May 17, 1938. R. McMASTER 2,117,561

SAFETY LIFT DEVICE FOR SNOW PLOWS

Filed June 22, 1937 2 Sheets-Sheet 1

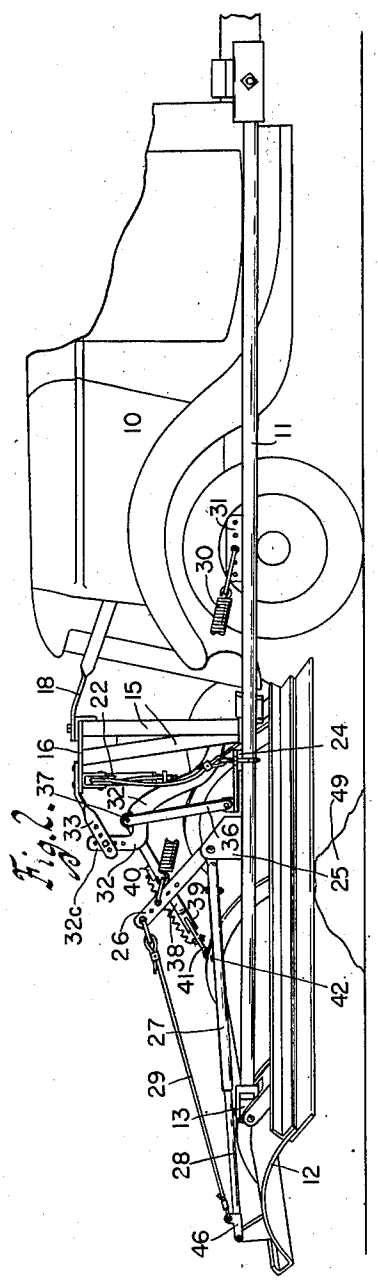


Fig. 2.

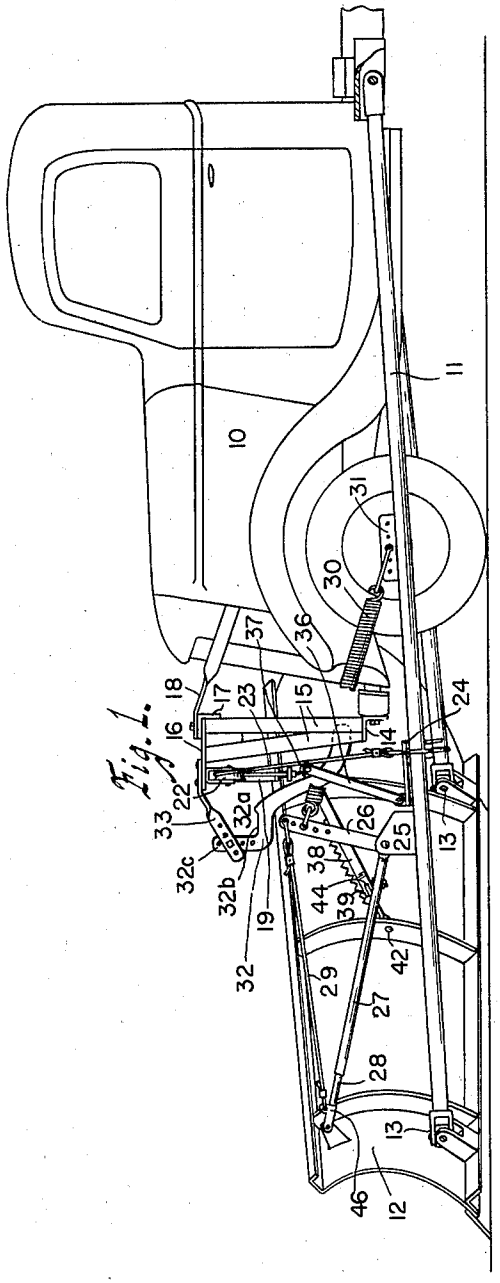


Fig. 1.

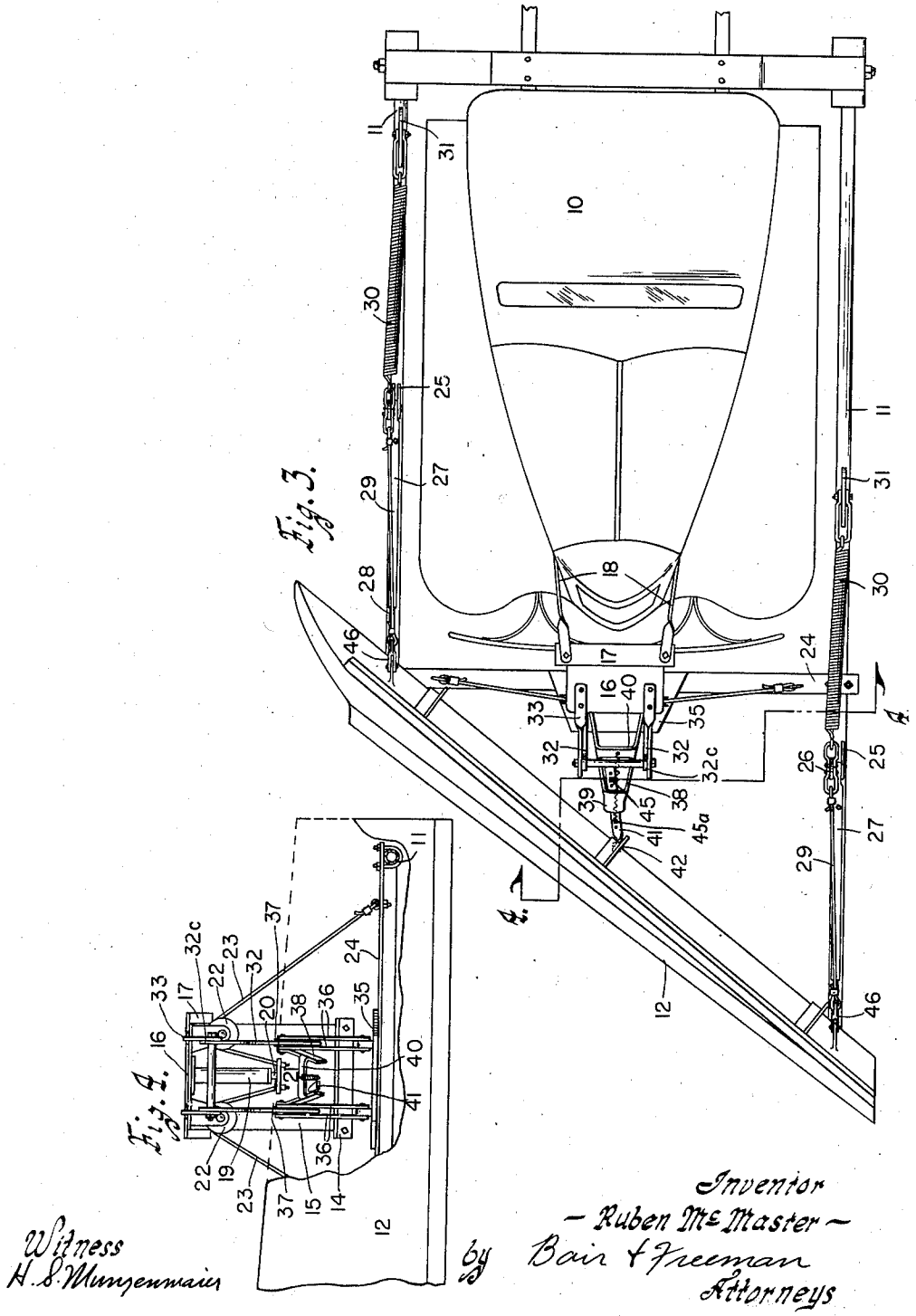
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SAFETY LIFT DEVICE FOR SNOW PLOWS

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SAFETY LIFT DEVICE FOR SNOW PLOWS

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6 Claims. (Cl. 37—42)

My invention relates to snow plows of the kind used for cleaning snow from highways and driven ahead of self-propelled vehicles, such as trucks or tractors.

More particularly, it is my purpose to provide means, simple and inexpensive of construction and accurate and efficient in operation, for causing the mold board of the snow plow to be tilted forwardly at the top and to have its lower portion lifted, when an obstruction is encountered, so as to cause the snow plow to clear the obstruction without serious injury to any of the machinery.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my safety lift device for snow plows, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of a portion of a snow plow having a mounting and operating means embodying my invention, the snow plow being shown installed on the front end of a truck, parts being broken away and parts being shown in section.

Figure 2 is a similar view illustrating the position of the snow plow and the mounting mechanism after the snow plow has met an obstruction and has been tilted and lifted, as described.

Figure 3 is a top or plan view of the snow plow and front part of the truck shown in Figure 1; and

Figure 4 is a front elevation of a portion of the snow plow, partly in section, taken on the line 4—4 of Figure 3.

In the accompanying drawings, I have used the reference numeral 10 to indicate generally a portion of a truck on which my improved snow plow is carried. Pivoted to the side frame members of the truck 10 are the laterally spaced, forwardly extending arms 11, connected at their forward ends to the lower part of the mold board 12 by suitable universal joints 13.

I provide suitable mechanism for raising and lowering the arms 11 and the mold board 12 and its associated mechanism.

Rigidly mounted on the front of the truck is a bar 14. Supported on the bar 14 are laterally spaced pairs of upwardly inclined angle bars or the like 15. The bars 15 in turn support at their upper ends the plate 16 and the transverse angle iron brace 17. The brace 17 is rigidly connected with and braced on the truck 10, by means of the brace arms 18.

Supported on the under side of the plate 16 is the cylinder 19 of a hydraulic or pneumatic device to which oil or air may be supplied by well-known means not here shown.

In the cylinder 19 is a plunger or piston not shown in the drawings, from which the stem 20 projects downwardly. On the lower end of the stem is a cross bar 21.

Hung from the plate 16 are the laterally spaced pulleys 22. Cables 23 are secured to the cross bar 21 and extend over the respective pulleys 22 and are secured to a rigid cross bar 24, which connects and is secured to the arms 11.

Thus it will be seen that when air or oil for example is forced into the cylinder 19 under pressure, the piston and cylinder will be forced downwardly, pushing the cross bar 21 downwardly, drawing the cables 23 around the pulleys 22 and lifting the bar 24, the arms 11 and the mold board 12.

It is, of course, obvious that there must be something to hold the upper part of the mold board against swinging on the front ends of the arms 11. On each side of the machine, there is fastened to the arm 11 a bracket 25. Pivoted on the bracket 25 is an upwardly inclined bar or arm 26 to the lower end of which is fixed a forwardly projecting sleeve 27. Pivoted to the upper part of the mold board 12 is a rod 28 slidably received in the sleeve 27. The forward sliding movement of the rod 28 with relation to the sleeve is limited by a cable 29 fastened to the rod 28 and to the upper end of the arm 26. A powerful coil spring 30 is adjustably secured at its rear end to a bracket 31 on the arm 11 and is adjustably secured at its forward end to the arm 26.

Thus it will be seen that the mold board may be raised and lowered by properly actuating the hydraulic device indicated at 19.

Ordinarily in traveling forward and especially in plowing snow, the mold board will stand substantially in the position shown in Figures 1 and 3. However, if the mold board should strike an obstruction, for instance a rock or high spot in the pavement, so as to impose great stress on the parts, the mold board will tilt on the axis of the forward pivots of the arms 11 and the upper part will tilt forward, so that the mold board can slide over the obstruction.

However, it is found that in many instances the operation will be much more satisfactory and impose less strain on the parts, if the mold board could be lifted when it is thus rocked or tilted.

I have provided the following means for ac-

complishing the lifting of the mold board when it is tilted.

Secured to laterally spaced members of the arms 15 are cam-like bars 32, the rear faces of which are curved from their rear ends upwardly and forwardly, and then have short upwardly projecting shoulders or the like 32a, forwardly of which are horizontal portions 32b terminating in the upstanding parts 32c. The upper ends are adjustably fastened to the plate 16 by bars 33.

On the bar 24 is mounted a horizontal plate 35. For each cam bar 32, a pair of bars 36 are pivoted to the plate 35 and incline upwardly on opposite sides of the cam bar. At their upper ends, they carry a roller or anti-friction device 37 adapted to travel on the cam face of the bar 32. The inner two bars 36 are connected to the rear ends of the arms of an A frame 38. The arms of this A frame 38 extend forwardly convergingly, and are connected at their forward ends by a cross member 39, and are also connected and braced between their ends by a cross member 40. A bar 41 has its forward end secured to the mold board 12 preferably by a horizontal substantially transverse pivot 42 as illustrated for instance in Figures 1 and 3 and slidably extends through a slot 44 in the forward part of the A frame 38 and has stops as at 45 and 45a.

Operation

In the operation of my snow plow, the parts normally stand substantially in the position shown in Figure 1, as they travel forward pushing snow.

In the absence of any load, the upper part of the mold board may swing rearwardly slightly until the shoulder 46 (Figure 1) on the rod 28 engages the forward end of the sleeve member 27 on each side of the device. Assume that as the snow plow is moved forwardly, it strikes an obstruction 49 (Figure 2). Thereupon the resistance to forward travel of the lower part of the mold board causes the top part of the mold board to tilt forwardly. The forward movement of the mold board pulls the bar 41 and the A frame forwardly (see Figures 1, 2 and 3), thus causing the rollers 37 to roll upwardly on the cam faces of the bars 32 until they pass the humps 32a and rest on the substantially horizontal portions 32b. The movement of the rollers 37 upwardly effects a lifting movement of the rods or arms 11 and the entire mold board, so that the mold board tends to assume the position shown in Figure 2. There is then, of course, an increased tension on the springs 30, and as soon as the mold board clears the obstruction, the springs 30 pull the mold board back toward its position shown in Figure 1.

The bar 41 has pivotal connection with the mold board and pivotal and sliding connection with the A frame 38, so as to allow proper play of the parts during different adjustments of the mold board.

It will be seen from the foregoing that the structure to which my invention particularly relates is very simple and inexpensive to build. It has been tried in commercial devices and has been tried successfully under severe operating conditions.

It is my intention to cover by my claims any modification in the arrangement and construction of the parts or use of materials, which may be reasonably included within the scope of my invention, and which are included within the scope of the claims.

I claim:

1. In a device of the class described, a mold board, laterally spaced arms adapted to be supported at their rear ends, said arms being pivoted to the lower part of the mold board, means for maintaining the mold board in snow plowing position, and cam guided means for lifting the mold board when its upper part is tilted forwardly.

2. In a device of the class described, a mold board, laterally spaced arms adapted to be supported at their rear ends, said arms being pivoted to the lower part of the mold board, yieldable means for maintaining the mold board in snow plowing position, cam guided means for lifting the mold board when its upper part is tilted forwardly, cams, cam followers, and means for operatively connecting the mold board with the cam followers for causing the mold board to be lifted when its upper part is tilted forwardly.

3. In a snow plow or the like, a mold board, means for supporting the mold board for up and down swinging movement and for pivotal movement on a transverse axis for permitting the mold board to tilt when it encounters certain resistance, mechanism for normally holding the mold board in a given position of such pivotal movement, said mechanism including yielding members, and cam-guided means for lifting the mold board when it tilts away from such given position.

4. In a snow plow or the like, a mold board, means for supporting the mold board for up and down swinging movement and for pivotal movement on a transverse axis for permitting the mold board to tilt when it encounters certain resistance, mechanism for normally holding the mold board in a given position of such pivotal movement, said mechanism including yielding members, and cam-guided means including laterally spaced cams and members traveling on the cams and connected with the mold board above its tilting axis for lifting the mold board when it tilts away from such given position.

5. In a snow plow or the like, a mold board, means for supporting the mold board for up and down swinging movement and for pivotal movement on a transverse axis for permitting the mold board to tilt when it encounters certain resistance, mechanism for normally holding the mold board in a given position of such pivotal movement, said mechanism including yielding members, and cam-guided means including laterally spaced cams, members traveling thereon, and jointed means for connecting such last-named members with the mold board, for lifting the mold board when it tilts away from such given position.

6. In a snow plow, a mold board, a support, arms pivoted at their rear ends on the support, and pivoted at their front ends to the mold board, yieldable means carried by the arms for normally holding the mold board in load pushing position, such parts being adapted to permit the mold board to tilt forwardly when its lower part encounters certain resistance, and means for lifting the mold board when it is so tilted, the lifting means including cams on the support, members traveling on the cams, arms pivoted to the members and pivoted at their lower ends to be raised and lowered with the first arms, and means for connecting the members with the mold board.

RUBEN McMASTER.