pressed toward the other.

14. A device of the character described comprising a pair of clamping members, clamping jaws on the outer ends of said clamping members adapted to engage and clamp a bit between them, and inwardly extended flanges in connection with the clamping jaw of one of said members arranged to extend across a portion of the inner end of a bit mounted between said clamping jaws.

15. A device of the character described comprising a pair of members each having an inclined socket therethrough, a bit having a triangular body portion fitted in one of said sockets and extending into the other and having a point projecting beyond said sockets, and means for holding the walls of said sockets in clamping engagement with said bit.

16. A bit holder comprising two spaced parts, one of which has a triangular socket therethrough and the other of which has a socket in alinement with said first socket, a bit having a triangular body portion fitted in and extending through said first socket and into said second socket, means limiting extent of movement through said second socket, and a point on the end of said bit beyond said first socket.

17. A device of the character described comprising a bit having a triangular body and having end walls inclining from the base of said triangular body to the opposite corner and in directions away from each other, and a bit holder including spaced portions having triangular openings therein receiving a portion of the body of said bit and supporting said bit in an inclined position with respect to the longitudinal axis of said bit holder.

18. A device of the character described comprising a bit having a triangular body and having end walls inclining from the base of said triangular body to the opposite corner and in directions away from each other, a bit holder including spaced portions having triangular openings therein receiving a portion of the body of said bit and supporting said bit in an inclined position with respect to the longitudinal axis of said bit holder, and means for holding said bit in a predetermined adjustment in said openings.

19. A device of the character described comprising two spaced members, one of which is bendable toward the other and each of which has an inclined opening therein, a bit extending in an inclined position in said opening in one of said members and into said opening in the other member, means for holding said bit in an inclined position in said openings, and points on the opposite ends of said bit.

20. A device of the character described comprising a pair of clamping members at the outside of and having projecting portions extending into a socket in a chain lug, one of said members having an inclined socket opening through the body thereof and the other member having an inclined socket opening in longitudinal alinement with said first socket opening, a body integral with the inner ends of said projecting portions, a bit mounted in said socket openings, and an abutment rigid with one of said clamping members preventing longitudinal movement of said bit in one direction.

21. A device of the character described comprising a bit having a cylindrical body and having a triangular point at one end, and a bit holder including spaced portions having cylindrical openings therein receiving a portion of the body of said bit and supporting said bit in an inclined position with respect to the longitudinal axis of said bit holder.

22. A device of the character described comprising a bit having a cylindrical body and having a triangular point at one end, a bit holder including spaced portions having cylindrical openings therein receiving a portion of the body of said bit and supporting said bit in an inclined position with respect to the longitudinal axis of said bit holder, and means for holding said bit in a predetermined adjustment in said openings.

23. A device of the character described comprising a bit having a cylindrical body provided with a triangular point at each end, a bit holder including spaced portions having cylindrical openings therein receiving a

portion of the body of said bit and supporting said bit in an inclined position with respect to the longitudinal axis of said bit holder, and means for holding said bit in a predetermined adjustment in said openings and preventing longitudinal movement of said bit in one direction.

24. As a new article of manufacture, a bit having a body that is approximately wedge shape in cross section and having three outer side walls and having end walls converging from the edge of said wedge shaped body to intersection with the opposite side wall of said body, each of the three outer side walls of said body intersecting the remaining two outer side walls at two corners of said body.

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