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W. TITSLER

3,032,152

LOCKING DEVICE FOR INSERTIBLE CUTTING BLADE

Filed Nov. 6, 1959

FIG. 1

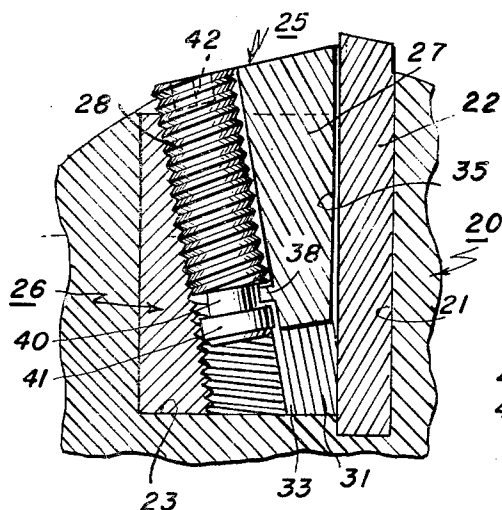


FIG. 2

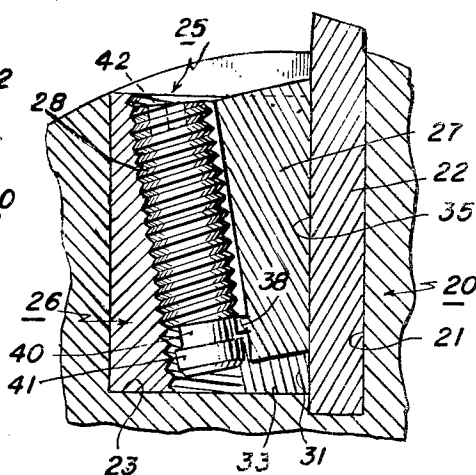


FIG. 3

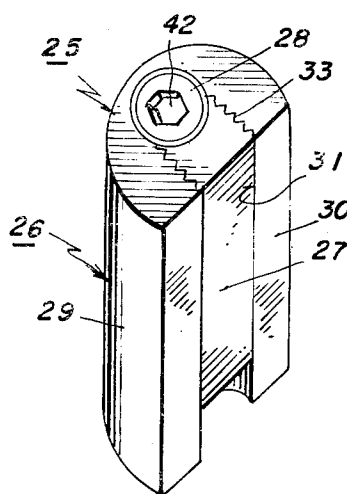


FIG. 4

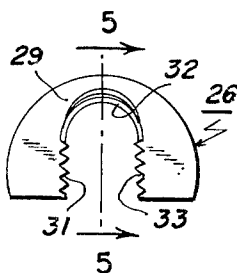


FIG. 5

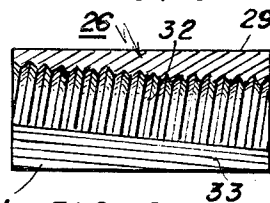
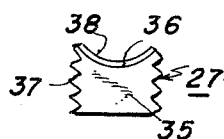


FIG. 6



31 FIG. 9 3.

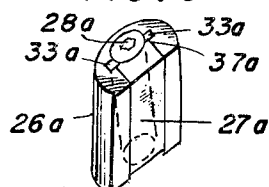


FIG. 10

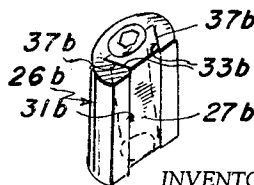


FIG. 7

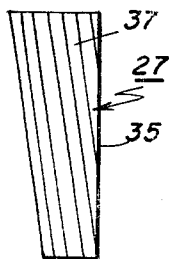
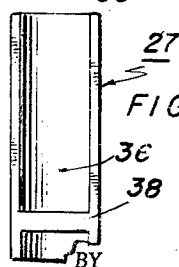


FIG. 8



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LOCKING DEVICE FOR INSERTIBLE CUTTING BLADE

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8 Claims. (Cl. 189—36)

This invention relates to an improved means for locking insertible blades in predetermined positions in blade-receiving and holding slots provided in a cutter body such as that of a milling tool, a boring bar or the like.

A primary object of the invention is the provision of an improved locking device of the cartridge or unitary type which may be applied to a conventional cutter body or the like without the necessity of providing tapped holes in the cutter body.

An additional object of the invention is the provision of such a device comprised of a relative minimum of parts including a wedge which is movable into and out of blade-locking position by means of a screw-threaded member, wherein a face of the wedge over its entire area or surface remains in constant engagement with the blade.

A further object of the invention is the provision of such a device which comprises a carrier having a slot or opening in one side in which is rectilinearly movable a wedge-shaped member and wherein complementary guides on the sides of the slot in the carrier and the wedge are provided in order that all portions of the wedge face are constantly equidistant from the opposed face of the blade during approach to or withdrawal therefrom, and upon contact therewith constantly and equally engage all portions of the wedge face.

A still further object of the invention is the provision of such a cartridge or unitary type locking device wherein the wedge and the operating member therefor are in continuous engagement or interlocking relation so that a predetermined rotary movement of the operating member will impart a continuous predetermined longitudinal movement to the wedge-shaped member.

Still another object of the invention is the provision of a device of the character indicated which is sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, assemble and replace.

Still other objects reside in the combinations of elements, the arrangements of parts, and the features of construction, all as will be more fully pointed out hereinafter and illustrated in the accompanying drawing, wherein there are shown preferred embodiments of the inventive concept.

In the drawings:

FIGURE 1 is fragmentary transverse section through a cutter body showing an insertible blade and one embodiment of the improved blade securing or locking device of the instant invention in released or non-locking position.

FIG. 2 is a view similar to FIG. 1, but showing the device in blade locking position.

FIG. 3 is a perspective view of the blade locking device per se.

FIG. 4 is a top plan view of the carrier with the wedge and operating screw removed.

FIG. 5 is a sectional view taken substantially along the line 5—5 of FIG. 4 as viewed in the direction indicated by the arrows.

FIG. 6 is a top plan view of the wedge element per se.

FIG. 7 is a side elevational view of the wedge disclosed in FIG. 6.

FIG. 8 is a rear or inside elevational view of the wedge of FIGS. 6 and 7.

FIG. 9 is a perspective view on a reduced scale of a modified form of construction similar to FIG. 3, and,

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FIG. 10 is a view similar to FIG. 9 but disclosing a further modification.

Similar reference characters refer to similar parts throughout the several views of the drawing.

With continued reference to the drawing, and more particularly to FIGS. 1 and 2, there is generally indicated at 20 a fragment of a cutter head or the like which is provided with a slot 21, parallel to or at an angle to the axis of rotation of the cutter head, in which is positioned a blade or bit 22. A recess or socket 23 is formed in the tool body or head adjacent each blade and the locking device of the instant invention, generally indicated 25, is adapted to be positioned in each socket 23, it being noted that the number of slots and sockets may be varied in accordance with the type of cutter head or tool body employed.

The locking device 25 is comprised essentially of three elements, a main body or carrier 26, a wedge 27 and a screw threaded operating member 28.

The carrier 26 consists of a generally cylindrical body 29 provided with a flat front face 30 contiguous to the blade and having a central vertically extending slot or opening generally indicated at 31. The body 29 of the carrier is provided with a downwardly and forwardly inclined substantially semi-annular bore 32 which is interiorly threaded throughout its length. The lower or converging end of the bore approaches more closely the front face 30 of the carrier. The threaded portion of the bore 32 is substantially semi-circular in configuration, as above indicated, and the slot 31 opens into the bore for its entire length. The opposed sides of the slot 31 are provided with a plurality of downwardly and forwardly inclined serrations 33, the angle of inclination of which conforms to the incline of the bore 32, for a purpose to be more fully described hereinafter.

The wedge 27 is adapted to be linearly moved in the slot 31 and includes a body portion having a flat front face 35, which is the blade-engaging face, and a concaved rear face 36. The concaved rear face conforms in radius of curvature substantially to that of the bore 32. Serrations 37 are formed on the opposite sides or edges of the wedge 27 and conform in inclination and in dimension to the serrations 33 on the sides of the slot 31 with which they interfit, the arrangement being such that as the wedge 27 is moved vertically in the slot 31 the front face 35 remains constantly in a vertical position parallel to the opposed face of the blade 22. A concaved web or rib 38 projects slightly from the lower portion of the inner concaved face 36 of wedge 27 for a purpose to be more fully described hereinafter.

The actuating member or screw 28 is threaded throughout substantially its entire length, the threads conforming to the threads of the bore 32 and cooperable therewith. Adjacent its lower end, however, the screw 28 is provided with a reduced diameter portion 40 and a head 41, the head being of less diameter than the main body portion so as to pass freely within the bore 32. The arrangement is such that the rib 38 engages in the groove formed by the reduced portion 40 and establishes an interconnection between the screw and the wedge so that as the screw 28 is moved upwardly or downwardly within the bore 32, the wedge 27 will be moved vertically with its front face 35 parallel to the opposed face of the blade.

The upper extremity of screw 28 is provided with a polygonal socket 42 for the reception of an Allen wrench or similar device by which the screw is rotated.

From the foregoing the use and operation of the device should be readily understood. Assuming the parts to be initially in the position of FIG. 2, wherein the blade is locked, in order to release the blade 20 it is merely necessary to rotate the screw 28 until the parts are loosened and assume the position shown in FIG. 1. At this time

the wedge 27 will have moved upwardly guided by the serrations 33 and 37, with the face 35 remaining constantly parallel to the opposed face of the blade 22. It will also be apparent that the interfitting serrations 33 and 37 prevent lateral disconnection or displacement of the wedge 27 from the carrier 26.

When the parts assume the position of FIG. 1, the blade may be adjusted or removed for replacement, and reverse rotation of the screw 28 will move the face 35 of the wedge 27 into locking engagement with the blade 22.

FIG. 9 discloses a slightly modified form of device wherein the body 26a is in all respects identical to the body 26, with the exception that the serrations 33 are supplanted by oppositely disposed grooves or channels 33a which incline forwardly and downwardly in the same manner as the previously described serrations 33. In this case the wedge 27a is provided with oppositely extending tongues 37a which engage in the guide grooves 33a for the same purpose as the previously described interengaged serrations 33 and 37.

FIG. 10 discloses a still further modified form of the device wherein the body 26b is provided with a dovetail slot 31b, the side walls of which converge outwardly as indicated at 33b to accommodate the inwardly diverging side walls 37b of the wedge 27b. In this case the slot is slanted forwardly and downwardly as in the previous embodiments and the dovetail arrangement or engagement of the side walls 33b and 37b serve the same function and purpose as the previously described serrations 33 and 37 and the tongues 37a and the guide grooves 33a.

In those instances where a cutting blade abnormal in length is employed, two or more locking devices sufficiently spaced may be utilized.

I claim:

1. In a locking device for clampingly engaging and locking an insertible blade in place in a tool body, a generally cylindrical carrier member having a flat face and an axially inclined threaded bore, said carrier member also having a slot extending longitudinally of said carrier and through the flat face thereof and communicating with the bore, a wedge-shaped member movable in and longitudinally of said slot and having a plane outer face for clamping engagement with the blade and a smooth concaved inner face, a transverse rib on the inner concaved face of said wedge-shaped member, a screw rotatably mounted in said threaded bore, said screw having a reduced portion intermediate its ends forming an annular groove receiving said rib whereby rotation of said screw occasions rectilinear movement of said wedge-shaped member relative to said carrier, and complementary guiding means on the sides of said slot and said wedge-shaped member and inclined with respect to the flat face of said carrier and the plane outer face of said wedge-shaped member for moving said wedge-shaped member laterally relative to said carrier upon rectilinear movement of said wedge-shaped member.

2. The device set forth in claim 1 wherein said complementary guiding means comprise interfitting serrations on the sides of said slot and the sides of said wedge-shaped member.

3. The device set forth in claim 1 wherein said complementary guiding means comprise interfitting serrations on the sides of said slot and the sides of said wedge-

shaped member, said serrations being inclined relative to said plane face of said wedge-shaped member and said flat face of said carrier at an angle corresponding to the angle of inclination of said bore.

4. In a locking device for clampingly engaging and locking an insertible cutting blade in place in a tool body, a generally cylindrical carrier member having a flat face and an axially inclined threaded bore, said carrier member also having a slot extending longitudinally of said carrier and through the flat face thereof and communicating with the bore, a wedge-shaped member movable in and longitudinally of said slot and having a plane outer face for clamping engagement with the blade and a smooth concaved inner face, a screw rotatably mounted in said threaded bore, means coupling said screw and said wedge-shaped member whereby rotation of said screw occasions rectilinear movement of said wedge-shaped member relative to said carrier, and complementary guiding means on the side of said slot and said wedge-shaped member and inclined with respect to the flat face of said carrier and the plane outer face of said wedge-shaped member for moving said wedge-shaped laterally relative to said carrier upon rectilinear movement of said wedge-shaped member for clampingly engaging the flat face thereof against the blade.

5. The device set forth in claim 4 wherein said complementary guiding means comprise interfitting serrations on the sides of said slot and the sides of said wedge-shaped member.

6. The device set forth in claim 4 wherein said complementary guiding means comprise interfitting serrations on the sides of said slot and the sides of said wedge-shaped member, said serrations being angularly inclined relative to said plane outer face of said wedge-shaped member and said flat face of said carrier member at an angle corresponding to the angle of inclination of said bore.

7. The device set forth in claim 4 wherein said complementary guiding means comprise inclined grooves in the walls of said slot and coacting tongues on the sides of said wedge-shaped member and received by said grooves.

8. The device set forth in claim 4 wherein said complementary guiding means comprise longitudinally inclined dovetailed side walls on said slot and said wedge-shaped member.

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