

[54] ARRANGEMENT FOR ENHANCING BLADE LIFE

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[58] Field of Search 37/41, 42, 50, 141 R, 142 R, 37/142 A; 172/783, 784, 787, 801, 681, 703, 704, 719, 765

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[57]

ABSTRACT

A steel blade, such as a snow plow blade or grader blade, is provided with wear resistant members separate therefrom and near the ends which have lower edges spaced upwardly from the lower edge of the blade so that the blade can be caused to wear off uniformly along the lower edge along a line parallel to the upper edge of the blade. The blade is discarded when the lower edges of the wear resistant members reach the level of the surface being worked. Thereafter, the worn blade is replaced by a new blade and, optionally, the worn blade can be fixed to the front face of the new blade along the lower region thereof as by welding.

10 Claims, 4 Drawing Figures

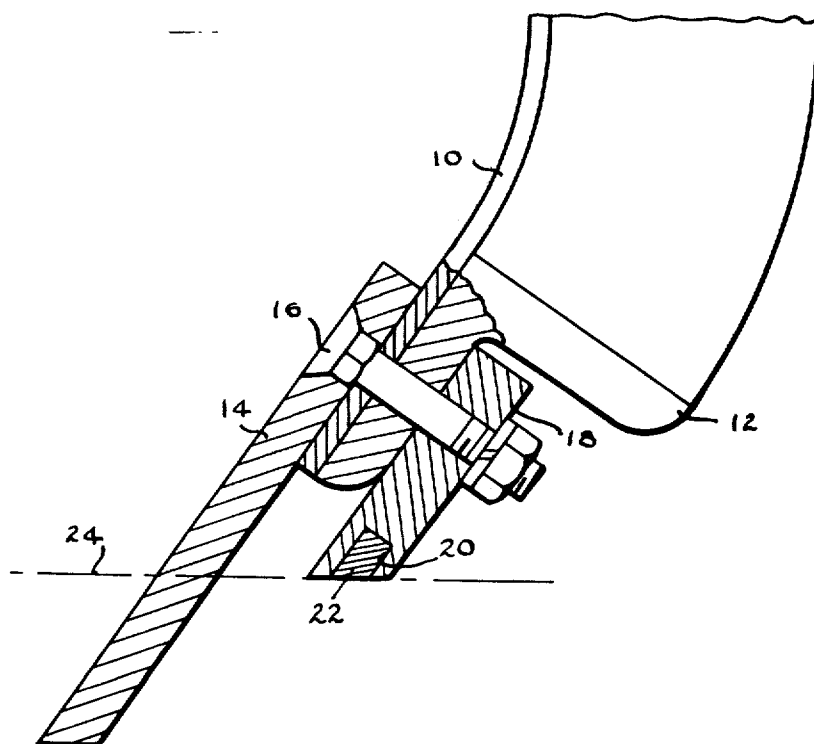


FIG.1

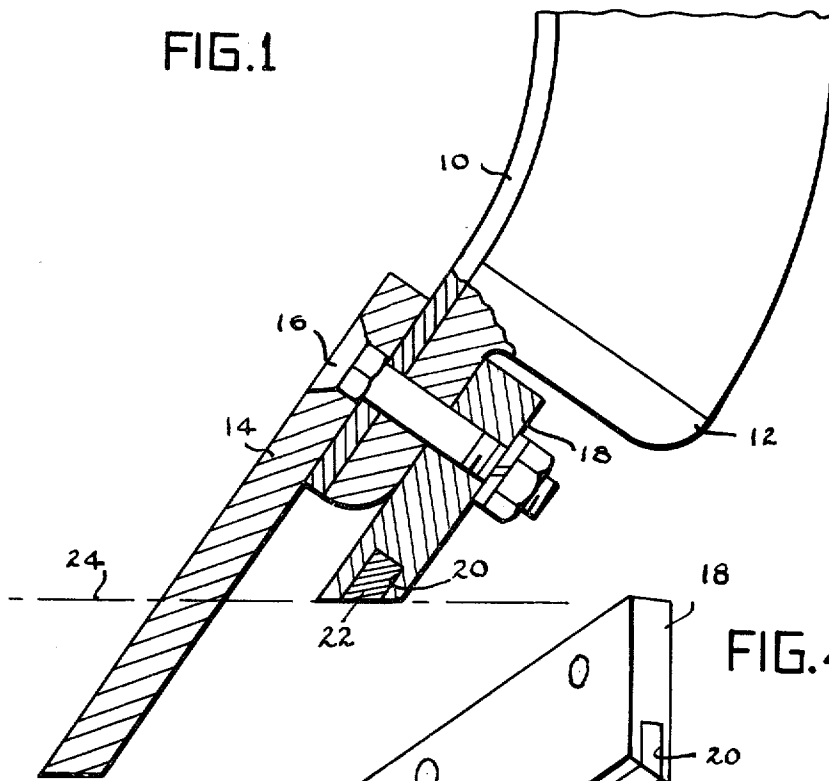


FIG.4

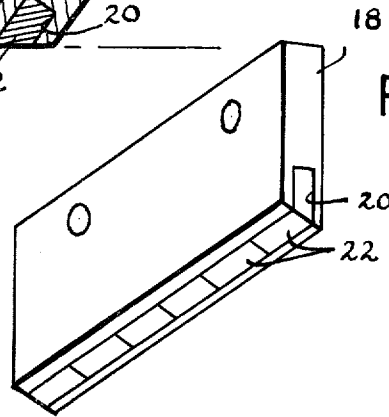


FIG.2

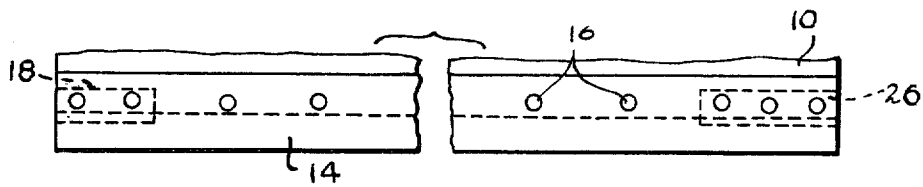
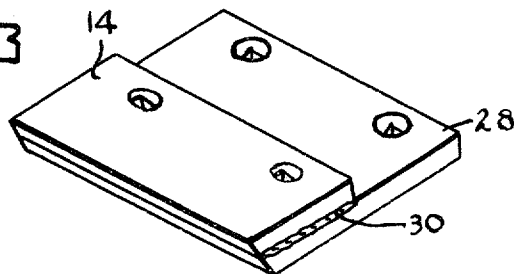


FIG.3



ARRANGEMENT FOR ENHANCING BLADE LIFE

This application is a continuation of co-pending Ser. No. 384,024, filed July 30, 1973, and now abandoned.

The present invention relates to an arrangement for enhancing the life of steel snow plow and grader blades and is particularly concerned with the combination of such a blade with wear resisting members mounted near the end of the blade and which have lower edges spaced upwardly from the lower edge of the blade and which wear resistant members inhibit further wear on the blade when the blade wears until the lower edge is in about the same horizontal plane as the lower edges of the wear resistant members.

Steel blades are widely used for snow plows and grader blades and have the advantage of being relatively inexpensive, but the disadvantage of wearing out extremely rapidly. The rate of wear of the steel blades introduces problems because once the blade is worn, it must be replaced by a new blade. If a worn blade is not replaced by a new blade, the wear at the lower edge of the blade can continue until the structure of the mold board along the lower edge is damaged by being exposed to the surface being worked.

In respect of snow plow blades, the frequent replacing thereof is a particular problem because many times this must be done under adverse weather conditions, and when it is quite cold. Steel blade edge members having cemented wear resistant hard metal carbide blocks distributed along the lower edge have become quite popular for use with snow plows and have a useful life which is a multiple of the best life that can be obtained from the best steel blade.

The carbide edged blades wear extremely slowly and are ideal for use on smooth highway surfaces. However, roads which are irregular or crowned or the like can readily cause damage to a carbide edged blade, and it is, therefore, the case that many roads are still treated with steel blade edges mounted on the lower edges of the mold boards of snow plows. Steel edges are not as readily damaged by impact as the carbide edged blades and, furthermore, wear away more rapidly so that they can be used on crowned roads and the like to some advantage.

It is the case, however, that the rapid rate of wear of steel blades can cause the blades to wear unevenly from one end to the other. This is particularly true where the mold board of a snow plow is free to tilt about a fore and aft axis because, in such cases, the steel blade edge member will wear more rapidly near the trailing end of the mold board than near the leading end thereof.

This comes about because the mold board is inclined to the direction of movement thereof and all the snow picked up thereby moves longitudinally along the mold board and is discharged from the trailing end thereof. The down thrust on the mold board is, thus, substantially higher at the trailing end than at the leading end. A steel blade will, thus, wear more rapidly near the trailing end of the mold board than near the leading end thereof.

With the foregoing in mind, the primary object of the present invention is the provision of an arrangement for enhancing the useful life of a steel blade, or blade edge member for a snow plow or grader.

A still further object is the provision of a method of operating a steel blade of the nature referred to for enhancing the useful life thereof.

BRIEF SUMMARY OF THE INVENTION

According to the present invention, there is mounted parallel to the steel blade, a pair of wear resistant members, one near each end of the blade. Each wear resistant member has a groove extending into the lower edge thereof and mounted therein in side by side relation are blocks of hard cemented carbide material such as cemented tungsten carbide.

The wear resistant members are supported with the lower edges spaced upwardly from the lower edge of the blade a distance about one-half the height of the blade and, normally, do not engage the surface being worked. When the steel blade wears down until the wear resistant members engage the surface being worked, the rate of wear of the steel blade member in that region is immediately inhibited, although the steel blade can wear along the other portions thereof.

When a blade is worn down to the point that both of the wear resistant members are engaging the surfaces being worked, the worn blade is replaced by a new blade and, at that time, the worn blade, which is about half as wide as when it was new, can be attached to the front face of the new blade and provide increased thickness therefor and, of course, increased life.

The wear resistant members are advantageously mounted behind the steel blade, and the one at the end of the steel blade which has the greater down thrust imposed thereon is longer than the other. Each wear resistant member is, however, only a fraction of the length of the steel blade.

The nature of the present invention will be more clearly understood upon reference to the following detailed specification taken in connection with the accompanying drawings in which:

FIG. 1 is an end view, partly in section, showing a steel blade and a wear resistant member according to the present invention mounted on the lower edge of a mold board.

FIG. 2 is a somewhat schematic front view of a steel blade showing a wear resistant member mounted therebehind at each end.

FIG. 3 is a fragmentary perspective view showing how a worn blade can be attached to the face of a new blade.

FIG. 4 is a perspective view showing a typical wear resistant member according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings somewhat more in detail, in FIG. 1, reference numeral 10 indicates the mold board of, for example, a snow plow. At the lower end of the mold board, there is provided an angle member 12. Mounted on the front side of mold board 10 and angle 12 is a steel blade 14 which may, for example, be about eight inches from top to bottom and from five-eighths to seven-eighths inches thick. The upper and lower edges of the blade are parallel with each other and the blade can be any desired length from a few feet, say, three feet, up to several feet in length.

The blade is held in place by bolts 16 extending through the blade near the upper edge and also through mold board 10 and angle 12. According to the present invention, disposed on the rear side of angle 12 are wear resistant members, one of which is shown at 18 in FIG. 1 and which has a groove 20 formed along the lower edge and in which is mounted blocks 22 of ce-

mented hard metal carbide, such as cemented tungsten carbide.

The lower edge of member 18 is disposed in a horizontal plane 24 which, it will be seen, passes through about the center of the vertical height of blade 14 and which plane is disposed below any parts of the mold board and angle 12 that could be damaged by engagement with the surface being worked.

In operation, the steel blade will wear upwardly from the lower edge until it is worn off to about plane 24 and at that point the lower edge of member 18 engages the surface and substantially halts further wear of the steel blade.

As will be seen in FIG. 2, which is a view looking in from the left side of FIG. 1, the said member 18 is disposed near one end of blade 14 and a like member 26 is disposed near the other end of blade 14. Both members are behind blade 14 and thereby do not obstruct the flow of snow or other material thereover. Member 26, it will be noted, is substantially longer than member 18.

For example, member 18 might be 6 inches long and member 26 might be about 17 inches long. This comes about because the mold board 10, when in operation, is inclined angularly to the direction of movement so that snow and like material picked up by the blade moves along the mold board and is discharged therefrom at one end.

To this end, the mold board is usually quite concave in the forward direction. Due to the material which is moved along the mold board and discharged from the trailing end, there is a substantially greater down thrust on blade 14 at the trailing end thereof than at the other end and, for this reason, the wear resistant member at the trailing end of the blade, namely, member 26, is made substantially longer than member 18.

It is true that the mold boards are sometimes supported at a fixed angle to the horizontal and, under these conditions, the trailing end of the blade does not tend to wear as rapidly as when the blade is free to tilt about a fore and aft axis. In either case, however, it is advisable for the wear resistant member at the trailing end of the blade to be more wear resistant than the other, and this can be accomplished conveniently by making the member at the trailing end of the blade longer than the member at the other end thereof.

When blade 14 is worn down to the point that the lower edge is about in plane 24 of FIG. 1, the blade is removed and replaced by a new blade. At this time, the worn blade, indicated at 14a in FIG. 3, can be mounted on one side of the new blade, indicated at 28 in FIG. 3, with the lower edges of the worn blade and the new blade substantially coplanar and the two blade elements fixed together as by welding 30.

FIG. 4 shows, in perspective, a typical wear resistant member, for example, the wear resistant member 18, wherein it will be seen to comprise a relatively short blade section with the aforementioned groove 20 formed along the lower edge thereof and opening downwardly and with the aforementioned blocks 22 of cemented hard metal carbide fitted in the groove in side by side relation and fixed thereto, as by brazing.

By the practice of the present invention, the life of a steel blade is substantially enhanced and damage to the supporting structure for the blade, or blade edge member, is substantially prevented. At the same time, the advantage exists that steel blades can be employed and

thereby permit adequate treatment of secondary roads and the like which are not well adapted to treatment by carbide blades.

What is claimed is:

1. Wear resistant means for use in combination with an elongated steel blade for a grader or snow plow, the blade in unworn condition having parallel upper and lower edges and including means near the upper edge for fixedly supporting the blade with the lower edge exposed, said wear resistant means adapted to be disposed parallel to and rearwardly of the blade near at least one end thereof, said wear resistant means including at least one member having upper and lower edges and being substantially more narrow in the vertical direction than the blade, said member in length being a small fraction only of the total length of the blade, means near the upper edge of said member for fixedly supporting the member parallel to the blade near the end of the blade and rearwardly thereof and with the said lower edge of the member spaced upwardly from the lower edge of the blade and parallel thereto, the distance between the lower edge of the said member and the lower edge of the blade when the latter is not worn being about equal to maximum amount to be worn off the blade before replacement thereof, the lower edge of said member including wear and abrasion resistant means substantially more wear and abrasion resistant than the steel of the blade.

2. Wear resistant means according to claim 1 in which said wear and abrasion resistant means comprises hard cemented metal carbide.

3. Wear resistant means according to claim 1 in which said member includes a downwardly opening longitudinal groove in the lower edge, and blocks of hard cemented metal carbide mounted in said groove in side by side relation.

4. Wear resistant means according to claim 3 in which said metal carbide comprises tungsten carbide.

5. Wear resistant means according to claim 1 in which the lower edge of said member is in about the same horizontal plane as the vertically central region of the blade.

6. Wear resistant means according to claim 1 in which said wear resistant means includes a pair of the said members, one member being near each end of the blade, the lower edges of the members being in alignment and parallel to the lower edge of the blade.

7. Wear resistant means according to claim 6 in which one member is longer than the other thereof.

8. In combination; an elongated steel blade which in unworn condition has parallel upper and lower edges spaced apart a distance which is a fraction of the length of the blade, a wear resistant member behind the blade near each end thereof and each thereof being a small fraction only of the total length of said blade, each member having a lower edge parallel to the lower edge of the blade and spaced upwardly therefrom a distance of about one-half the height of the blade, means rigidly interconnecting said blade and members in the aforesaid relative positions, a downwardly opening groove formed in the lower edge of each member, and blocks of cemented hard metal carbide fixed in said grooves in side by side relation.

9. The combination according to claim 8 in which said blade and members are mounted on the lower edge of a mold board which is concave toward the front and which is disposed at an angle to the direction of move-

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ment thereof whereby material lifted by the blade will move along the mold board toward the trailing end thereof, the said member behind the end of the blade nearest the trailing end of the mold board being longer than the other said member.

10. The method of enhancing the life of a steel blade for a grader or snow plow, said blade having longitudinally extending parallel upper and lower edges and having opposite end regions, said blade having the lower edge exposed for engagement with a surface to be worked, said method comprising; mounting members near the end regions of the blade and rearwardly

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thereof having lower edges which are substantially more wear resistant than steel and which are spaced upwardly about equal distances from the lower edge of the blade and parallel thereto, and using the blade until worn off to the horizontal plane of the lower edges of the members, replacing the worn blade with a new blade, and fixing the worn blade to the new blade in longitudinally coextensive relation therewith and with the lower edges of the new blade and worn blade in substantially the same horizontal plane.

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