

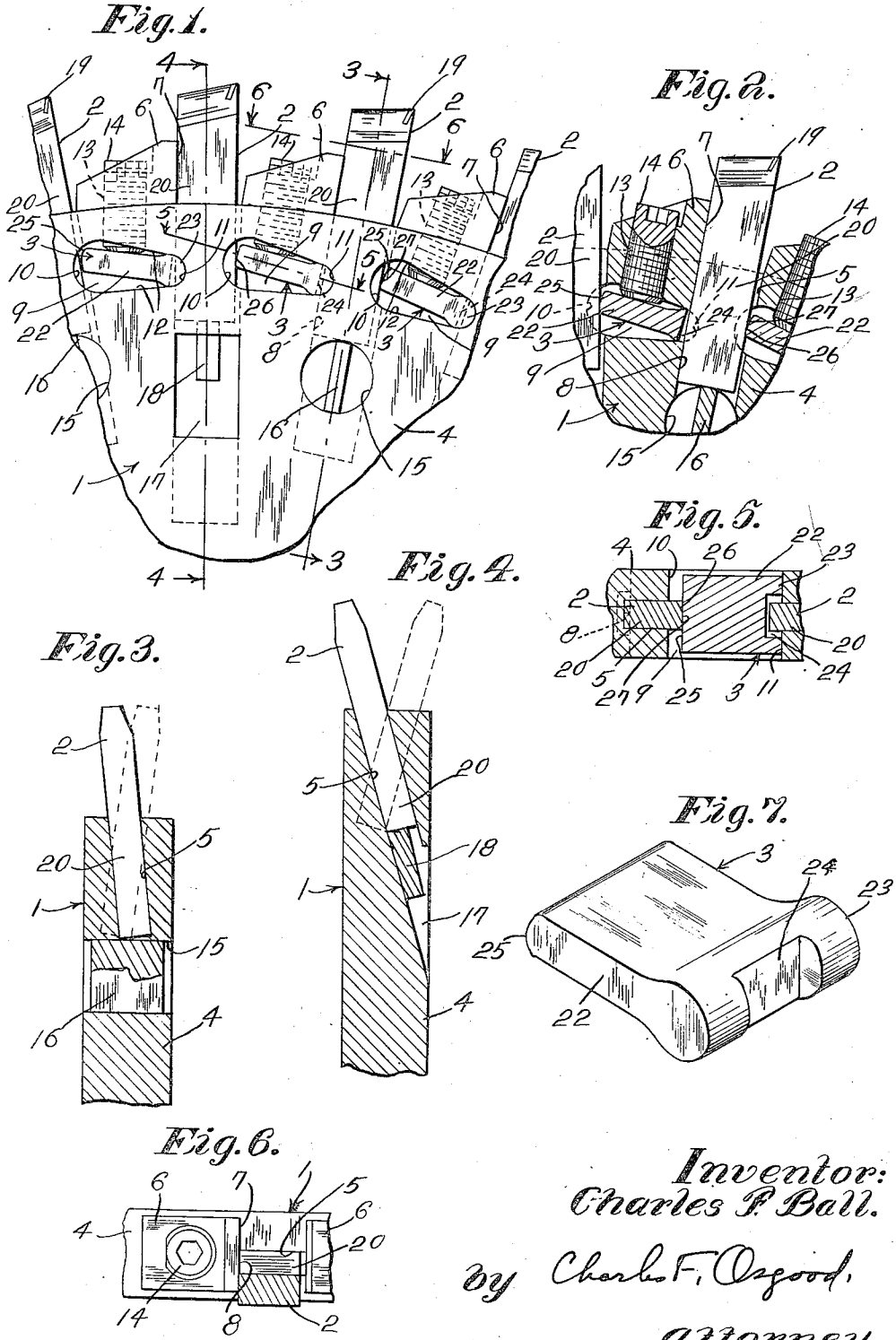
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BIT SECURING DEVICE FOR ROTARY PAVEMENT CUTTERS OR THE LIKE

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BIT SECURING DEVICE FOR ROTARY PAVEMENT CUTTERS OR THE LIKE

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This invention relates to cutting devices and more particularly, but not exclusively, to cutting devices for a rotary pavement cutter.

In certain types of cutters, and particularly in a rotary pavement cutter where cutting conditions are especially severe, some difficulty has been encountered in the proper securing of the cutters in position on the cutting wheel. Somewhat similar conditions are encountered in the cutter chains of coal cutting machines, in the disintegrating mechanisms of continuous mining apparatus and other similar types of cutting devices for forming slots or kerfs in relatively hard, brittle materials such as concrete, or minerals such as coal. The present invention contemplates improvements over known types of cutting devices in that an extremely effective supporting and holding means is provided for the cutters whereby the latter is rigidly supported and firmly held in cutting position.

It is accordingly a primary object of the present invention to provide an improved supporting and holding means for a cutting or disintegrating instrument, or cutter bit. Another object is to provide improved means for rigidly securing cutter bits on a rotary wheel of a pavement cutting machine. Still another object is to provide an improved cutter securing means which is comparatively simple and rugged in design and readily releasable when desired. These and other objects and advantages of the invention will, however, more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing:

Fig. 1 is a fragmentary side elevational view of a rotary cutting wheel with which an illustrative embodiment of the invention is associated.

Fig. 2 is a central longitudinal vertical section through a portion of the rotary cutting wheel and illustrating details of the bit supporting and securing means.

Fig. 3 is a transverse sectional view taken radially of the cutting wheel on line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view taken radially of the cutting wheel on line 4—4 of Fig. 1.

Fig. 5 is a detail transverse sectional view taken on line 5—5 of Fig. 1, illustrating details of the invention.

Fig. 6 is a detail transverse sectional view taken on line 6—6 of Fig. 1.

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Fig. 7 is a perspective view of the novel bit keeper.

In this illustrative construction, as shown in the drawing, the rotary cutting wheel is generally designated 1, the cutter bits are designated 2 and the improved bit securing means is generally designated 3. Evidently, the bit supporting and securing means of the present invention may be associated with other types of cutting devices such as a cutter chain of a mining machine or the disintegrating chain mechanism of a continuous mining apparatus.

The rotary cutting wheel comprises a circular plate 4 having a series of radially located bit-receiving openings or sockets 5 closely spaced about its peripheral portion and formed generally of rectangular cross section as shown in Figs. 5 and 6. The bit-receiving sockets open outwardly through the wheel periphery and projecting from the wheel periphery rearwardly of the sockets are lateral lugs 6 which may be welded to the wheel and these lugs have their front faces 7 lying flush with the plane rear walls 8 of the sockets in the manner shown. These lugs project upwardly along the rear surfaces of the cutting portions of the cutter bits for firmly supporting the bits during the cutting operation. Traversing the cutting wheel near its peripheral portion are openings 9 disposed between and opening into the bit-receiving sockets 5 (see Fig. 2), and these openings have substantially semi-circular rear walls 10 and smaller substantially semi-circular front walls 11 and these curved end walls are connected by relatively inclined side walls 12, 12. Evidently, the openings 9 may be of any desirable shape. In this instance, the openings 9 are disposed inwardly with respect to the wheel periphery directly inwardly of the bit supporting lugs 6 and the latter have threaded openings 13 inclined slightly with respect to the radial axis of the cutter bits and opening inwardly into the transverse openings 9. Set screws 14 are received in the openings 13 as shown most clearly in Fig. 2. Every other one of the radial bit receiving sockets 5 are traversed near their inner ends by circular bores 15 and arranged in these bores and secured as by welding at their edges to the bore-walls are relatively narrow diametrically arranged stop plates 16. The intermediate bit receiving sockets extend diagonally through the side surfaces of the wheel at 17 and have stop lugs 18 secured as by welding to their inner walls. The cutter bits 2 may assume various conventional forms and herein have cutting points 19 of

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hard wear-resisting material and rectangular shanks 20 receivable in the radial sockets 5 with the inner ends of the bit shanks resting on the stop plates or lugs 16 and 18 as shown in Figs. 3 and 4. The bit-receiving sockets are relatively inclined laterally of the wheel to provide proper lacing of the cutter bits so that the bits may cut out a slot or kerf of a width sufficient to receive the wheel.

In this illustrative construction, received in the transverse openings 9 are pivoted bit-securing-members or bit keepers 22 desirably of a width slightly less than the width of the cutting wheel (see Fig. 5) and the openings 9 are shaped, as above described, to permit free swinging of the keepers between clamping and releasing positions. The keepers 22 have semi-circular rear bearing portions 23 which pivotally engage the curved walls of the smaller front end surfaces 11 of the transverse openings 9 as shown in Fig. 1. The curved bearing portions 23 of the pivoted keepers are centrally cut away or notched at 24 and the bit shanks extend through these notches (Fig. 5) with some clearance so that the cutter bits, in the event the set screws should become loosened or lost, lock the keepers against lateral release from the openings 9. The rear curved edges 25 of the keepers are engageable at 26 with the front surfaces 27 of the cutter bits and the set screws 14 when threaded inwardly in the lug openings 13 are engageable with the outer surfaces of the keepers substantially midway between the ends of the latter, to swing the keepers inwardly about their pivots to lock the bit shanks firmly in position in the radial sockets 5. The keepers 22 when in bit securing position nearly approach a right angular position with respect to the longitudinal axes of the bit shanks and, are so arranged and constructed that when in bit securing position a tremendous holding force is imparted to the bit shanks so that the latter are rigidly held in position in the wheel sockets. When the set screws are loosened the bit keepers may be readily released to enable removal of the cutter bits from the sockets. In the event the keepers should become stuck they may be pried or driven into their released positions by suitable instruments inserted in the openings 9 beneath the keepers. During the cutting operation the rear surfaces of the cutter bits near their outer cutting ends abut against the front surfaces 7 of the lateral lugs 6 so that the cutting forces are to a substantial extent absorbed by the rear supporting lugs.

As a result of this invention an improved cutting device is provided having improved supporting and securing means for the cutter bits whereby the latter are rigidly supported and firmly held in position during the cutting operation. By the provision of the improved bit supports on the rotary cutting wheel of the pavement cutting machine and the novel bit securing devices the cutter bits are firmly held in position and are so supported that they easily withstand the tremendous cutting forces encountered in the slotting of pavement. By the provision of pivoted keepers which directly engage the bit shanks in the manner disclosed and the novel arrangement of the set screws a tremendous holding force is imparted to the bit shanks thereby substantially eliminating the possibility of the release of the bits during the cutting operation. The novel bit securing means not only rigidly holds the bits in position but is also extremely compact and rugged in design, features of prime importance in

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a relatively narrow cutting wheel of the type disclosed. The bit supporting and securing means may be readily applied to a mining machine cutter chain or the disintegrating chains of a continuous mining apparatus. The pivoted keeper arranged and constructed as disclosed greatly increases the mechanical advantage obtained by an ordinary set screw, such as is used with conventional mining chains. The manners of use and other advantages of the invention will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be 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 combination, a rotary cutter wheel having a series of radially located sockets opening outwardly through the periphery thereof, transverse openings at the peripheral portion of the wheel between said sockets and opening into said sockets, cutters receivable in said sockets and having cutting portions projecting outwardly from the wheel periphery, a pivoted keeper arranged in each of said transverse openings and swingable inwardly into engagement with the front surfaces of said cutters for securing the latter in said sockets, and set screws threaded in the peripheral portion of the wheel outwardly of said openings and adjustable into engagement with the outer surfaces of said keepers for swinging the latter inwardly in the cutter securing position, each of said keepers having a bearing portion engaging one end wall of each transverse opening and having its bearing portion recessed to receive a cutter disposed in the next adjacent socket whereby said adjacent cutter serves to hold the keeper against endwise displacement from its opening in the event the set screw becomes loosened.

2. In a cutter supporting and securing device, a movable support having spaced cutter receiving sockets, a cutter having a shank receivable in each socket, a transverse opening in said support between each pair of cutter receiving sockets and opening into said sockets, a pivoted keeper arranged in said opening between each pair of sockets and engageable at one end with the shank of one of said cutters, and set screw threaded in said support and engageable with said keeper for swinging the latter into cutter securing position, said keeper having a bearing portion located at its other end and recessed to receive the next adjacent cutter shank whereby said adjacent shank serves to prevent endwise release of the keeper from its opening in the event the set screw becomes loosened.

3. In a cutter supporting and securing device, a movable support having spaced cutter receiving sockets, cutters having shanks receivable in said sockets respectively, pivoted keepers, one arranged between each pair of sockets and engageable at their free ends with the shanks of said cutters respectively, each of said keepers having interlocking relation with the next adjacent cutter shank whereby said next adjacent cutter shank serves to prevent endwise release of the keeper from said support, and adjusting members secured to said support and adjustable relative to said support into engagement with said

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keepers respectively for swinging the latter about their pivots into cutter securing position while such interlocking relation is maintained.

4. In a cutter securing and supporting device, a movable support having spaced cutter receiving sockets, cutters having shanks receivable in said sockets respectively, pivoted keepers mounted on said support with one arranged between each pair of sockets and insertable endwise into position through one side of said support, said keeper swingable about their pivots to bring their free ends into clamping engagement with the shanks of said cutters respectively, said keepers each having a bearing portion in interlocking relation with the next adjacent cutter shank whereby said next adjacent shank serves to prevent endwise displacement of said keeper from said support, and adjustable devices carried by said support and respectively engaging the outer surfaces of

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said pivot keepers for swinging the latter inwardly about their pivots into cutter securing position while such interlocking relation is maintained.

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