SCAPER SNOWPLOW WITH PIVOTAL DOZER BLADE

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References Cited

UNITED STATES PATENTS

407,513 7/1889 Deadman ..................................  37/46
1,701,746 2/1929 Cook ...............................  37/44
1,711,488 5/1929 Bising ................................  37/44
1,718,360 6/1929 Kaczorowski .......................  37/44
2,218,512 10/1940 Ball ..............................  37/42 R
2,904,904 9/1959 Krueger ...........................  37/30 X
3,279,104 10/1966 Wandscher et al. ..............  37/41

A dozer blade is positioned along the upper edge of an angularly positioned scraper snowplow blade and pivotally mounted adjacent the trailing edge thereof to receive accumulated compacted snow when the snow reaches a depth too great to be thrown away from the path of travel by the scraper blade. When the scraper blade is stopped by the accumulation of compacted snow, the outer free end of the dozer blade is pivoted outwardly removing a portion of the accumulated snow from in front of the scraper blade. The plow is then moved rearwardly with the dozer blade extended outwardly from the path of travel so that the snow at the sides of the scraper blade is pushed upwardly and outwardly beyond the trailing edge of the scraper blade to provide a wider path of clearance traveling in the rearward direction than in the forward direction so that during the next forward movement of the plow the scraper blade may move accumulated snow to the cleared side.

10 Claims, 4 Drawing Figures
SCAPER SNOWPLOW WITH PIVOTAL DOZER BLADE

BACKGROUND OF THE INVENTION

This invention relates to snowplowing equipment and in particular to a snowplow designed to force its way through an extremely substantial snowfall or a large ridge of drifted and compacted snow.

Either a conventional snowplow of the type having a single angularly mounted blade which is designed to scrape snow into a curved portion of the plow and having a moldboard designed to throw the snow well away from the path being cleared or a plow of the type having a V-wing with two angularly mounted blades meeting at the apex of the V is designed to work best at a fairly substantial speed. However, the large sized trucks used to operate such plows can become stalled and unable to move the plow as rapidly as would be required to throw the snow well away from the path being cleared at times when the snowfall is extremely heavy or when the roadway has been drifted over with a substantial layer of snow, as frequently happens in northern climates. Present V-wing snowplowing equipment, even when operated by the largest size truck, will become stuck in a snowdrift and unable to back away from the snow compacted in front of the plow when the snow depth reaches several feet as happens from time to time in the northern rural areas of the United States. A necessary procedure in such a case is to have one truck and its V-wing plow, force a path through the drifted-over roadway by repeatedly ramming into the accumulated snow and, when it becomes stalled, to have a second truck pull the first plowing truck out of the snowbank, so that it may take another run at the drifted-over roadway. Thus the present technique can require two trucks to operate one plow and the plow will only advance a few feet at a time.

SUMMARY OF THE INVENTION

The present invention provides a plow of a type which can be operated by a single truck efficiently to clear a path in a road which has been covered by many feet of snow. A plow, according to the present invention, may have, in part, a scraper blade having the required curvature and moldboard to throw snow well away from the path being cleared under normal high speed operating conditions. Lying along the upper edge of the scraper blade is a dozer blade which is pivotally mounted adjacent the trailing edge thereof. Under normal forward operating conditions, the dozer blade parallels the top of the scraper blade. However, as the plow is forced into deeper and deeper snow causing the truck to slow down and allowing snow to become compacted and accumulate in front of the scraper blade, it also piles up into the dozer blade. At such time as the truck is stopped, the pivotally mounted dozer blade is extended outwardly from the front of the plow, pushing the accumulated compacted snow to the side of the path being cleared. The dozer blade is so shaped and mounted on its pivotal mounting that the truck then may be backed up, forcing the accumulated snow on the side of the path being cleared a further distance as the truck is operated rearwardly. By making a wider path of snow clearance in the rearward direction than in the forward direction, sufficient space is made for the scraper blade to move snow aside when forward travel is resumed.

Accordingly, an object of the present invention is to provide a snowplow in which has a main scraper blade and a pivotally mounted dozer blade which will push aside accumulated compacted snow from in front of the plow when the plow is stalled and which may additionally be used to push snow away from the path being cleared when the plow is propelled rearwardly to provide a wider path of clearance when traveling rearwardly than forwardly.

IN THE DRAWINGS

FIG. 1 is a top plan view showing one embodiment of the invention being operated in the normal forward mode;

FIG. 2 is a top plan view showing the embodiment of FIG. 1 being operated in the rearward travel mode;

FIG. 3 is a side plan view of the same embodiment shown in FIG. 1; and

FIG. 4 is a side sectional view of the plow of the invention taken along line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, a plow, according to the invention and generally designated 10, is propelled by a truck 12 to which it is mounted by a frame 14. The plow 10 has a V-wing scraper portion which is formed by blades 16 and 18 trailing rearwardly from the apex of the V. The blades are curved concavely to form moldboards 16a and 18a, respectively. A cutting member 20 is mounted at the apex of the V to cut and divide snow into portions which are plowed away by the respective blades 16 and 18. The plow has a pair of dozer blades 22 and 24 pivotally mounted about shafts 26 and 28 and operated by double acting hydraulic cylinders 30 and 32 positioned between the dozer blades and the fixed blades of the scraper, respectively. In the normal position the free outer ends of the blades 22 and 24 are supported by a strut 34 mounted at the apex of the scraper section. The blades 22 and 24 are shaped concavely with respect to snow to be moved to provide a shoveling or lifting action when compacted snow is moved while the truck is stationary. The same concave shape allows snow to be windrowed when the truck is moved rearwardly.

The shafts 26 and 28 are mounted adjacent to the trailing edges of the scraper blades 16 and 18, respectively, and canted at an angle forwardly with respect to the normal direction of travel and inwardly towards the center of the plow. The pivotal axes of the dozer blades 22 and 24 are canted inwardly and forwardly so that the dozer blades will decline towards the outer free ends thereof towards the apex of the plow to position the dozer blade sections near the apex of the plow at a lower level than the outer trailing edges of the moldboards of the scraper blade. This positioning of the dozer blades in the normal position allows them to move a substantial body of compacted accumulated snow away from the front of the scraper blades when the truck has become stalled in a snowdrift.

It will also be appreciated that when the scraper blades are moved outwardly on the pivot shafts 26 and 28 by hydraulic cylinders 30 and 32, respectively, the forward and inward canting of the pivot shafts will cause the dozer blades 22 and 24 to become inclined upwardly as the outer edges thereof are moved into a position extending beyond the normal trailing edge of the scraper blades. This allows the snow pushed upwardly and outwardly and when rearward movement of the propelling vehicle is commenced, the snow will be rolled over outwardly and upwardly in much the same fashion as a road grader operates.

It will be apparent from the foregoing description that when the plow has become impacted in the snowdrift or in exceptionally heavy snow on the roadway after a snowfall, that the dozer blades 22 and 24 move from the position seen in FIG. 1 in alignment with the top edge of the wings of the V scraper forming an upper extension thereof when the plow is moving forward to a position as seen in FIG. 2 at about 45° laterally separated from the wing of the scraper and extending upwardly as much as 30° with respect to the horizontal.

In operation, the plow will be propelled by a bank of snow to be cleared until snow accumulates and fills the cavity in the scraper moldboards and in the dozer blades and compacts in those positions until the truck stalls or stops. Once the plow is stopped, the two hydraulic pistons force the dozer blades around the pivot shafts 26 and 28 and outwardly from above the apex of the V scraper. The outer free ends of the dozer blades also become elevated from the plane of the surface of the scraper portion of the plow, as previously described. Initially the hydraulic cylinders push the snow compacted against the dozer blades in the outward direction to space it from the front of the plow. When this positioning of the dozer blades is achieved the truck may be backed up. The dozer blades, now
extending forwardly of the truck and upwardly from what was the trailing edge of the plow, serve to plow the lateral edges of the previously cleared path as the truck backs out and to push a window of snow away from the sides of the truck. When the truck is sufficiently removed from the drift to let it get another run at sufficient momentum, the dozer blades are once again moved to the forward normal operating position forming upward extensions of the wings of the plow. Since the windrow of snow is at the immediate edge of the cleared path has been cleared farther away from the action of the dozer blades, any snow which has fallen down into the previously cleared path between the backed up position of the truck and the place where it has been stuck will be thrown out by the moldboard action of the plow. When the truck encounters the previously compacted snow, it will continue to move forward into the direction of travel to adapt the snowplow for plowing while being propelled both forwardly and rearwardly comprising:

It is clear from the foregoing description that this invention has numerous advantages. One of the advantages is that the efficiency and ease with which a snowplow driven by a truck may be greatly increased by the operation of the dozer blades.

In addition, the plow equipped with dozer blades, according to this invention, may be operated in the conventional manner of a conventional snowplow when the snow cover on a roadway is sufficiently light to permit normal high speed operation of the truck throwing the accumulated snow to the side using the moldboard action of the scraper section. In addition, the truck employing the present invention is less likely to become stuck in a snowdrift and will not require the use of a second truck whose sole purpose will be to pull the plowing truck out of a snowdrift each time it has become stuck. Thus, in heavy snow, the use of a V-wing scraper adapted for traveling next to the surface to be plowed having a pair of wing scraper blades joined at the apex of a V and extending to trailing edges at the tips of the V, and formed with moldboards at the upper portions thereof to throw the snow up and away from the path being cleared during normal forward travel, a pair of dozer blades normally positioned along the upper moldboard edges of the wing scraper blades for receiving snow accumulated by the scraper and pivotally mounted at pivot points proximate to the trailing edges of the scraper blades, and means for pivoting the dozer blades from the normal forward plowing position to a position for plowing during the rearward travel, said means being capable of moving aside snow accumulated in front of said blades.

4. The apparatus of claim 3 wherein the pivot axis for mounting said dozer blades is canted forwardly with respect to the plow so that the free ends of said blades will move upwardly during outward pivotal movement.

5. The apparatus of claim 3 wherein the pivot axis for mounting said dozer blades is located inwardly with respect to the plow so that these blades have a smaller angle with respect to the plowed surface in the normal position than in the rearward plowing position.

6. The apparatus of claim 3 wherein said dozer blades are concave with respect to the snow to be moved to provide a lifting and windrowing action during rearward plowing movement.

7. The apparatus of claim 3 wherein said dozer blades extend forwardly from the respective pivot points to the apex of the V-wing scraper element.

8. The apparatus of claim 7 and further comprising a support strut mounted at the apex of the V-wing scraper blades to support the outer free ends of said dozer blades during forward travel of the plow.

9. The apparatus of claim 3 wherein said pivot points are placed inwardly of the trailing edges of said scraper blades so that when pivoted outwardly, the trailing edges of said scraper blades are located inwardly on the trailing edges of the dozer blades to insure that snow previously moved is captured during rearward movement of the plow.

10. The apparatus of claim 3 wherein the dozer blades are angled downwardly from the pivot points to position the outer free ends thereof at a position lower than the trailing edges of the scraper blades so that the outward movement of the dozer blades clears accumulated snow to a level below that of the upper portion of the trailing edges of the scraper blades to allow the plow to accumulate and compact a different body of snow.