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R. W. McLEAN

CUTTER

1,964,786

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Fig. 1

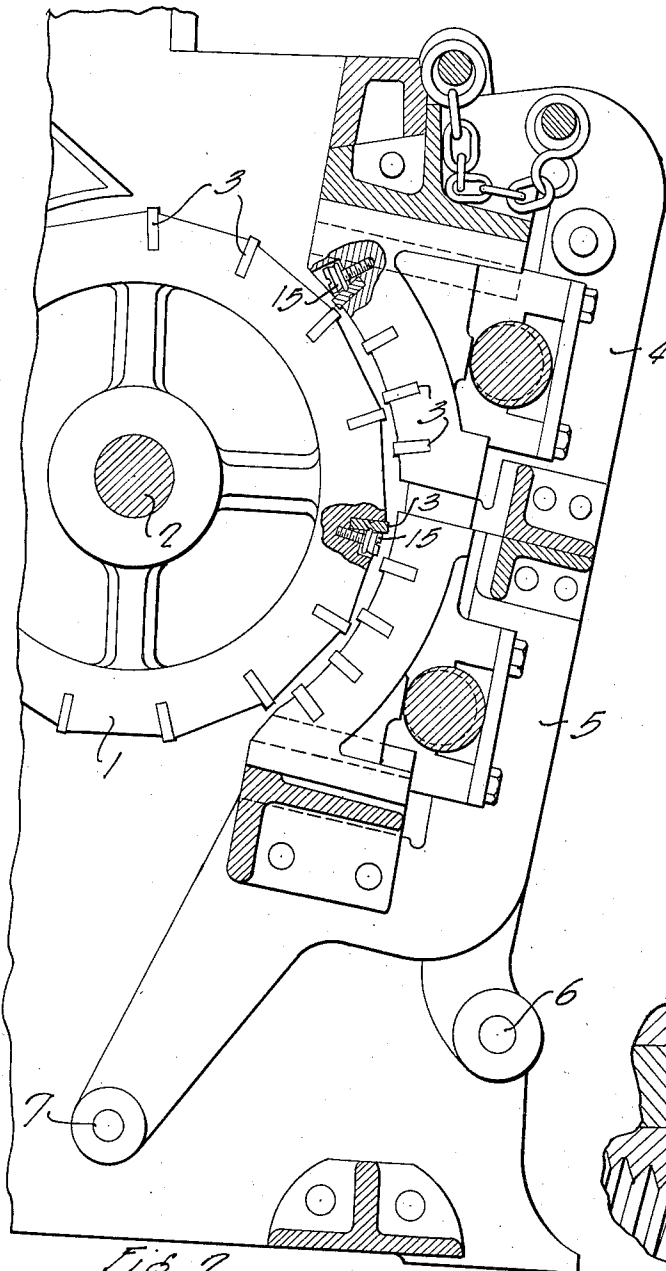


Fig. 5

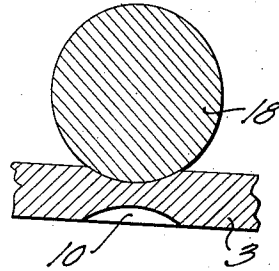


Fig. 3

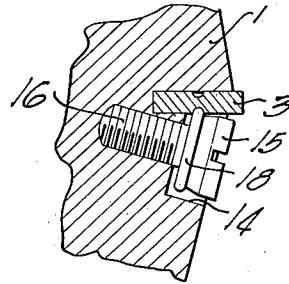


Fig. 4

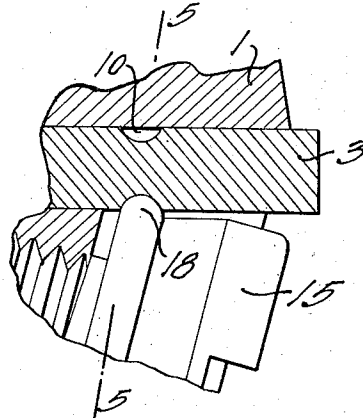
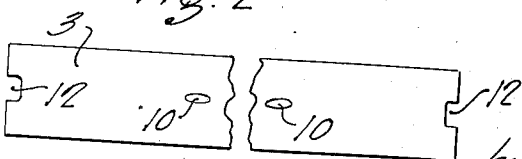


Fig. 2



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UNITED STATES PATENT OFFICE

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CUTTER

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2 Claims. (Cl. 83—14)

This invention relates to cutters, knives, or like devices used in power-driven machines running at high speeds and in which the knives or cutters are subjected to hard and abusive treatment necessitating their frequent replacement. While the improved knife or cutter forming the immediate subject of the present invention is of broad utility, I have herein chosen to illustrate and describe it as embodied in a cottonseed huller as representative of machines of this general class and wherein its peculiar characteristics are highly advantageous.

A cottonseed huller usually consists of a rotary drum or cylinder carrying knives spaced circumferentially about its periphery and adapted to cooperate with similar knives mounted in one or more concave members arranged adjacent to the drum, such as is shown in my prior Patent No. 1,590,305, granted June 29, 1926, the seeds to be crushed or hulled being fed between the drum or cylinder and the stationary concave member and being subjected to the crushing or cutting action of the two sets of knives.

In machines of this character, the cutting elements are subjected to heavy shocks and severe usage, and frequently small hard objects find their way into the machine and often destroy the cutting elements before such objects can be removed. Due to the heavy loads and severe shocks, the cutting elements usually are made of comparatively heavy stock (for example, $\frac{5}{8}$ of an inch thick). In order to facilitate replacement and permit the individual cutting elements to be reversible and interchangeably secured in the holder, each cutter commonly is provided with a longitudinally extending groove or recess in each face, midway between its cutting edges, this groove receiving suitable fastener elements such as bolts having annular shoulders which hold the bar against radial or outward movement.

Such constructions are not wholly satisfactory in that the long grooves materially reduce the strength of the knife or cutter, so that the cutters sometimes bend or break at this weak cross section. Moreover, as the cutters are held in place merely by the engagement of the shoulder of the bolt with the groove, there is usually only a line contact between these elements, and in many cases only a point contact. The unit pressure between the parts may thus become very great, while furthermore, the cutters are held against outward or radial movement only, no provision being made positively to prevent movement of the cutter in the longitudinal direction relative to the holder. If the fastening member becomes loos-

ened, worn, or crushed by the severe shocks which it sustains, a longitudinal shift in the position of the cutter is permitted, while the looseness of the cutter not only interferes with the accuracy of operation of the machine, but also results in the premature dulling of the cutter and the necessity of frequent renewal or replacement, all of which adds substantially to the operating expense of machines of this character.

The principal object of this invention is to provide an improved cutter which is of simple design, which is of rugged durable construction adapted better to withstand the severe usage encountered in such operations and to remain tightly fixed in its original position in its holder, which is inexpensive to manufacture, and which overcomes the aforementioned objectionable features inherent in the cutters of prior constructions while still retaining their reversible, interchangeable and readily removable character.

Further objects and advantages will be apparent from a consideration of the following description and the accompanying drawing which exemplifies one embodiment chosen for the purpose of illustration.

In the drawing,

Fig. 1 is a vertical cross-sectional view of a cottonseed huller showing the cylinder and portions of the concave in end elevation;

Fig. 2 is an elevation of one form of my improved cutter;

Fig. 3 is a sectional detail of a portion of the huller cylinder showing the improved cutter and one fastening member in assembled relation with the holder;

Fig. 4 is an enlarged sectional detail showing the complementary interengaging elements of the cutter and fastening member; and

Fig. 5 is a section on the line 5—5 of Fig. 4.

Referring to Fig. 1, the machine comprises a rotary cylinder or drum 1 mounted upon a shaft 2 and provided with a series of circumferentially spaced cutter elements or blades 3. Cooperating with the cylinder 1 is a concave, here shown as made up of two parts 4 and 5, each part being pivotally mounted adjacent to the base of the machine, the part 4 being pivoted at 6 and the part 5 at 7. These parts may swing away from the drum 1 by breaking one or more frangible links (not shown) in the event that any hard substance, such as a stone or piece of metal, should get between the teeth of the cutting edges, so as to avoid too great damage. The peripheral surface of the drum or cylinder 1 and the inner surfaces of the concaves are furnished with substantially radial

blade-receiving slots of the usual character and dimensions, which are adapted to hold the usual thick and rigid, forged or cast blades or cutters of substantially rectangular cross section. One side wall of the blade-receiving slot constitutes an abutment element against which the cutter is firmly held, as hereinafter more fully described. Such constructions are well known and are fully set forth in my prior Patent No. 1,590,305, to which reference may be had for a more complete description.

In accordance with the present invention the cutters or blades 3 are made from a relatively thick piece of metal, having in general a substantially rectangular transverse section of such dimensions as to fit snugly in the blade-receiving slots, the longitudinal edges of the blade defining its cutting edges. On opposite faces, and midway between its cutting edges, the blade is provided with two or more symmetrical depression or dimples 10, preferably spaced at equal distances from the ends of the blade. Preferably these depressions extend longitudinally of the blade and are of toroidal contour. The ends of the blade may be provided with suitable notches 12 which permit the insertion of a tool for removing blades which may have become pressed into firm engagement with the holder due to the clamping action of the retaining member. Each of the blades is similarly constructed so that it may be reversed in the holder and interchanged with other blades in both the concave and cylinder.

Adjoining the blade-receiving slots are the usual recesses 14 which receive the heads 15 of retaining members or bolts 16. Each bolt head preferably is provided with an annular shoulder 18 having a contour conforming to that of the depressions 10. Preferably the outer edges of the shoulders are of toroidal shape and adapted snugly to fit within the depressions 10 to define therewith complemental interengaging surfaces for holding the blade firmly in place in the retaining slot. When the blade 3 is to be assembled in the machine, it is first inserted part way into the blade-receiving slot and the bolt 16 is threaded part way into place so that its annular shoulder 18 and depression 10 are brought into loose engagement with each other, it being understood that a plurality of these bolts are similarly arranged along each of the slots. The bolts may then be tightened, bringing the blades down-

wardly into firm engagement with the bottom of the retaining slot, as shown in Fig. 3.

Referring to Figs. 4 and 5, it will be noted that the shoulder 18 and depression 10, being symmetrical and conforming in contour, define a surface contact of substantial extent which positively locks the blade against transverse and longitudinal movement relative to the holder. It will be further noted that the depressions constitute but a very small percentage of the cross-sectional area of the blade and consequently do not weaken the blade to any appreciable extent.

While I have shown and described one desirable embodiment of this invention, it is to be understood that the present disclosure is for the purpose of illustration only and that various changes in shape, proportion, and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. In a machine of the class described, the combination of a holder having an elongate blade-receiving slot, an elongate blade fitting within said slot, said blade having a plurality of dimples in each of its opposite faces, all of said dimples being substantially midway between the cutting edges of the blade, and a bolt for holding said blade and holder in assembled relation, said bolt having a circumferentially extending shoulder with a contour conforming to that of said dimples, said shoulder and dimples defining complemental interengaging parts which lock said blade against transverse and longitudinal movement relative to said holder, the blade having notches at its opposite ends for the insertion of a tool for use in removing the blade from its slot.

2. A cutter for use in a machine of the class described, said cutter comprising an elongate metallic blade of substantially uniform and rectangular cross section, whose longitudinally extending edges are cutting edges, the opposite faces of said blade each having a pair of elongate dimples therein, extending longitudinally of the blade and arranged substantially midway between its cutting edges, the ends of the blade having notches therein for the reception of a tool for removing the blade from operative position in the machine.

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