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KNIFE BLADE HOLDER EJECTOR MECHANISM

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Fig. 1

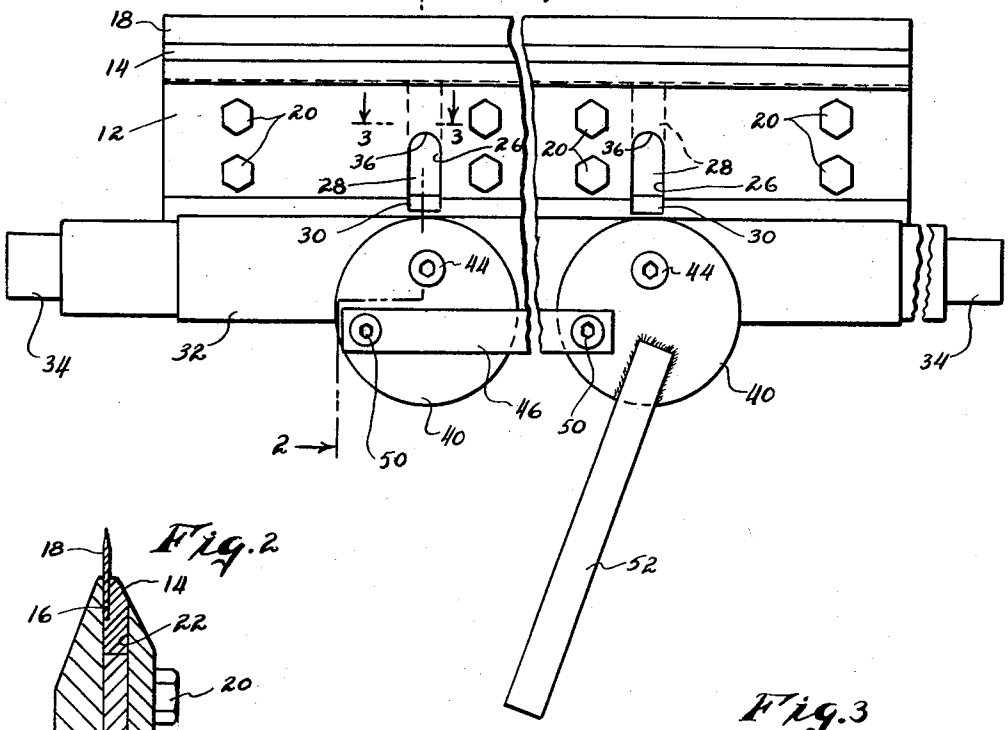


Fig. 2

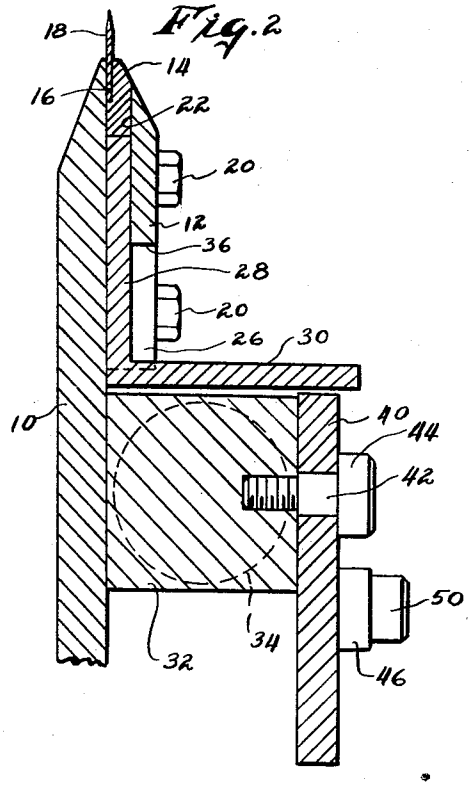


Fig. 3

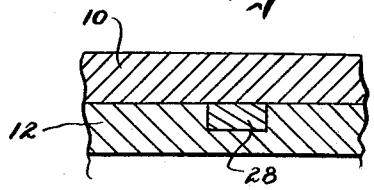
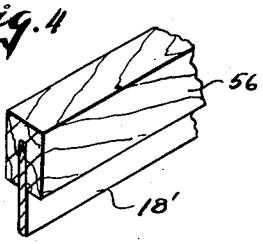


Fig. 4



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KNIFE BLADE HOLDER EJECTOR MECHANISM

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3 Claims. (Cl. 15—256.5)

This invention relates to roller mill scrapers, and more especially to knife blade holders for the scrapers.

The knife blades of roller mill scrapers are subject to severe service and frequent replacement of the blades is necessary. It is an object of this invention to provide an improved holder assembly having improved accessibility of the knife slot for cleaning; and into which knife blades can be inserted quickly and conveniently, and from which a used knife blade is ejected with greater safety and by simple and rugged mechanism, preferably operated by a single manually-actuated lever.

The preferred embodiment of the invention relates to an apron knife of the type commonly used for scraping material from roller mills, and both the holding and ejecting means are a part of a unitary assembly with the apron.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views;

Figure 1 is a fragmentary front elevation on an apron knife equipped with the ejectors of this invention;

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is a perspective view, partly in section, showing the means for pressing the knife blade into the groove of the knife holder.

Referring to Figures 1 and 2, the construction illustrated includes an apron plate 10 and a second plate 12 for holding a knife back or blade holder 14 against the upper portion of the apron plate 10. The face of the blade holder 14, which confronts the apron plate 10, contacts the apron plate for a distance upward from the lower end of the blade holder; but the face of the blade holder 14 has a set-back portion for a substantial distance down from the top of the blade holder and the space between this set-back portion of the blade holder face and the confronting face of the apron plate provides a groove 16.

The groove 16 extends for the full length of the apron plate and blade holder; and there is a knife blade 18 which fits snugly into the groove 16 with the upper end of the knife blade extending above the apron plate 10 and blade holder 14 for contact with a mill roll, or other structure with which the knife blade is intended to be used.

The knife blade 18 is preferably not clamped between the apron plate 10 and the blade holder 14. In the preferred construction, the knife blade 18 fits the groove 16 snugly enough to prevent any play between the knife blade and the groove; and the knife blade is held in the groove 16 by friction.

The second plate 12 is clamped to the apron plate 10 by bolts 20 at spaced locations along the length of the plate 12, and there are preferably two rows of bolts 20,

as clearly shown in Figure 1. The upper portion of the plate 12 is notched to form, with the apron plate 10, a groove 22. It is this groove 22 which provides a clearance between the upper ends of the apron plate 10 and the second plate 12 for receiving the blade holder 14. The blade holder fits snugly into the groove 22 and in the preferred construction, is held in the groove 22 by friction only. It is practical to have the blade holder 14 and the knife blade 18 held in place by friction because the forces against the blade holder and knife blade do not include any components which would lift the blade holder and knife blade out of the grooves in which they are located.

The advantage of this construction is that the blade holder and the knife blade can be ejected and a replacement knife blade inserted, without releasing any clamping screws or performing any other operations which would entail added labor and loss of time when a knife blade requires replacement.

The apron plate 10, the second plate 12, and the blade holder 14 have top faces which slope inwardly to give the assembly a tapered construction of reduced thickness toward the knife blade and this permits the knife blade to be brought adjacent to a mill roll without having as high a knife blade as would otherwise be necessary.

There are vertically extending notches 26 in the face of the second plate 12 which confronts the apron plate 10. There is an ejector 28 located in each of these notches 26 and vertically movable in the notch. Each ejector 28 is of angular shape and has a straight bottom portion 30 extending away from the apron plate and across the top surface of a pressure bar 32 by which the apron plate 10 is carried. This pressure bar 32 has cylindrical ends 34 for insertion into supporting bearings in accordance with conventional construction for knives which are to be used with mill rolls.

The ejector 28 is shown in its lowermost position in Figure 2. When the ejector is moved upwardly, it pushes against the bottom of the blade holder 14 and lifts the blade holder 14 out of the groove 22. This also ejects the knife blade 18 from the assembly. By having the holder 14 ejected, a wide groove exists in the apron which can be cleaned with a paint brush dipped in solvent. The holder itself may be wiped clean. Cleaning is necessary to prevent both contamination of the product and misalignment of the blade caused by dirt in the apron groove 22. In order to provide clearance for the bottom portion 30 of the ejector 28, the notches 26 are cut all the way through the plate 12 for a limited distance up to the faces 36 on the plate 12.

The ejectors 28 slide freely in the notches 26 which serve as guide bearings. The ejectors are mechanically operated by eccentrics 40 supported on axles 42 which have threaded ends that screw into the pressure bar 32. There are heads 44 on the axles for preventing axial displacement of the eccentrics 40. This structure is obtained by use of a conventional shoulder screw. Each of the ejectors 28 extends beyond the pressure bar far enough to be lifted by one of the eccentrics 40 as the eccentric rotates about its axle 42.

There is a different eccentric 40 for each of the ejectors 28. The eccentrics 40 are operated simultaneously and form a common source of power by a connecting rod 46. A crank pin 50 extends from each of the eccentrics 40 and connects the eccentric with the connecting rod 46. In the construction illustrated, power for operating the eccentrics 40 is supplied by an operator-actuated hand lever 52 secured to the eccentric 40 near one end of the pressure bar 32.

Whenever the knife blade 18 becomes damaged or excessively worn, the pressure bar 32 is rocked into position to remove the knife blade from the vicinity of the mill roll, and the handle 52 is then pulled toward

the right in Figure 1 to rotate the eccentrics 40 counterclockwise. This movement of the eccentrics 40 causes them to contact with the bottom portions of the ejectors 28, and to lift the ejectors so that the blade holder 14 and knife blade 18 is ejected from the knife-supporting assembly. In order to insert a new knife, the lever 52 must be returned to its original position so that the ejectors 28 can drop back into their lowered positions, and the blade holder 14 must be again inserted into the groove 22. A new knife blade 18' (Figure 4) has its upper edge portion inserted into a block of wood 56, or other convenient holder, and an operator grips this block 56 and uses it as a handle portion while moving the knife blade 18' into the groove 16 (Figure 2) between the apron plate 10 and the blade holder 14.

After the blade has been inserted for the full depth of the groove 16, the operator removes the block 56 by holding one end of the knife blade down while lifting that end of the block 56 until the block is disengaged from the knife blade for the full length of the block.

The preferred embodiment of the invention has been illustrated and described. Terms of orientation are, of course, relative, and changes and modifications can be made and some features can be used in different combinations without departing from the invention as defined in the claims.

What is claimed is:

1. Apparatus for holding a knife blade adjacent to the periphery of a mill roll including an apron plate, a second plate secured to the apron plate and having a back face confronting the front face of the apron plate, the confronting face of one of the plates being spaced from the face of the other plate at the upper ends of the plates to provide a groove, a knife blade with a back that fits into the groove with a friction fit, ejectors carried by the plates at spaced locations along the length of the groove, slidable in openings formed in at least one of the plates below the groove, means for operating the ejectors when a knife is to be ejected from the groove for replacement by another knife, said means including a cam under each of the ejectors, and common actuating means for all of the cams.

2. Apparatus for holding a knife blade adjacent to the periphery of a mill roll including an apron plate, a second plate secured to the apron plate and having a back face confronting the front face of the apron plate, the confronting face of one of the plates being spaced from the face of the other plate at the upper ends of the plates to provide a groove, a knife blade with a back that fits into the groove with a friction fit, ejectors carried by the plates at spaced locations along the length of the groove, slidable in openings formed in at least one of the plates below the groove, means for operating the ejectors when a knife is to be ejected from the groove for replacement by another knife, said means including a cam under each of the ejectors, and common actuating means for all of the cams, each of the cams being an eccentric, and the common actuating means including a connecting rod pivotally connected to each cam and a lever extending from one cam in position to serve as a crank for manual rotation of the eccentrics through a limited angle of movement.

3. A roller mill scraper construction including an apron plate assembly having a constant-width groove at its upper end, a narrow strip of material extending from within the groove upwardly above the apron plate and constituting a knife blade, a wider piece of material in contact with the knife blade within the groove and extending for substantially the full length of the blade, but terminating below the upper end of the blade, and constituting a holder for the blade, the combined width of the blade and holder being substantially equal to the width of the slot whereby the blade and holder are retained in the groove by friction, ejectors for lifting the blade and holder out of the groove when the blade needs to be replaced, a pressure bar attached to the apron plate assembly and extending forwardly under and beyond the portion of the assembly in which the groove is located, the assembly having guide openings therein extending from the bottom of the groove downwardly toward the pressure bar for guiding the ejectors, there being a plurality of said ejectors at spaced-apart locations along the length of the groove and each ejector having a forwardly-extending bottom portion that rests in its lowermost position on top of the pressure bar and each of which ejectors has its forwardly-extending bottom portion projecting beyond the front of the pressure bar, a plurality of eccentrics rotatable on axles extending from the front of the pressure bar, there being one eccentric under each of the ejectors, a crank on one eccentric having a grip portion by which an attendant manually operates the crank to turn the eccentric and lift the ejector that extends across the top of that eccentric, and a connecting rod joined to all of the eccentrics for transmitting to the other eccentrics the same motion as is imparted to the eccentric having said crank.

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