Aug. 15, 1961 W. J. GREENLEAF 2,996,158

CUTTING BLADE LOCK

Filed Jan. 23, 1958

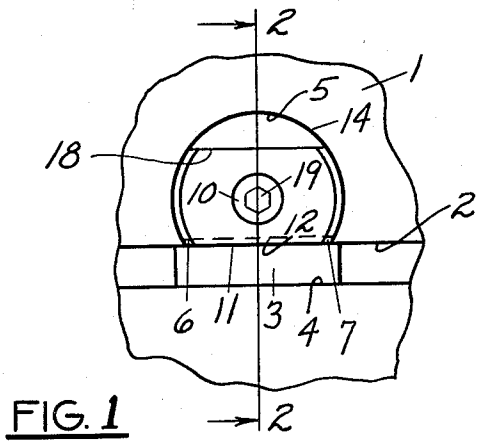


FIG. 1

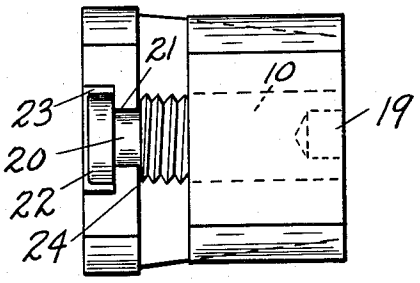


FIG. 3

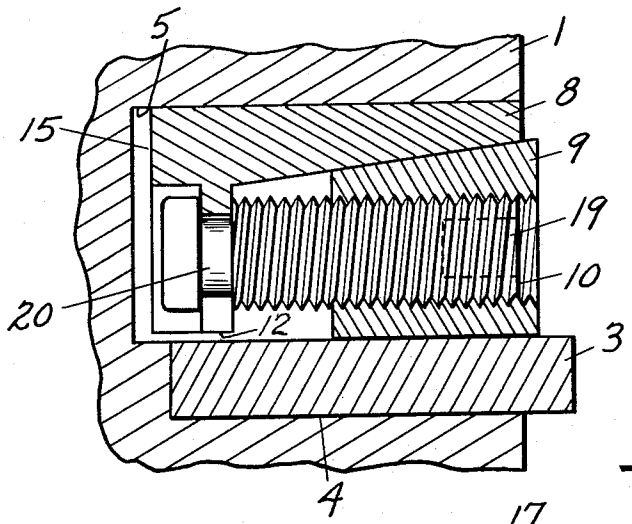


FIG. 2

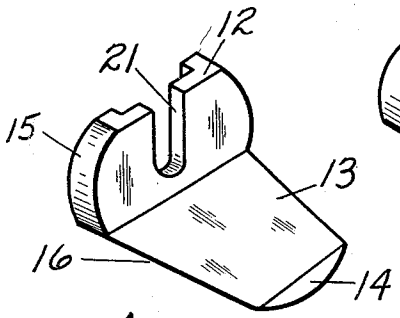


FIG. 4

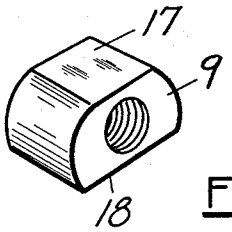


FIG. 5

INVENTOR.
Walter J. Greenleaf
BY
Ralph Hammar
Attorney

United States Patent Office 2,996,158 Patented Aug. 15, 1961

2,996,158

CUTTING BLADE LOCK

Walter J. Greenleaf, R.D. 3, Meadville, Pa.

Filed Jan. 23, 1958, Ser. No. 710,823
1 Claim. (Cl. 189—36)

This invention is a cartridge type lock for clamping in place the cutting blades or bits of milling cutters, reamers, broaches and the like where thin blades must be solidly and accurately held in slots in the cutter body. To use the lock, a hole is drilled in the body of the cutting tool to provide a socket intersecting and parallel to the blade receiving slot. All of the parts of the lock are mounted on a stationary part of generally L shape in profile and which has a cylindrical outer surface with a sliding fit in the socket so that it can easily be dropped in place. The moveable part of the lock consists of a wedge member of lesser width than the diameter of the socket having on one side a flat surface parallel to the slot for engaging the blade and having on the opposite side an inclined flat surface sliding on a complementary inclined surface on the stationary part of the lock. The wedge member is moved by a screw threaded in the wedge and having a head anchored in the stationary part of the lock.

The lock is simple to make and positive in action. It is also easy to keep clean, an important feature in cutting tools where chip-fragments are always present and may lodge in locations which would interfere with the operation of the lock.

In the drawing, FIG. 1 is an end view of a cutting blade lock mounted in a cutting tool; FIG. 2 is a section on line 2—2 of FIG. 1; FIG. 3 is a bottom plan view of the lock; FIG. 4 is a perspective of the stationary part of the lock; and FIG. 5 is a perspective of the moveable or wedge part of the lock.

In the drawing, 1 indicates the body of a cutting tool having a slot 2 therein for receiving a cutting blade 3, which may, for example, be a flat piece of one of the carbide materials. The portion illustrated in FIG. 1 might be part of many different kinds of cutting tools.

It is essential that the bit or blade 3 be clamped solidly against the side 4 of the slot 2 in order that the bit may be adequately supported. For this purpose, a hole 5 is drilled in the body 1 parallel to the side 4 of the slot and in such position so that it intersects the slot 2 thereby providing a socket which has cylindrically curved walls within the body and which is open to the slot between points 6 and 7. The socket 5 can be very easily and accurately formed by a drilling operation.

The blade is clamped against the side 4 of the slot by a cartridge clamp or lock comprising a stationary part 8, a moveable part or wedge 9, and a screw 10. The stationary part 8 is made from a cylindrical piece of such diameter that it has a sliding fit in the socket 5. At the bottom 11, there is milled a flat 12 which is of slightly greater length than the space between the points 6 and 7 so that when the stationary member 8 is dropped in the socket 5, it lies wholly within the confines of the socket. Starting from the top of the stationary part 8, there is a surface 13 parallel to, but inclined depthwise relative to the surface 4 of the slot. The surface 13 can be easily formed by a milling operation. Although the part 8 is quite thin beneath the surface 13, the outer cylindrical surface 14 remaining is of substantial extent and is adequate to take the clamping thrusts. The inclined surface 13 terminates short of the bottom of the stationary part 8 so that in profile, the part 8 is generally of L shape with the base of the L 15 fitting in the bottom of the socket 5 and with the stem of the L 16 underlying the inclined surface 13 and fitting against the cylindrical wall of the socket opposite the blade 3.

The moveable or wedge member 9 of the lock is made from a cylinder of lesser diameter than the socket 5 and has on the side adjacent the blade 3 a flat 17 which is narrower than the space between the points 6 and 7 so that the wedge can move out a substantial distance in order to exert a clamping force. Opposite the flat 17, there is an incline 18 complementary to the inclined surface 13 on the stationary part 8 of the lock. The incline 18 is parallel to, but inclined depthwise relative to the flat 17.

The locking and unlocking action is obtained by moving the wedge 9 back and forth along the inclined surface 13. This movement causes the flat surface 17 of the wedge to move toward and away from the blade 3 thereby locking and unlocking the blade 3 against the surface 4. The wedge 9 is positively moved along the inclined surface 13 by the screw 10, which is threaded in the wedge 9 and has in its outer end a socket 19 by which the screw may be turned. The screw has at the end opposite the socket 19 a neck 20 which is slidably received in a slot 21 milled in the L-shaped portion 15 perpendicular to the surface 4. Beyond the neck 20 is a head 22 on the screw which slidably fits in a recess 23 milled in the bottom of the stationary part 8 of the lock. If the screw 10 should be out of parallel with the surface 4, it would be necessary that the screw move toward and away from the surface 4 as the wedge 9 moved along the inclined surface 13. The slot 21 and the recess 23 permit this movement of the screw and prevent binding of the screw threads which might otherwise take place.

The lock is very easy to manufacture and assemble. The stationary part 8 and the wedge 9 can be made with simple milling operations. By having the screw 10 parallel to the surface 4, it can be of larger diameter with the resultant increase in strength. The neck of the screw is easily slid into the slot 21 and the wedge member 9 can be easily threaded on the outer end of the screw.

The lock has a positive action in both the locking and unlocking directions. In the locking direction, the wedge member is pulled toward the head end of the screw and the thrust is taken between the head 22 of the screw and the bottom surface of the recess 23. In the unlocking direction, the wedge member 9 is pushed away from the head end of the screw and the thrust is taken by a surface 24 at the opposite side of the neck 21.

While it might be thought that the parts of the lock would not remain in alignment, that is not the case. When the parts are dropped into the socket 5, the wedge 9 and the stationary part 8 together are held in substantial alignment by the cylindrical side walls of the socket. It is possible to put the lock in the socket with the parts not perfectly aligned but as the wedge is tightened, the flat surfaces 17 and 18 on the wedge member cooperate with the blade 3 and the inclined surface 13 to turn the stationary part 8 of the lock to a position in which it is perfectly aligned.

In the use of the lock, the blade 3 is placed in the slot 2 in the cutting tool body and the lock consisting of parts 8 and 9 and 10 assembled together is dropped in the socket. By means of a socket wrench, the screw is turned in the direction to pull the wedge member 9 up the inclined surface 13 on the stationary part 8 of the lock. This movement forces the flat surface 17 of the wedge member out against the blade 3 exerting a clamping force urging the blade against the surface 4 of the slot. The clamping thrust is transferred from the inclined surface 18 of the wedge member to the complementary inclined surface 13 on the stationary part and from there is dis-

tributed to the cylindrical side walls of the socket by the cylindrical surface **14**. The lock is loosened by turning the screw in the opposite direction forcing the wedge member outward and releasing the clamping force. Both the locking and unlocking operations are positive. The lock is very easy to keep clean. Chips lodging on any part may be easily blown out without disassembling the lock. This is an advantage for cutting tools where chip-fragments are always present and could conceivably interfere with the operation, if allowed to accumulate.

What is claimed as new is:

A self contained cartridge type lock adapted to lock a cutting blade against a seat on a cutting tool having a cylindrical socket in front of the seat, said lock being adapted in the released condition of the lock to be slidably received in the cylindrical socket in the cutting tool in front of the blade seat, comprising a body having a cylindrical outer surface and an L-shaped profile with a flat surface on the stem of the L extending inward from the one end of the body and terminating short of the base of the L at the other end of the body, said surface being open on one side of the body throughout its length and inclined to the axis of the body at a wedging angle, a wedge slidably received on said surface and constructed

to project progressively from the axis of the body as moved along the surface in a wedging or locking direction and thereby to exert a clamping force on the blade, a slot extending into the base of the L from said one side of the body and transverse to the axis of the body, an axially extending screw threaded into the wedge and rotatably received in the slot, said screw being slidable in the slot transverse to the axis of the screw, the slot being of width sufficient to permit the screw to be inserted laterally, shoulders on the screw cooperating with the body to transmit thrust from the screw to the body, and means accessible from one end of the lock for turning the screw.

References Cited in the file of this patent

UNITED STATES PATENTS

2,153,858	Scott	Apr. 11, 1939
2,245,446	Sheldrick	June 10, 1941
2,395,288	Miller	Feb. 19, 1946
2,504,192	Gairing	Apr. 18, 1950
2,508,437	Thomas	May 23, 1950
2,584,449	Hoglund	Feb. 5, 1952
2,632,536	Skeel	Mar. 24, 1953
2,778,092	Bader	Jan. 22, 1957
2,842,233	Greenleaf	July 8, 1958