Nov. 13, 1962 C. F. OSGOOD 3,063,691

CUTTER BIT AND SUPPORT THEREFOR

Filed Nov. 9, 1959

FIG. 1.

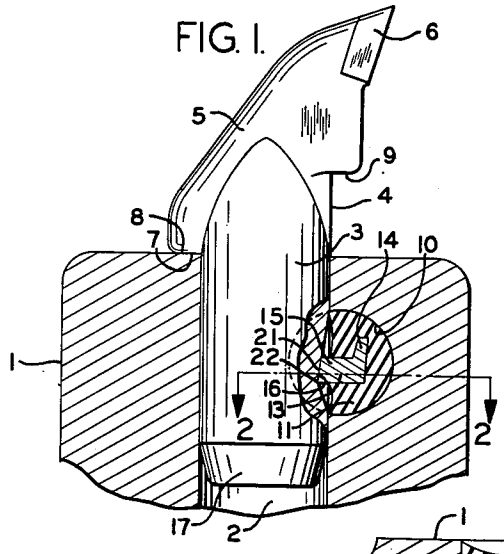


FIG. 2.

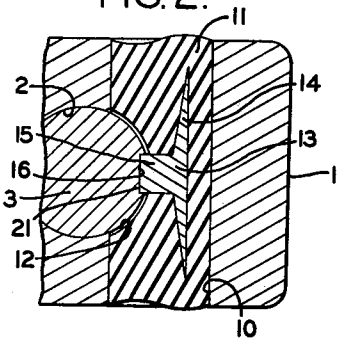
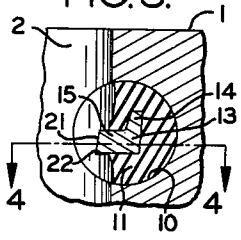


FIG. 3.



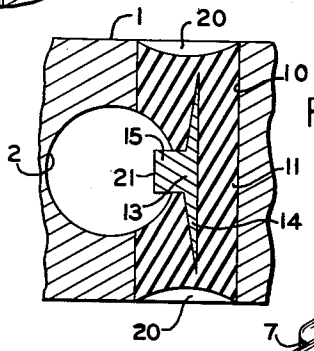


FIG. 4.

FIG. 5.

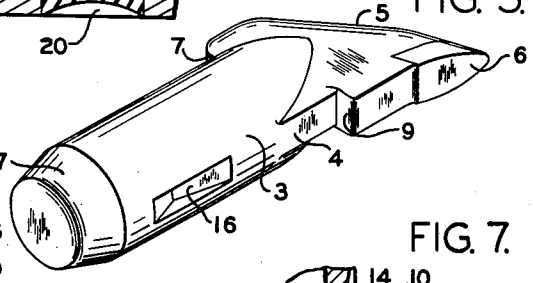


FIG. 6.

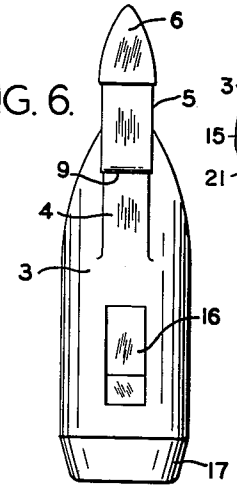


FIG. 8

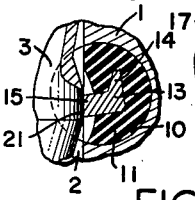


FIG. 9

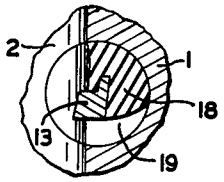
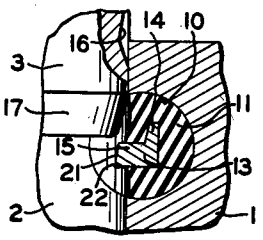


FIG. 7.



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CUTTER BIT AND SUPPORT THEREFOR

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10 Claims. (Cl. 262—33)

This invention relates to a cutter bit and support therefor and more particularly to an improved resilient detent means for holding the cutter bit in cutting position on its support.

In mining machinery now in common use it is found desirable to hold resiliently the cutter bit in cutting position and to enable ready release of the bits from their supports by a relatively simple prying action. This is sometimes accomplished by yieldable holding means on the support engaging the shank of the cutter bit and yieldable to release its holding action as the bit shank is pried out from the support socket. The present invention contemplates improvements over known types of cutter bits and bit supports in that the resilient detent means serve not only to hold the cutter bit in cutting position on its support but also locks the bit shank against rotation on its socket of support. The bit support, in accordance with the present invention, may be either a chain block of endless cutter chain or the supporting arm of a rotary boring head, and desirably the cutter bit has a cylindrical shank received in a socket of circular cross section, and the resilient detent means engages a recess in the bit shank not only to hold the same against outward axial displacement but also to lock the bit shank against rotation in its socket.

It is therefore a primary object of the present invention to provide a cutter bit and support therefor, having improved resilient detent means engaging the bit shank for holding the cutter bit in cutting position on its support. Another object is to provide an improved resilient detent means for a cutter bit for locking the bit shank against rotation in the support socket. Yet another object is to provide a detent element yieldingly mounted in a resilient mass of elastomeric material such as rubber supported within a transverse bore in the bit support and having a detent portion yieldingly engaged in a recess in the bit shank. Yet another object is to provide an improved cutter bit of the cylindrical shank type having a longitudinal slot for receiving a detent element for locking the cylindrical bit shank against outward axial displacement from and rotation in its socket. These and other objects and advantages of the invention will however hereinafter more fully appear.

In the accompanying drawing there are shown for purposes of illustration one preferred embodiment and a modification which the invention may assume in practice.

In this drawing:

FIG. 1 is a fragmentary longitudinally extending vertical section through a cutter bit support with a cutter bit mounted in cutting position thereon and illustrating a preferred form of the improved resilient detent means.

FIG. 2 is a transverse section taken on line 2—2 of FIG. 1.

FIG. 3 is a fragmentary section, taken in the plane of FIG. 1, showing the cutter bit removed from the support socket and with the detent means in released position.

FIG. 4 is a detail section taken on line 4—4 of FIG. 3.

FIG. 5 is a perspective view of the improved cutter bit.

FIG. 6 is a front elevational view of the cutter bit.

FIG. 7 is a detail section, similar to FIG. 3, with the bit shank partially inserted in the support socket.

FIG. 8 is a detail section, similar to FIG. 7, showing the bit shank partially released from its socket and with the detent held out of the shank-slot.

FIG. 9 is a detail section, similar to FIG. 3, showing a slightly modified mounting for the detent lock.

In the preferred illustrative construction, as shown in FIGS. 1 to 7 inclusive of the drawing, a bit support 1 has a socket 2 of circular cross section for receiving the cylindrical shank 3 of a cutter bit 4. The bit support shown is desirably in the form of a chain block of a conventional cutter chain but evidently the bit support may assume other forms such as a supporting arm of a rotary boring head, in a well known manner. The cutter bit shank has an integral outer cutting portion or head 5 provided with a hard metal cutting point 6. The cutter head portion has a rearwardly located shoulder 7 seating at 8 against the outer portion of the support 1, as shown in FIG. 1. A forwardly located shoulder 9 also on the bit head portion is engageable by a suitable prying instrument whereby the cutter bit may be removed with a prying action from the support socket.

The bit support has a forwardly located transverse bore 10 in which a resilient mounting 11 of the detent means is received. This resilient mounting desirably includes a resilient mass of elastomeric material such as rubber in the form of a molded plug or block fitted within the transverse bore, and the plug at its rearward side is cut away at 12 on a curve corresponding to the curvature of the adjacent socket wall (FIG. 2). A detent element or latch 13 projects rearwardly into the shank-socket and has its transverse body portion 14 embedded in the elastic plug with its rearward detent or latch portion 15 received in a longitudinal slot or groove 16 in the forward wall of the projecting detent portion 15 of the detent element, and bit shank. This slot provides a recess for receiving the the latter serves to hold the cutter bit in cutting position on its support, holding the bit shank both against axial displacement from and rotation in the socket of its support. The resilient mounting for the detent also acts to some extent as a cushion so that shocks and vibration are at least somewhat reduced.

The shank of the cutter bit at its inner portion is tapered at 17 to provide an inclined surface which engages the detent as the bit shank is inserted into the support socket (see FIG. 7) to tilt the detent outwardly from the socket and when the slot 16 assumes a position nearly oppositely of the detent the detent element springs rearwardly with a tilting motion and inwardly into the slot to hold the cutter bit in position.

In the modification shown in FIG. 9 the elastic plug 18 is cut away or recessed at 19 at its lower portion to provide a space into which the elastomeric material is squeezed as the detent is forced laterally upon movement of the bit shank in the support socket. In FIG. 4 the ends of the elastic plug are desirably concaved at 20 so that when the detent is pressed laterally, as shown in FIGS. 1 and 2, the elastomeric material is forced or squeezed axially of the transverse bore to cause the concave ends of the plug to bulge outwardly as shown. Evidently the elastic plug may be held in position within the transverse bore in any suitable manner.

As the bit shank is inserted into the support socket the inclined inner surface 17 of the shank engages the detent and forces the latter laterally from the socket and tilts the detent inwardly and upwardly as shown in FIG. 8. When the slot 16 at the bit shank assumes a position nearly opposite the detent the latter tilts back to its original position and is pressed inwardly by the resiliency of the elastic mounting into holding contact with the inclined bottom walls and sides of the slot (FIG. 1). The inner face of the detent is inclined at 21 to provide a transverse edge 22 which engages the bottom walls of the recess 16 at or near the point of convergence of the recess walls. The shoulder 7 on the outer head por-

tion of the cutter bit when the latter is in cutting position on its support rests at 8 against the outer surface of the support. The detent holds the bit shank against rotation in and outward axial displacement from the support socket with the head shoulder 7 maintained seated against the outer surfaces of the support. Upon withdrawal of the bit shank from the position shown in FIG. 1, the lower inclined wall of the slot effects tilting of the detent back to the position shown in FIG. 8, releasing the detent from the slot.

The cutter bit may be removed from its support by a prying action and the forward shoulder 9 as on the outer head portion of the cutter bit may be engaged by a suitable prying instrument for forcing the cutter bit outwardly from its support. As the bit shank is removed outwardly the lower inclined bottom surface of the shank slot 16 tilts the detent laterally from the slot thereby to release the bit shank for complete free withdrawal.

As a result of this invention an improved cutter bit and bit support are provided having improved yieldable detent means for holding the cutter bit in cutting position on its support. The resilient detent means with its yieldably mounted detent element serves to hold the bit shank both against outward axial displacement from and rotation in the support socket. The yieldable detent means enables ready release of the cutter bit from its support by a simple prying action thereby greatly facilitating bit replacement. These and other advantages of the invention will be clearly apparent to those skilled in the art.

While there are in this application specifically described one form and a modification which the invention may assume in practice, it will be understood that this form and modification thereof are shown for purposes of illustration and that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a cutter bit and support therefor, a socket of circular cross section formed in said support, a cutter bit having a lateral cutting portion providing a forward cutting face, said bit also having a cylindrical shank received and free to rotate in said socket with the shank substantially fitting the socket, said shank having a slot extending longitudinally along one side thereof, and resilient detent means carried by said support and projecting into said socket, said detent means having a detent element received in said shank-slot for holding said shank both against rotation in an axial displacement from said socket, and resilient means for yieldingly urging said detent element with a tilting motion into said slot in said bit shank, said slot in said bit shank having relatively inclined converging bottom walls and said detent element being laterally tiltable about a transverse axis against the resilient action of said resilient means and having a portion seated in said slot against said bottom walls at or near the point of convergence of said bottom walls, one of said walls engaging said detent element upon movement of said shank to tilt said detent element toward released position.

2. A cutter bit and support as set forth in claim 1 wherein said tiltable detent element has an inner surface inclined inwardly toward a socket wall with said inner surface extending outwardly toward the outer end of said socket.

3. A cutter bit as set forth in claim 2 having inclined inner end surface engageable with the inclined surface of said detent element for pressing the latter outwardly with a tilting action opposed by said resilient means as said shank is inserted in said socket.

4. A cutter bit and support as set forth in claim 1 wherein the lower inclined surface of said longitudinal shank slot engages the detent element tilting the latter inwardly to effect lateral release of said detent element against the action of said resilient means as said bit shank is withdrawn by an axial prying action from said socket.

5. A cutter bit and support therefor comprising a socket in said support for receiving the shank of a cutter bit, said shank having an inclined surface at its inner portion, said support having a bore for receiving an elastic plug, a tiltable detent carried by said elastic plug and projecting into said socket, said detent due to the elasticity of said plug having a tilting motion relative to the bore walls, and a recess in said bit shank disposed outwardly of said inclined shank surface into which said detent projects for holding said bit in cutting position on said support, said inclined surface on said bit shank as the latter is inserted in the socket pressing said detent outwardly and said detent by the inherent resiliency of said elastic plug springing into said shank recess when the latter is positioned oppositely of said detent, said shank recess having an inclined bottom surface engaging said detent for tilting said detent outwardly toward released position in opposition to the resilient action of said elastic plug as said bit shank is moved outwardly in said socket.

6. A cutter bit and support therefor, said support having a socket of circular cross section and movable in a direction normal to the socket axis, a cutter bit mounted on said support and having a lateral cutting portion providing a front cutting face, said bit also having a cylindrical shank receivable and freely rotatable in said socket, and resilient detent means on said support and comprising a detent element projecting into said socket at one wall thereof into engagement with the bit shank for locking the latter both against axial displacement from and rotation in said socket, said shank having a slot extending longitudinally therealong midway between the sides of said cutter bit and positionable oppositely to said detent means, said slot having parallel side walls and said detent element has a rectangular portion received in said slot and with which the parallel side walls of said slot are engageable, and an elastomeric plug arranged in a transverse bore in said support and in which said detent element is embedded, said plug acting as a spring for urging said detent element toward locking position, said plug holding said detent element when in locking position against both lateral and outward movements.

7. A cutter bit and support as set forth in claim 6 wherein said slot is located at the front side of said bit shank and said transverse bore enters said socket at the front side thereof and in which said elastomeric plug is carried with said detent element projecting rearwardly from the front side of said bore into said slot.

8. A cutter bit and support as set forth in claim 6 wherein said slot has an inclined bottom surface engaging said detent element as said bit shank is withdrawn from said socket for effecting tilting of said detent element about a transverse axis out of locking position and the inherent resiliency of said elastic plug permitting such tilt while always urging said detent element toward locking position.

9. In a cutter bit and support therefor, said support having a socket, a cutter bit having a shank fitted in said socket in engagement with the socket walls, said shank having a slot formed lengthwise thereof, said support having a bore entering said socket, an elastic plug held in position in said bore, and a tiltable detent element embedded in said elastic plug and urged inwardly thereby into said slot for locking the cutter bit in cutting position on said support, said slot having an inclined bottom surface engaging said detent element for tilting said detent element relative to the bore-walls outwardly from said slot as said shank is withdrawn from said socket and said elastic plug deforming to permit such outward tilting movement of said detent element and the inherent elasticity of said plug constantly urging said detent element with a tilting motion toward its inward locking position.

10. In a cutter bit and support therefor, a socket of circular cross section formed in said support, a cutter

bit having a lateral cutting portion providing a front cutting face and seated against said support, said bit also having a cylindrical shank received and rotatable in said socket with said shank substantially fitting said socket, said shank having a slot extending longitudinally along one side thereof, said support having a transverse bore entering said socket, a molded resilient plug of elastomeric material secured in said bore, and a detent element embedded in said plug and engaging said shank-slot for holding said shank both against rotation in and axial displacement from said socket, said elastic plug yielding upon release of said detent element from said slot in opposition to its inherent resiliency tending to move said detent element toward locking position, said elastic plug also resisting any tendency toward lateral movement of said detent element to yieldingly oppose rotative movement of said shank in said socket.

References Cited in the file of this patent

UNITED STATES PATENTS

722,324	Pitkin	Mar. 10, 1903
2,610,049	Elles et al.	Sept. 9, 1952
2,907,559	Brown et al.	Oct. 6, 1959
2,965,365	Krekeler	Dec. 20, 1960
2,996,291	Krekeler	Aug. 15, 1961

FOREIGN PATENTS

743,234	Great Britain	Jan. 11, 1956