Aug. 23, 1927. 1,639,807

T. H. OPPENHEIM ET AL

CUTTER HEAD

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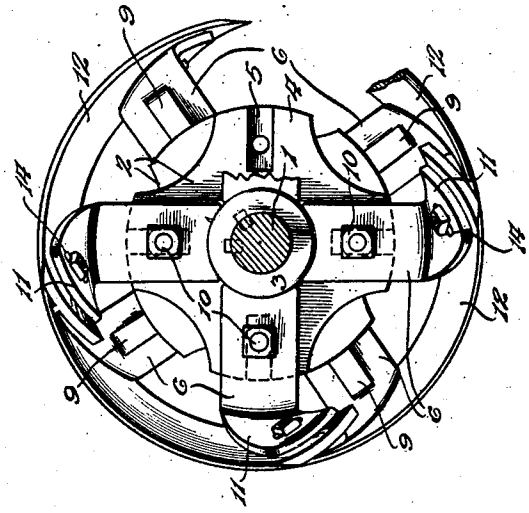

Fig. 2.

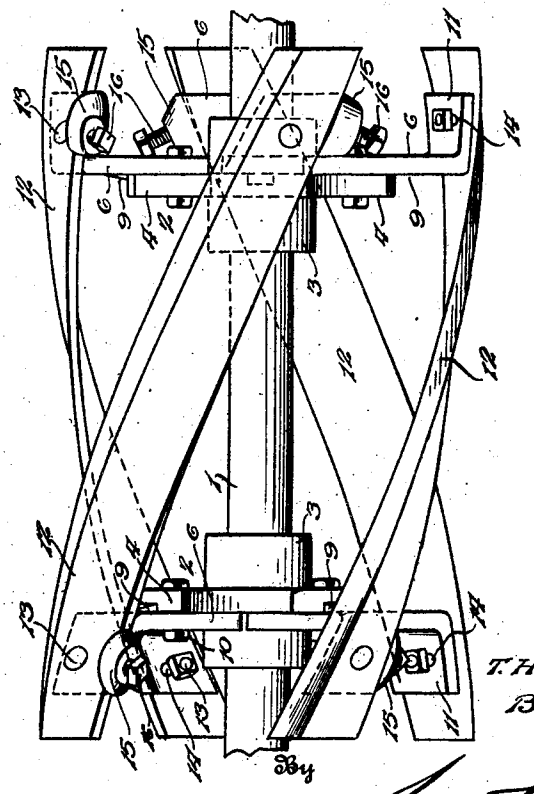

Fig. 1.

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Fig. 4.

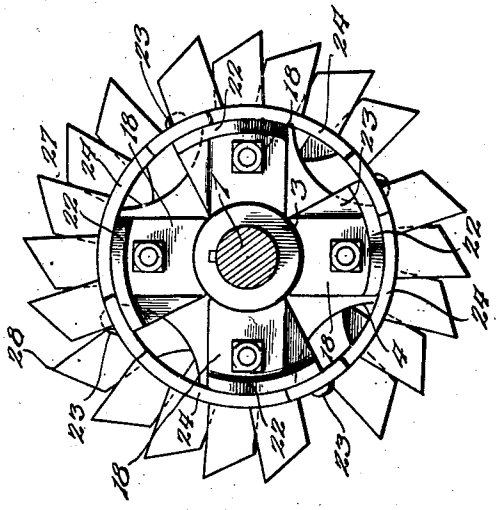

Fig. 3.

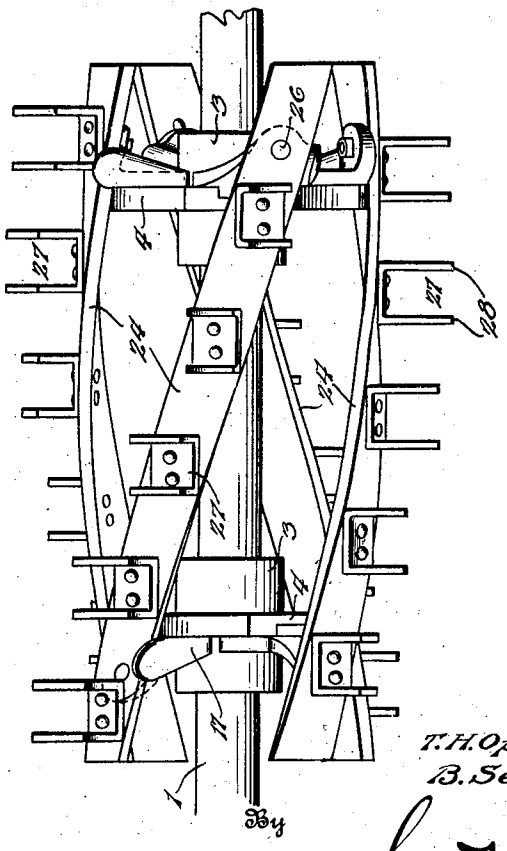

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Fig. 6.

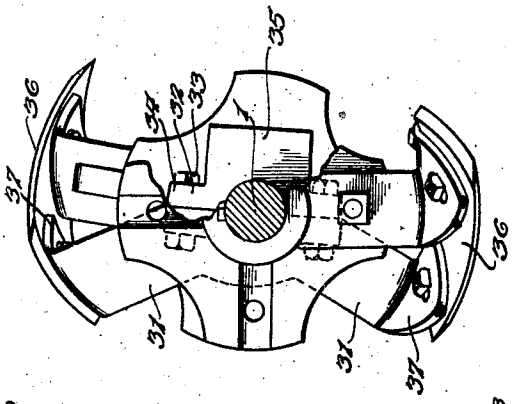


Fig. 7.

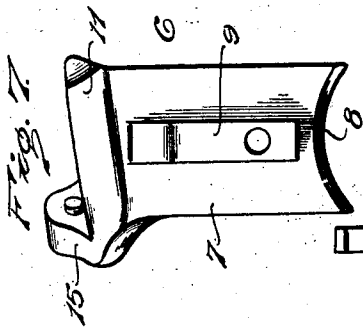


Fig. 8.

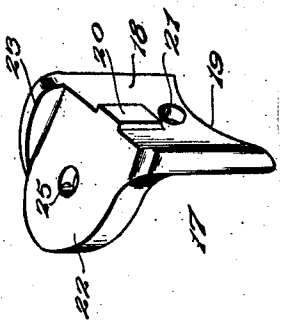
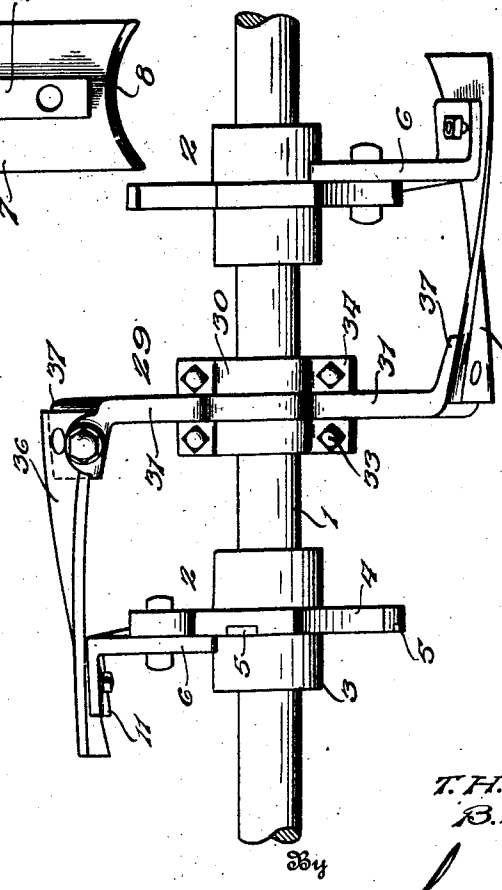


Fig. 5.



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Patented Aug. 23, 1927. 1,639,807

UNITED STATES PATENT OFFICE.

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CUTTER HEAD.

Application filed December 13, 1924. Serial No. 755,689.

This invention relates to cutter heads for corn huskers, corn shredders, ensilage cutters and similar machines and has for its primary object the provision of a novel construction whereby the head may be equipped at will with cutters of different lengths or with shredder bars or with some cutters and some shredder bars. Another object of the invention is to provide a novel construction whereby the removal of the entire cutter head from the machine, when sharpening of the bars or any adjustment of the parts is necessary, will be avoided and the removal and replacement of the knives or shredder bars may be easily effected. Other objects of the invention will appear incidentally in the course of the following description, and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is an elevation of our improved cutter head equipped with long knives;

Fig. 2 is an end view of the same, partly broken away;

Fig. 3 is a view similar to Fig. 1 showing the head equipped with shredder bars;

Fig. 4 is an end view of the arrangement illustrated in Fig. 3;

Fig. 5 is an elevation of a cutter head equipped with oppositely disposed short knives;

Fig. 6 is an end view of the cutter head illustrated in Fig. 5;

Fig. 7 is a detail perspective view of one form of bracket employed in the invention, and

Fig. 8 is a perspective view of another form of bracket.

The cutter shaft 1 is the usual shaft which is mounted in bearings provided therefor upon the frame of the machine in such position that the blades or shredder bars driven therefrom will cooperate properly with a shearing bar secured in fixed position in the machine. The shaft has secured thereto in spaced relation similar heads 2 each consisting of a hub 3 and spokes 4 radiating therefrom, it being understood that any desired number of spokes may be employed, although we have shown four which is the number most generally desired. Each spoke is provided in one side face with a radial groove 5 and the hubs are constructed so that they may be keyed to the cutter shaft 1, as will be understood. In connection with each spoke, we employ a bracket 6 which comprises a flat-sided stem or shank 7 having an arcuate inner end 8 which is adapted to fit against the hub 3 of the head and is provided upon one side face with a rib 9 to engage in the radial groove 5 of the adjacent spoke, a bolt 10 being inserted through openings provided therefor in the shank and the spoke to secure the bracket rigidly to the spoke. The outer end of the stem or shank is turned laterally to provide a rest 11 upon which the end of the spirally curved or twisted knife 12 is seated. The knife is secured upon its seat by a bolt 13 inserted through an opening provided therefor in the knife and countersunk therein so that the head of the bolt will lie flush with the surface of the knife, the stem of the bolt passing through a slot 14 in the seat 11 whereby the knife may be adjusted to compensate for wear and sharpening. The bracket is also constructed at the rear end of the seat 11 with a lug 15 which is disposed at the rear edge of the knife, and a set screw or bolt 16 is mounted in this lug and bears against the rear edge of the knife, it being noted that the said bolt or screw is disposed in the plane of the knife at a right angle to its edge so that the adjustment of the screw to compensate for wear of the knife does not result in any bending and consequent binding of the screw. So far as we are aware, whenever set bolts or their equivalents have been provided heretofore for adjusting the knives, such bolts have been disposed at a right angle to the axis of the cylinder or cutter head and when it was attempted to adjust the screw so as to secure the knife in proper working position, the screw was frequently bent and could be operated only with considerable difficulty, if at all. This objection has been overcome in our device. It will be understood that the screws or bolts 16 do not secure the knives upon the brackets, that function being performed by the bolts 13 which are inserted through the knives and the slotted seats of the brackets.

It is to be noted that in assembling the parts the heads will be so disposed upon the shaft that the spokes of the two heads

will be out of axial alinement and the spokes of one head will be approximately midway between the radii upon which the spokes of the other head are located. The knives, as shown and as has been stated, are twisted or spirally curved, and this formation of the knives disposes them in such relation that each knife begins to cut before the preceding knife has ceased to cut. The corn husks or other material which is being run through the machine is thus cut into small lengths without any of the thumping or jolting which is an incident to the operation of nearly all prior machines, the cutting operation being continuous.

It is often desired to obtain a shredding effect upon the material being passed through the machine rather than a cutting of the same into pieces of appreciable length, and to meet this demand we provide the brackets 17, one of which is shown in detail in Fig. 8. The same cutter heads are employed and the shanks 18 of these brackets are provided with the arcuate edges 19 to fit against the hubs of the heads and also with the ribs or blocks 20 to engage in the grooves of the spokes of the heads, the brackets being secured to the spokes by bolts inserted through openings, such as 21, provided in the shanks and the spokes. The shanks 18 of the brackets 17 are shorter than the shanks 7 of the brackets 6, however, so that the seats 22 of the brackets 17 will be flush with the outer ends of the spokes. See Fig. 4. The brackets 17 are provided with stops or back rests 23 in the form of lugs projecting above the upper surfaces of the seats 22 to receive the thrust of the shredder bars 24, but it is not necessary to provide adjusting set screws or bolts through the said lugs 23 nor are the seats 22 slotted. The seats are, however, provided with bolt holes 25 to accommodate the securing bolts 26 which are inserted through the shredder bars 24 and have their heads flush with said bars. The shredder bars are given the same spiral or twisted formation as the knives 12, but, of course, do not have cutting edges. Secured upon the outer surfaces of the shredder bars are series of shredders consisting substantially of U-shaped knives 27 having their side members projecting outwardly from the respective shredder bars and formed to present acute angles or points 28 at the junction of their front edges and their outer end edges. These shredder knives are thin enough to readily cut through the material which is being run through the machine but at the same time are stout enough to resist the strain imposed upon them and avoid bending. As shown most clearly in Fig. 3, the shredder knives upon successive bars are staggered so that, as the cutter is rotated, the stalks or other material will be so engaged and cut up as to be divided into thin shreds or strings.

In Figs. 3 and 4, we have shown four shredder bars mounted upon the heads just as in Figs. 1 and 2 we have shown four knives, but it is to be understood that a greater or less number of shredder bars may be employed, and it may sometimes be found desirable to employ shredder bars and knives upon the same head and arrange them alternately. These arrangements may be easily effected without requiring the entire cutter head to be removed from the machine as all that needs to be done is to change the brackets to suit the demands of any particular circumstances. Heretofore, when it was desired to sharpen the knives or to rearrange the same, it was necessary to remove the entire cutter head from the machine which operation was laborious and time-consuming. With our device, in order to permit the knives to be sharpened, it is necessary merely to release the knives, whereupon they may be withdrawn through the end of the machine without disturbing the heads or the brackets upon which the knives are seated and, if it be desired to substitute shredder bars for knives, it is necessary merely to remove the brackets carrying the knives and substitute the brackets carrying the shredder bars. It is to be understood that, while we have illustrated the brackets as secured to the outer sides of the spokes, they may, if desired, be secured to the inner sides of the spokes.

It is also to be noted that the construction shown and described produces a balanced head so that it is not necessary to employ the counterbalancing blocks which have been heretofore considered necessary and, therefore, we dispense with weight which in previous machines is simply a drag upon the motor and adds to the cost of operation. If one of the brackets should be broken with our construction, it is not necessary to obtain a complete head to repair the break but all that needs to be done is to remove the broken bracket and substitute a new one therefor. If the owner of the machine is careful, the brackets are not apt ordinarily to be broken and a foresighted owner, by having additional brackets on hand to guard against emergencies, will lose use of his machine for only the few minutes needed to substitute a new bracket for the broken bracket.

If it be desired to cut the fodder or other material into longer lengths than will be provided by the use of the four knives illustrated in Figs. 1 and 2, such demand may be met by using only two knives carried by radially alined spokes so that the knives will be disposed at diametrically opposite points of the head and the head will still be bal-

anced so that it will run evenly and smoothly. If still longer lengths are wanted, we may provide the arrangement illustrated in Figs. 5 and 6, in which a center head 29 is employed between the two end heads 2. This center head has a half hub member 30 and spokes or arms 31 extending from said hub member, the said spokes or arms defining an obtuse angle, as shown most clearly in Fig. 6. The hub member 30 is secured to the shaft by a clamping collar member 32 fitted to the shaft at the opposite side thereof from the hub member 30 and secured by bolts 33 inserted through registering openings in mating flanges 34 provided upon the half hub member and the clamping member, as shown and as will be understood. To balance the spokes 31, the clamping member is provided with an offset or projecting body 35 which is preferably cast with the shaft engaging portion of the member. The knives 36 employed in this arrangement are only half as long as the knives 12 shown in Figs. 1 and 2 and their outer ends are secured upon the brackets 6 carried by the end hubs while their inner ends are secured upon lateral terminals or seats 37 formed at the outer ends of the arms 31. It will be readily understood that the arms 31 are disposed so as to form an obtuse angle because the knives 36 would otherwise be both disposed for their entire length at the same side of a plane passing through the center of the cutter shaft, and in order that the outer ends of the knives may be properly supported and the entire structure maintained in proper balance or equilibrium one end head 2 is disposed, in the arrangement shown in Figs. 5 and 6, at an angle of about one hundred and sixty degrees from the position in which it is set in the previously described arrangements. To effect this rearrangement of the head, before the center support or head 29 is placed in position, one end head, which is provided with two keyways, as indicated in Fig. 2, is moved inwardly, then rotated through an angle of one hundred and sixty degrees and then slipped outwardly so that the previous disengaged keyway will be engaged with the key and the head thus held in shifted position. The center head is then secured in place and the short knives secured to the brackets 6 and to the seats 37 of the center head. We thus bring the knives into position at opposite sides of the cutter head shaft and also so dispose them that the entire structure is perfectly balanced and will run easily and smoothly with only such intermittent shocks as is due to the existence of intervals between successive contacts of one knife with the fodder or other material which is being cut. Of course, it is possible to employ half length shredder bars in the same manner that half length knives are employed and by securing the proper brackets to the end cutter heads it is possible to employ full length shredder bars with half length knives or vice versa.

We provide a construction which is simple and compact and which will permit the parts to be used interchangeably and in any desired combination without requiring the services of skilled labor.

The arrangement illustrated more particularly in Figs. 5 and 6, which employs half length knives, is particularly well adapted for use in corn-husking and shredding machines in which two pair of snapping rolls are arranged above the cutter head. These rolls are arranged with a dividing bar between the inner rolls for the purpose of directing the stalks into proper engagement with the snapping rolls and, therefore, there are no stalks passing between the inner rolls, and the center clamp head will be disposed below this dividing bar and will not offer any obstruction to the passage of the stalks or other material through the machine.

Having thus described the invention, we claim:

1. A cutter head of the type described comprising heads each having a hub member to be secured upon a driving shaft and spokes extending radially from the hub member, brackets each comprising a shank to bear against a transverse side of a spoke and having its inner end arcuate to fit against the hub, means for securing the brackets to the spokes in fixed relation thereto, seats at the outer ends of the brackets, and cutter bars secured upon said seats.

2. In a cutter head of the type described, a shaft, end heads secured on the shaft and provided with radially disposed spokes, one of said heads being shiftable circumferentially of the shaft, and having a plurality of keyways engageable selectively with a single key on the shaft, brackets secured to the sides of some of said spokes and having laterally extending seats at their outer ends, an intermediate head having two spokes disposed at an obtuse angle to each other and constructed with laterally extending seats at their outer ends, said seats extending in opposite directions from the respective spokes, an overbalanced clamping member cooperating with the intermediate head to secure said head on the shaft, and cutter elements each having its inner end secured upon the seat at the end of a spoke on the intermediate head and its outer end secured upon the seat of a bracket carried by one of the end heads.

3. In a cutter head of the type described, heads to be secured upon a driving shaft and including radially extending spokes, brackets having shanks to be detachably secured to

transverse sides of the spokes of the heads with their inner ends resting upon the hubs of the heads, seats at the outer ends of the brackets extending laterally with respect to the brackets and curved circumferentially with respect to the hubs of the heads, and cutter members resting at their ends upon and secured to said seats, the brackets being of different lengths and interchangeable whereby a cutter or a shredder may be used without changing the radius of the circle described by the cutting edge.

In testimony whereof we affix our signatures.

THEODORE H. OPPENHEIM. [L. S.]
BERNARD SELHORST. [L. S.]