

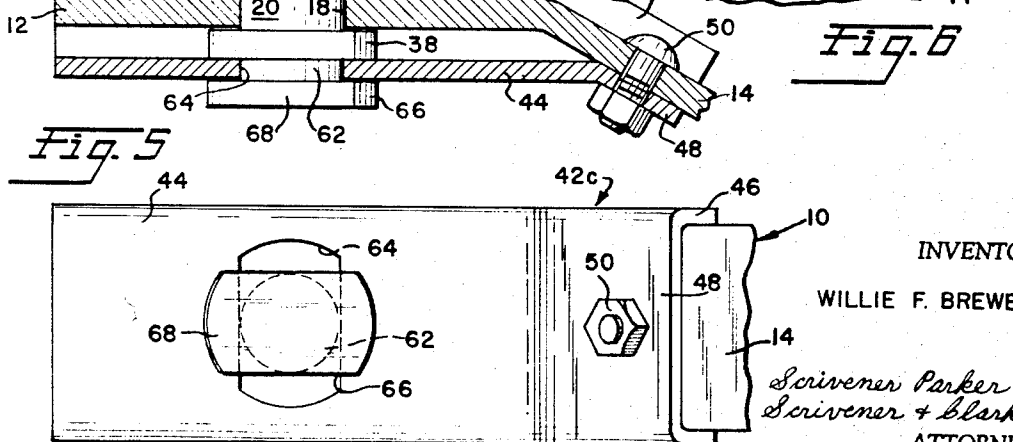
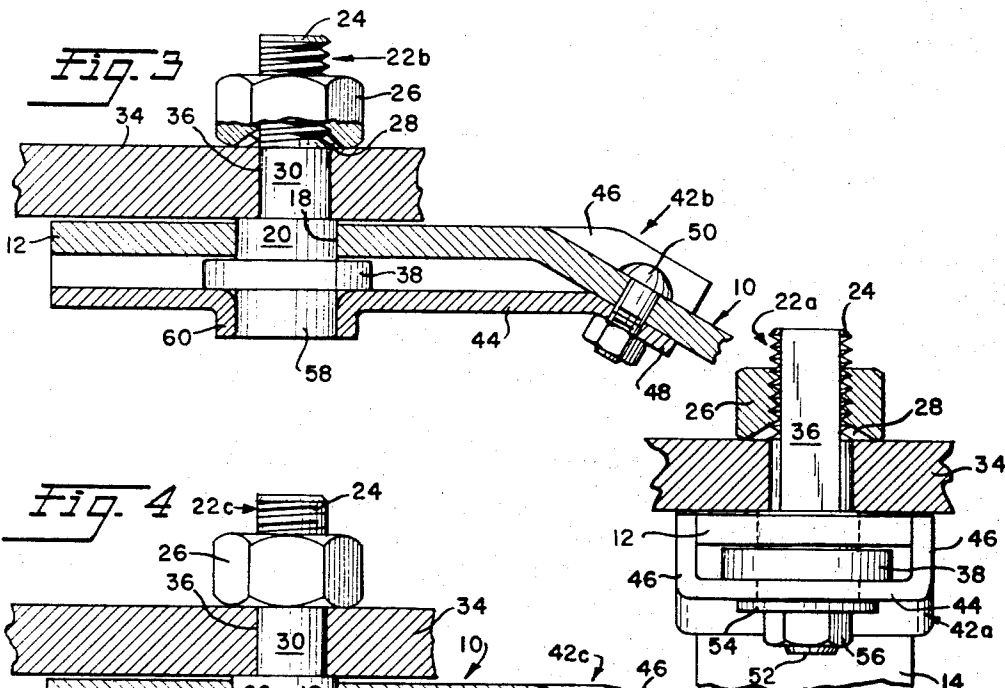
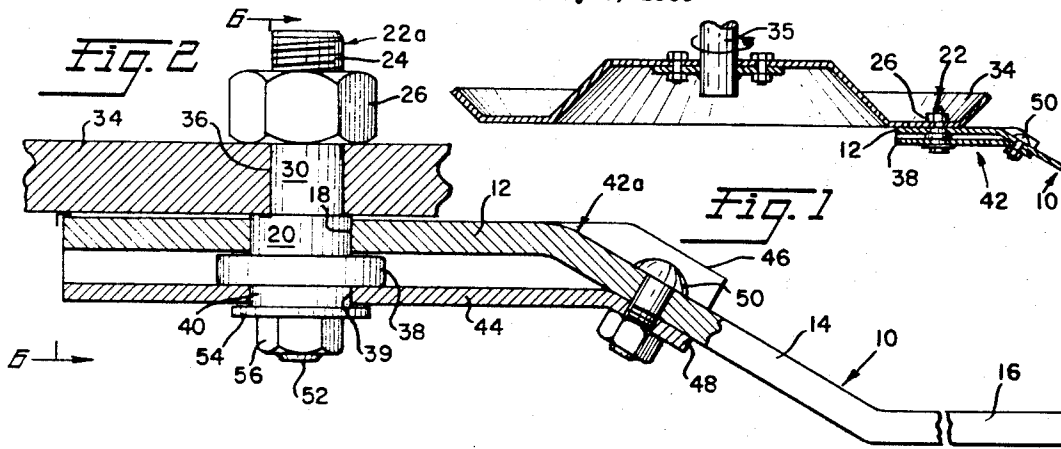
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REINFORCING MEANS FOR ROTARY MOWER BLADES

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3,418,793 REINFORCING MEANS FOR ROTARY MOWER BLADES

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This invention relates to cutters or mowers of the rotary full swinging blade variety and more particularly to reinforcement means for such blades.

Rotary mowers or cutters of the type employing a horizontally rotatable blade holder carrying full swinging blades, particularly cutters of the heavy duty variety, have an inherent weakness at the eye of the blade where it is pivotally connected to the blade holder. When a blade breaks at this point it develops a very dangerous situation wherein serious damage is often caused to the cutter, the tractor, particularly the rear tires thereof, or to persons in the vicinity of the machine. The broad object of the present invention is to provide additional reinforcement for the eye of the blade which substantially lessens the possibility of a blade breaking at its eye during high speed rotation thereof.

A more specific object of the invention is to provide reinforcement which accomplishes the foregoing by the provision of a reinforcing element which may be detachably connected to the blade to pivot therewith about the axis of specially constructed pivot bolt means which also serves as a pivotal support for the blade.

Other objects and their attendant advantages will become apparent as the following detailed description is read in conjunction with the accompanying drawings wherein:

FIG. 1 is a broken-away, vertical cross-sectional view, through a blade holder illustrating the present invention in its position of intended use;

FIG. 2 is an enlarged, broken-away vertical cross-sectional view of one form of reinforcement means embodying the features of the present invention;

FIG. 3 is a view similar to FIG. 2 of a second embodiment of the present invention;

FIG. 4 is a view similar to FIG. 2 of a third embodiment of the present invention;

FIG. 5 is a bottom plan view of the embodiment of FIG. 4; and

FIG. 6 is an end view partly in elevation and partly in section taken along the line 5—5 of FIG. 1.

Referring now to the drawings and particularly to FIG. 1 and 2 the numeral 10 refers to a cutter blade which may be of substantially conventional construction comprising an inner horizontal part 12, downwardly and outwardly sloping intermediate part 14 and a substantially horizontal outer blade part 16. The inner end 12 is provided with a circular opening or eye 18 which pivotally receives a journal part 20 of a blade bolt 22 which may be similar in many respects to the bolt shown and claimed in the patent to William L. Brewer, Jr., No. 3,112,599 which is assigned the same assignee as the present invention. In common with the patented bolt the several bolt embodiments of the present invention have an upper threaded end-part 24 adapted to receive a nut 26 which may have a conical recess 28 on its lower side as shown in FIGS. 3 and 6 in order to accommodate any part of a non-threaded shank portion 30 which may extend slightly above the upper surface of a rotary blade holder, indicated in all of the drawings by the numeral 34, and which may be driven centrally through a shaft 35 as shown in FIG. 1. As explained in the above-mentioned patent, the shank portion 30 is noncircular in cross-section to mate with a non-circular opening through the blade holder

34 whereby the bolt 22 is prevented from rotating with respect to the holder. Preferably the non-circular parts are afforded by the provision of a flat 36 to one side of the vertical axis of the shank portion 30 and this flat may, if desired, extend upwardly along the threaded part 24 of the bolt or the threaded part can be of less diameter than the horizontal distance across the shank from the flat to the opposite side through the vertical axis of the circular part of the shank. As is obvious from the drawings, the opening through the blade holder 34 has a shape which, in plan, is complementary to the cross-sectional shape of the shank.

The shouldered-bearing part or journal 20 has a vertical dimension which is greater than the corresponding dimension of the inner part 12 of the blade and carried at the lower end of the bearing part 20 is a head part 38 which, from one aspect, serves the identical function as the head part 18 in the above-mentioned patent in that the upper side of the head retains the blade member 10 in its intended position of use.

In accordance with the invention and with particular reference to FIG. 2 the bolt 22a of the above-mentioned patent is modified by the provision of a second circular bearing or journal part 40 which is integrally joined to the lower side of the head part 38 to rotatably receive an opening or eye 39 of reinforcement means constructed in accordance with the invention and generally designated in FIG. 1 by the numeral 42 and particularly designated in FIG. 2 by the numeral 42a.

As can be seen in FIG. 6, and in common with the several embodiments, each reinforcement member of the invention is channel-shaped in cross section having a flat, lower wall 44 and two integral-upstanding side walls 46 whose inner faces are spaced apart a distance only slightly greater than the width of the blade whereby the latter is closely confined between the side parts 46 as can be seen in FIG. 6.

The reinforcing member 42 as is co-extensive with the rear part 12 of the blade member 10 and at its forward end 48 the member 42 is bent downwardly to the same degree of angularity as the sloping part 14 of the blade with the inner face of the bottom wall 44 of the member 42 being adapted to abut the sloping part 14 of the blade and the blade and reinforcement are suitably punched to provide registering openings to receive a nut and bolt 50 rigidly connecting the sloping part 14 of the blade and the forward part 48 of the reinforcing member together as can be clearly seen in FIGS. 2 through 4.

In the embodiment of FIG. 2, the lower bearing part 40 has rigidly connected thereto a downwardly extending threaded boss 52 which is adapted to receive a washer 54 of substantially greater diameter than the bearing part 40 and a nut 56. As with the upper bearing part 20, the bearing part 40 has a vertical dimension which is somewhat greater than the thickness of the lower wall 44 of the reinforcing member whereby the reinforcing member swings freely on the bearing part 40 to the same extent as the blade itself swings freely on the upper bearing part 20. As is apparent in each embodiment, the head 38, in addition to serving as retaining stop for the blade, also serves as a spacer between the upper face of the lower wall 44 of the reinforcing means and the lower face of the blade.

The embodiment of the invention illustrated in FIG. 3 is substantially identical to that shown in FIG. 2 and differs only in that the lower bearing part 58 of the bolt member 22b has a substantially greater vertical dimension than the thickness of the reinforcing member 42b and the latter is coined or punched to provide a downwardly extending circular neck or flange 60 which is rotatably received on the bearing part 58.

The embodiment of the invention as shown in FIG. 4 is generally similar to the embodiment of FIG. 2 in that the second circular bearing part 62 and the several parts thereabove are identical to the corresponding elements of FIG. 2. However, instead of the lower wall 44 of the reinforcing means 42c being provided with a circular hole to receive the lower bearing part 62, the hole 64 is laterally elongated with a width only slightly larger than the diameter of the bearing part 62 whereby the bearing part is engaged by the straight sides 66 of the opening 64 as can be seen in FIG. 5. The reinforcing element 42c is retained in its position of use by the provision of an elongated head 68 which is integral with the lower circular bearing part 62 of the bolt 22c shown in FIG. 4. The elongated head 68 is only slightly smaller than the elongated opening 64 and prior to assembling the reinforcing member and blade to the holder 34, the head is aligned with the opening 64 and is moved therethrough and the entire assembly is rotated 90° so that the axis of the head is at right angles to the axis of the opening 64 whereby the reinforcing element 42c cannot move downwardly beyond its position of FIG. 4 because the head serves as a stop to prevent such movement. After the bolt, reinforcing element 42c and blade have been assembled together the threaded end part 24 of the bolt and the non-circular shank 30 are inserted into and through the non-circular complementary opening 36 in the blade holder 34.

From the foregoing description of the several embodiments of the present invention, it will be apparent that the invention has provided a reinforcement means for a swingable rotary blade which not only reinforces the eye and inner end of the blade against lateral shock through the medium of the upstanding side walls 46 which embrace the blade, as illustrated best in FIG. 6, but the reinforcement also strengthens the blade against fatigue failure due to the centrifugal force exerted on the eye of the blade as the blade carrier is rotated at extremely high cutting speed.

Those skilled in the art will recognize that the invention is susceptible of modifications and changes beyond the specific embodiments shown and described without, however, departing from the scope and spirit of the appended claims.

What is claimed is:

1. Reinforcing means for full swinging blades of a rotary mower which includes a horizontally rotatable blade holder, an eye at one end of each blade and pivot means rotatably connecting said eye to said holder, said reinforcing means comprising an elongated member having inner and outer ends, an eye through said reinforcing means intermediate the ends thereof, second pivot means rotatably connecting the eye of said elongated member to said blade holder for rotation with respect to said holder about the same axis as said blade, and means spaced along the length of said member and said blade from said common axis rigidly interconnecting said blade and said member.

2. The reinforcing means of claim 1 wherein the elongated member of said reinforcing means is channel-

shaped in cross section including a bottom wall and a pair of laterally spaced side walls closely embracing the sides of said blade to afford lateral reinforcement along at least a portion of said blade.

3. The reinforcing means of claim 1 including a bolt means connected to said blade holder and wherein said first and second pivot means comprise first and second vertically arranged co-axial journal means carried by said bolt means and pivotally receiving the respective eyes of said blade and said reinforcing means.

4. The reinforcing means of claim 3 wherein said first and second journal means are vertically spaced, and including spacer means carried by said bolt means between said first and second journal means.

5. The reinforcing means of claim 1 wherein the blade includes a substantially horizontal part having inner and outer ends, said blade eye being adjacent said inner end, a downwardly and outwardly sloping part integral with the outer end of said horizontal part, and wherein said reinforcing means is substantially horizontal and has inner and outer ends, the eye of said reinforcing means being adjacent said inner end, a downwardly and outwardly sloping part integral with the outer end of said reinforcing means, said last named part sloping at the same degree of angularity as the corresponding part of said blade and being in engagement therewith, and means rigidly interconnecting the respective engaged part of the blade and the reinforcing means.

6. The reinforcing means of claim 4 wherein the blade and the reinforcing means have downwardly and outwardly interengaged sloping parts spaced along their length away from their respective eyes, and means rigidly interconnected the respective sloping parts of said blade and reinforcing means.

7. The reinforcing means of claim 4 including stop means carried by said bolt means on the side of the lower of said journal means opposite said spacer means.

8. The reinforcing means of claim 4 wherein the eye of the member pivoted on the lower journal means is coined to include an annular vertical flange surrounding said journal means.

9. The reinforcing means of claim 7 wherein said stop means comprises an elongated horizontal head part and wherein the eye of the member pivoted on the lower journal means is laterally elongated and of a size to receive therethrough said head part when the axes of said head part and said opening are in registry while preventing removal of said head part through said opening when the respective axes are moved to angular positions with respect to each other.

References Cited

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