July 23, 1963 J. E. KOCH 3,098,309

SNOWPLOW ATTACHMENT FOR AUTOMOBILES

Filed March 15, 1961

FIG. 1

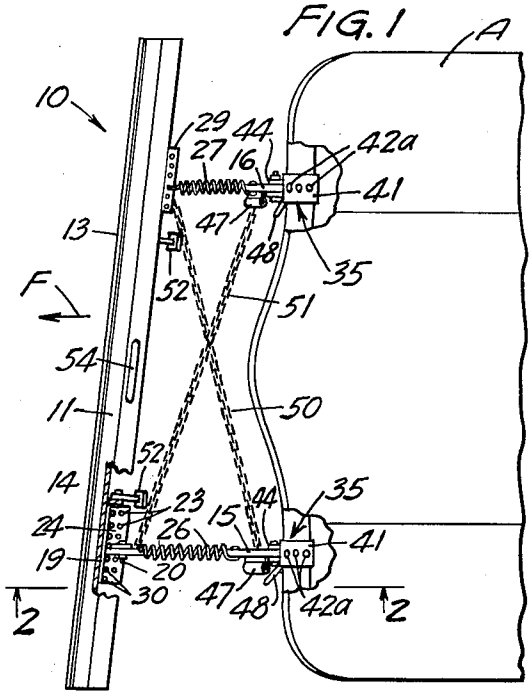


FIG. 3

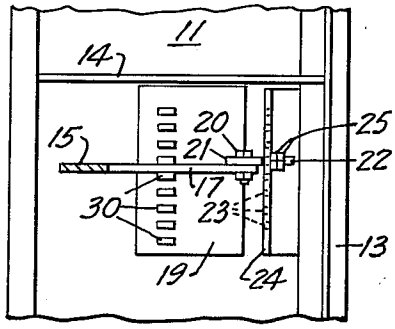


FIG. 6

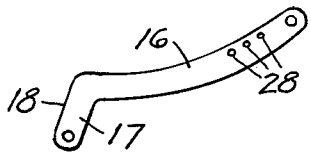


FIG. 2

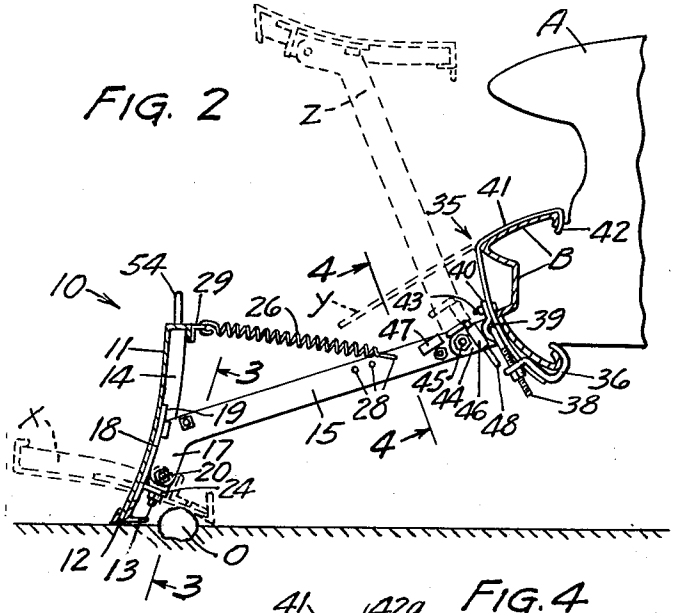


FIG. 5

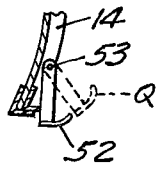
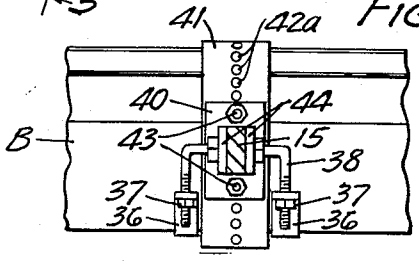


FIG. 4



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SNOWPLOW ATTACHMENT FOR AUTOMOBILES

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This invention relates to apparatus attachable to an automobile and more particularly relates to a snow-plowing attachment for automobiles.

Although snow plowing attachments for automobiles have been known in the past, all such attachments have had distinct disadvantages. One primary disadvantage of all previously known snow-plowing attachments is that such attachments have been rather difficult to store and attach to an outomobile in a convenient and easy manner such that the average home owner would be likely to take on such a job. It has been felt necessary in the past that snow-plowing attachments should be heavy and therefore cumbersome and therefore such attachments have been difficult for a person to handle by himself and difficult to apply to an automobile. Furthermore, in the past, the attachment apparatus has been rather difficult to manipulate so as to be properly attached to a person's automobile. It has been found necessary to either buy expensive specific attachments for a particular type or model of automobile, or on the other hand the attachment provided would not fit propertly or would not mount the plow in a proper fashion.

Another distinct disadvantage of previously known plows is an extremely important one in that such plows have not been rugged enough to stand up under conditions which prevail at the time plowing is necessary and as a result have malfunctioned when attempts have been made to carry out the plowing operation.

Although it has been known before that a snowplow moldboard might tip over when an obstruction is encountered by the pavement-engaging edge thereof, such snowplow attachments have not operated effectively because the moldboard will not always return to the same predetermined position with respect to the pusher arms that is required for proper operation of the plow. Furthermore it has been known that the moldboard would tip over in certain circumstances where a real obstruction is not encountered and where it is desired that plowing should continue.

With these comments in mind it is to the elimination of these and other disadvantages that my invention is directed along with the inclusion therein of other novel and desirable features.

An object of my invention is to provide a new and improved snowplow attachment of simple and inexpensive construction and operation.

Another object of my invention is the provision of a novel snow-plowing attachment for automobiles, which attachment will adaquately handle snow-plowing functions in several situations without causing malfunctioning or without causing damage to the pavement being plowed.

Another object of my invention is the provision of an improved and novel snow-plowing attachment for an automobile, which attachment is readily and easily applied to the automobile and which attachment will free itself from obstructions encountered while plowing, but will immediately continue to plow snow when the obstruction is avoided.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a top plan view of the invention and being partly broken away for clarity of detail;

FIG. 2 is a detail section view taken at approximately 2—2 in FIG. 1;

FIG. 3 is a detail view taken approximately at 3—3 in FIG. 2; and

FIG. 4 is a detail view taken approximately at 4—4 in FIG. 2; and

FIG. 5 is a detail section view showing a portion of the moldboard; and

FIG. 6 is an elevation view of the short pusher arm.

The snowplow is indicated in general by numeral 10 and includes a generally upright and slightly curved moldboard 11 having a linear bottom edge 12 reinforced with an angle bar 13. The moldboard 11 has a plurality of stationary vertical reinforcing ribs 14 affixed as by welding to the rear side of the moldboard and extending downwardly to the angle bar 13. The upper edge of the moldboard 11 is bent rearwardly and then downwardly to be strengthened thereby.

A pair of plow-pushing arms 15 and 16 extend rearwardly and upwardly from the moldboard and are normally attached to the bumper B of an automobile A. The plow-pushing arm 16 is slightly shorter than the arm 15 so that the moldboard 11 is oriented slightly obliquely with respect to the forward direction of travel of the automobile which is indicated by the arrow F. The shorter arm 16 is curved between its front and rear ends in a smooth curvature with the concave edge thereof facing generally upwardly. The shorter plow-pushing arm 16 thereby comes into the rear of the moldboard at a slightly different angle than the arm 15, and the forward portion of the arm 16 is more nearly horizontal than the forward portion of the arm 15. The forward ends of the arms 15 and 16 are substantially identical. The plow-pushing arms are both bar-shaped or rectangular in cross section and the front ends 17 thereof are bent sharply downwardly and may be said to have a dog-leg shape. The depending front ends 17 of the arms define moldboard-engaging upright front edges or surfaces 18 which lie against the reinforcing plate 19 which is welded to the moldboard 11. The lower end 17 is connected by a horizontally oriented pivot bolt 20 to an upstanding ear 21 having a threaded stud 22 depending therefrom and extending downwardly through one of a plurality of apertures 23 in the mounting flange 24 which is affixed as by welding to the moldboard and which projects rearwardly therefrom. The threaded stud 22 is affixed as by nuts 25 to the flange 24. It will therefore be seen that the front end of each of the plow-pushing arms is connected to the moldboard for pivotal swinging about upright and horizontal axes extending generally along the moldboard. The moldboard may thereby swing downwardly to the dotted position shown in FIG. 2 when the bottom edge 12 thereof encounters an obstruction so that the moldboard may easily pass over the obstruction without being damaged. Elongate tension springs 26 and 27 are positioned above the arms 15 and 16 respectively, and the rear ends of the springs are anchored to the arms at apertures 28. The front ends of the springs 26 and 27 are hooked into appropriate apertures in flanges 29 which are affixed as by welding to the upper edge of the moldboard so that the springs 26 extend directly forwardly and along the pusher arms.

The reinforcing plate 19 carries a plurality of spaced lugs or bars 30 affixed as by welding to the plate 19 in spaced and parallel relation with each other. The lugs 30 are formed of round bar stock and are spaced from each other a distance substantially equaling the thickness of the bar-shaped front ends 17 of the pusher arms. The spaces between the lugs 30 are disposed in vertical relation between the apertures 23 in the flanges 24 so that the front edge 18 of the pusher arms engages the mold-

board reinforcing plate 19 at a position between the lugs 30. The lugs prevent any side-to-side movement of the upright front ends 17 of the pusher arms and cause the moldboard 11 to return, after having been swung downwardly, to a preset position or to the same identical position that the moldboard had assumed previous to the downward swinging thereof.

The rear ends of the arms are attached to the bumper B by a clamping apparatus indicated in general by numeral 35 The apparatus includes a pair of upwardly turned hooks 36 for engaging and gripping the lower edge of the bumper B. The hooks 36 are secured by nuts 37 on the depending ends of U-bolts 38, the horizontal intermediate portion of which extends through a recess 39 in the bracket 40 which lies against the bumper B. The bracket 40 is secured to the bumper by an elongate substantially rigid metal strap 41 having a permanently formed hook 42 in its upper end. The strap 41 is initially in a substantially linear condition as indicated by the dotted line Y in FIG. 2. When the strap 41 is being applied to the bumper B the hook 42 is first applied to the upper edge of the bumper and then the linear portion of the strap is manually bent downwardly around the contour of bumper B to lie flush thereagainst and in engagement therewith. It will be seen that the strap 41 lies between the bracket 40 and the bumper and the strap 41 is provided with a plurality of apertures 42, certain of which are employed for securing the bracket thereto as by bolts 43. The strap 41 lies against the back of the bracket 40 in obstructing relation with the recess 39 for holding the U-bolt 38 therein.

The bracket 40 has a pair of forwardly projecting rigid ears 44 welded thereto and apertured to receive a horizontally extending pivot bolt 45 extending through the rear end of the plow-pushing arm. One of the ears 44 has a rigid pin-receiving sleeve 46 affixed thereto as by welding and oriented in a forwardly and inclined position. Another similar sleeve 47 is affixed as by welding to the rear end of the plow-pushing arm in a position extending generally along the arm and spaced from the pivot bolt such as to swing, when the arm is swung, to an elevated position as indicated by the dotted lines Z in FIG. 2, into alignment with the sleeve 46 so that the pin 48 may be dropped through the aligned sleeves 47 and 46 and thereby hold the pusher arms in elevated position. It will be understood that each of the brackets 35 are identical and each has a sleeve 46 affixed thereon for cooperating with the corresponding sleeve on the corresponding pusher arm. When the arms have been swung upwardly and retained in the dotted position Z shown in FIG. 2, the plow may be easily transported from one location to another where snow plowing is to be accomplished.

Cross chains 50 and 51 extend diagonally between the pusher arms and are connected to the respective front and rear ends of opposite arms for preventing movement of the moldboard 11 in a direction substantially longitudinally thereof when the plow is moved in the forward direction F.

In FIG. 5 is shown a moldboard supporting shoe 52 connected by a pivot bolt 53 to the upright ribs 14 at the rear side of the moldboard 11. The shoe 52 has an upwardly turned rear end so as to lie over the surface in a rearward direction when the automobile is moved in a reverse direction, as in the instance where a driveway is being plowed out and the plow must be reversed along the driveway in order to take an additional area for plowing during the next forward movement. It will be seen in FIG. 5 that the shoe 52 will tip to an inclined position Q when the plow is moved in a forward direction.

As hereinbefore pointed out, the shorter pusher arm 16 is smoothly curved with the concave portion of the curve facing generally upwardly and the arm 16 will thereby properly push the moldboard 11 in all situations, including the situation where a driveway falls off sharply in an incline and the bumper B has come to the steep incline in the driveway. The plow is pushed forwardly in the conventional fashion without malfunction.

It will be understood that in forming the bar-shaped front ends 17 of the pusher arms 15 and 16 identical techniques are used. The end portion 17 of the arms both form substantially identical angles with the generally horizontal portion of the arms immediately adjacent thereto. By producing the bow in the shorter pusher arm 16, the front edge 18 thereof is tilted rearwardly to the necessary extent as to effectively lower the point of maximum forward thrust against the moldboard. It has been found that the forming of the bow in the shorter pusher arm 16 and the corresponding rearward tilting of the front edge 18 of the shorter arm 16 prevents tipping of the moldboard to the dotted position X when the moldboard passes over a sharply defined dip, such as at the street end of a driveway. It will be understood that as the forwardmost portion of the moldboard moves beyond a crest or edge of a dip in a driveway, it cannot immediately move downwardly because the trailing portion of the moldboard, adjacent arm 16 is still in engagement with the pavement at the crest or edge of a dip in a driveway. In this situation drag on the lower edge of the moldboard produced by engagement with the pavement is primarily located beneath the shorter pusher arm 16. Because of the additional rearward tilt angle of the edge 18 of the shorter arm 16 and because of the corresponding lowering of the point of maximum forward thrust between the shorter arm 16 and the moldboard, the moldboard will be maintained in an upright position as shown in full lines in FIG. 2 and is prevented from tipping over to the dotted position X as the moldboard travels over the crest or edge of the dip and downwardly therealong. The moldboard will travel down the dip to the adjacent lower portions of the driveway without tipping over.

It will be noted that a handle 54 is welded on the upper edge of the moldboard to provide for ready and easy handling of the snowplow. When the plow is removed from the automobile the arms 15 and 16 may be swung toward each other so as to lie flat against the moldboard. The moldboard may thereby be conveniently stored in a small space and the plow may be carried in this condition and easily manipulated.

It will be understood that the plow may carry a vertical mast or marker rod which extends well upwardly therefrom so that when deep snow is encountered the operator of the automobile may see the mast and know that his moldboard is in upright condition.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of the invention which consists of the matter described herein and set forth in the appended claims.

What I claim is:

1. A snowplow attachable to the bumper of an automobile, comprising an elongate snow-pushing moldboard normally extending along the ground in a substantially upright position in front of the automobile, the moldboard having a ground-engaging edge and an upper portion, a pair of parallel and rigid plow-pushing arms extending in a forwardly and downwardly inclined direction toward the moldboard, said arms having front and rear ends, means removably attaching the rear ends of the arms to an automobile bumper, the front ends of said arms being bar-shaped and oriented in a vertical plane, and said front ends being bent downwardly to define elongate moldboard-engaging edges bearing against the moldboard, pivot means below the front ends of said arms and adjustably attaching the front ends of the arms to the moldboard at spaced positions longitudinally along the moldboard and for swinging movement about upright and substantially horizontal axes extending generally parallel to the moldboard whereby to permit the moldboard to

swing downwardly when the lower edge of the moldboard encounters an obstruction and to permit the arms to be folded against the moldboard when removed from the automobile, elongate springs above the arms and extending therealong, said springs having opposite ends anchored on the arms and on the upper portion of the moldboard respectively for returning the moldboard to upright position after having been swung downwardly, the moldboard having a pair of rigid plates thereon and having a plurality of rearwardly projecting rigid arm-guiding and retaining lugs in spaced side by side relation with each other and affixed to said plates adjacent each of the arms and receiving said edges of the arms therebetween to maintain the front end of said arms in predetermined relation with the moldboard and to cause the moldboard to return to a preset position each time the moldboard is swung upwardly after having been swung downwardly by an obstruction.

2. A snowplow attachable to the bumper of an automobile, comprising an elongate snow-pushing moldboard normally extending along the ground in a substantially upright position in front of the automobile, the moldboard having a lower ground-engaging edge and having an upper portion, a pair of parallel and rigid plow-pushing arms extending in a forwardly and downwardly inclined direction toward the moldboard, said arms having front and rear ends, a mounting bracket removably attachable to the bumper of an automobile and being attached to the rear ends of the arms, the front ends of said arms being bar-shaped and oriented in a vertical plane, said front ends being bent downwardly to define elongate moldboard-engaging edges bearing against the moldboard, pivot means below the front ends of said arms and attaching the front ends of the arms to the moldboard for swinging movement about upright and substantially horizontal axes extending generally parallel to the moldboard whereby to permit the moldboard to swing downwardly when the lower edge of the moldboard encounters an obstruction and to permit the arms to be folded against the moldboard when removed from the automobile, elongate springs above the arms and extending therealong, said springs having opposite ends anchored on the arms and on the upper portion of the moldboard respectively for returning the moldboard to upright position after having been swung downwardly, the moldboard having a pair of rigid arm-guiding and retaining members adjacent each of the arms and projecting rearwardly at opposite sides of said moldboard-engaging edge to maintain the front ends of said arms in predetermined relation with the moldboard and to cause the moldboard to return to a preset position each time the moldboard is swung upwardly after having been swung downwardly by an obstruction, the arm-supporting brackets each having a forwardly and upwardly extending rigid bracket sleeve affixed thereto, each arm having a rigid arm sleeve affixed on the rear end and extending along the arm, the rear ends of the arms being pivoted to the brackets for vertical swinging, to swing the arm and bracket sleeves into end-to-end alignment with each other as the moldboard is lifted upwardly, and removable pins extending through the aligned sleeves to maintain the arms and moldboard in elevated position.

3. A snowplow attachable to the bumper of an automobile, comprising an elongate snow-pushing moldboard normally extending along the ground in a substantially upright position in front of the automobile, the moldboard having the lower ground-engaging edge and having an upper portion, a pair of parallel and rigid plow-pushing arms extending in a forwardly and downwardly inclined direction toward the moldboard, said arms having front and rear ends, the front ends of said arms being bar-shaped and oriented in a substantially vertical plane, and said front ends being bent downwardly to define elongate moldboard-engaging edges bearing against the moldboard, the moldboard having rearwardly protruding ledge means adjacent said lower edge and beneath the lower front ends of said arms, pivot means below the front ends of said arms and attaching the front ends of the arms to the ledge means of the moldboard to direct force downwardly for urging the lower edge of the moldboard against the ground, and said pivot means permitting relative swinging between the moldboard and arms about upright and horizontal axes extending generally along the moldboard whereby to permit the moldboard to be swung downwardly when the lower edge thereof encounters an obstruction, and to permit the arms to be folded against the moldboard when removed from the automobile, the moldboard having rigid arm-guiding and retaining members adjacent each of the arms and projecting rearwardly from the moldboard at opposite sides of said moldboard-engaging edges to maintain the front ends of said arms in predetermined relation with the moldboard and to cause the moldboard to return to a preset position each time the moldboard is swung upwardly after having been swung downwardly by an obstruction, elongate springs above the arms and extending therealong, said springs having opposite ends anchored on the arms and on the upper portion of the moldboard respectively for returning the moldboard to upright position after having been swung downwardly, a pair of brackets at the rear ends of the plow-pushing arms and having horizontally extending pivots oriented transversely of said arms and securing the arms for vertical swinging to said brackets, and upper and lower bracket-mounting hooks respectively applicable to the upper and lower edges of the automobile bumper and clamping means securing said upper and lower hooks together and securing said brackets to said hooks in widely spaced relation with the upper hook and in closely spaced relation with the lower hook to cause the forward and downward thrust to be delivered to the plow-pushing arms from the lower portion of the bumper.

4. A snowplow attachable to the bumper of an automobile, comprising an elongate snow-pushing moldboard normally extending along the ground in a substantially upright position in front of an automobile and along an oblique angle with respect to the forward direction of travel, the moldboard having a ground-engaging edge and an upper portion, a pair of substantially parallel and rigid plow-pushing arms extending in a forwardly and downwardly inclined direction toward opposite ends of the moldboard, one of said arms being shorter than the other of said arms, said arms having front and rear ends, means removably attaching the rear ends of the arms to an automobile bumper, the front ends of said arms extending generally horizontally and forwardly and including bar-shaped depending moldboard-engaging portions having rearwardly tilted moldboard-engaging front edges bearing against the moldboard, pivot means below the front ends of said arms and attaching the front ends of the arms to the moldboard for swinging movement about upright and substantially horizontal axes extending generally parallel to the moldboard whereby to permit the moldboard to swing downwardly when the lower end of the moldboard encounters an obstruction and to permit the arms to be swung against the moldboard when removed from the automobile and thereby permit ready and easy storage of the snowplow, elongate springs above the arms and extending therealong, said springs having opposite ends anchored on the arms and on the upper portion of the moldboard respectively for returning the moldboard to upright position after having been swung downwardly, the shorter of said arms being bowed into an upwardly facing concave shape and having the forward moldboard-engaging edge thereof tilted rearwardly at a sharper angle than the corresponding edge of the other of the arms so as to lower the point of maximum thrust against the moldboard and thereby prevent undesired downward swinging of the moldboard against the action of said springs.

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