May 1, 1934. C. H. FRINK 1,957,103

SNOWPLOW

Filed May 27, 1932 2 Sheets-Sheet 1

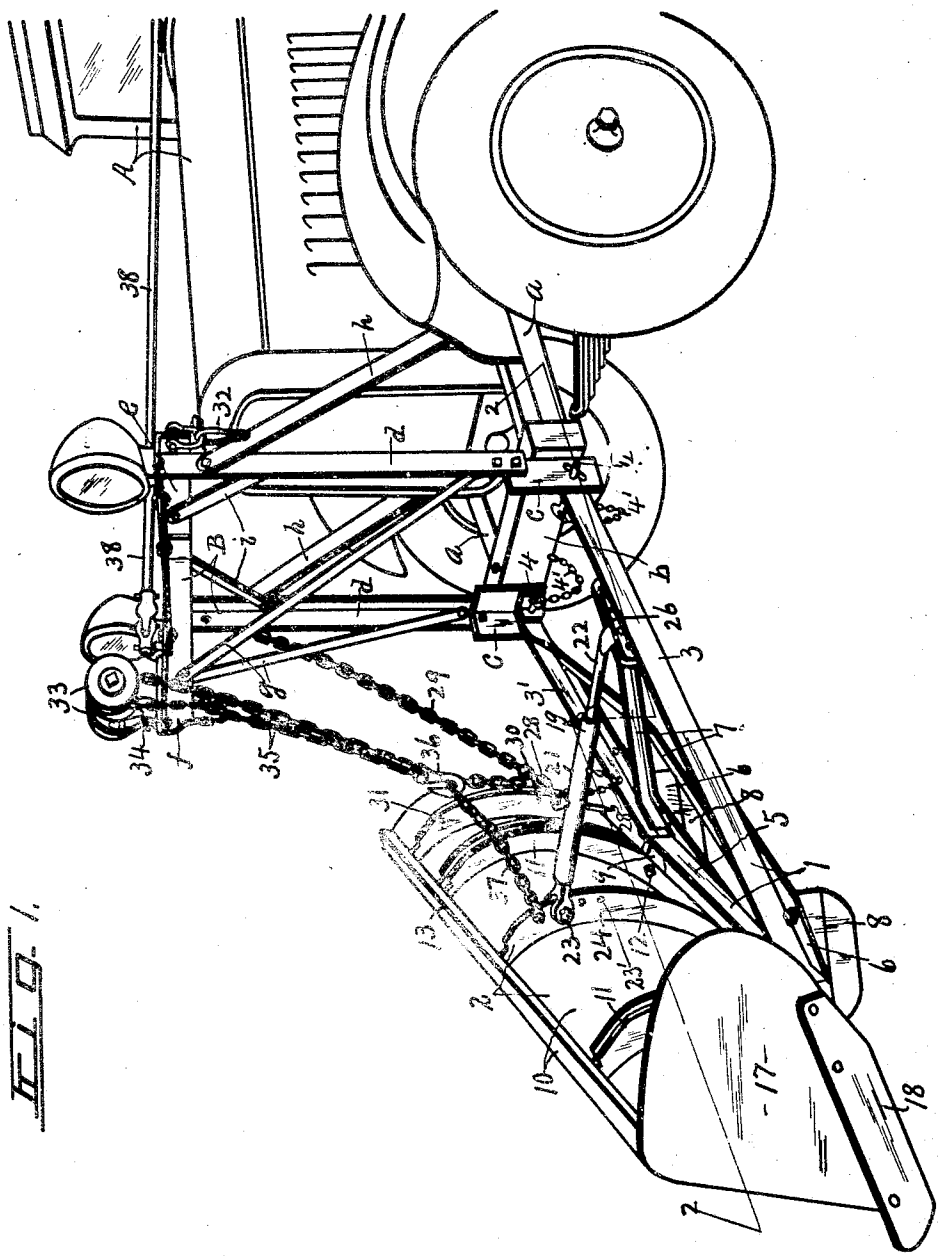


FIG. 1.

INVENTOR
C. H. Frink

WITNESS
J. J. Mains

BY
Dennison & Thompson
ATTORNEYS

May 1, 1934. C. H. FRINK 1,957,103

SNOWPLOW

Filed May 27, 1932 2 Sheets-Sheet 2

FIG. 2.

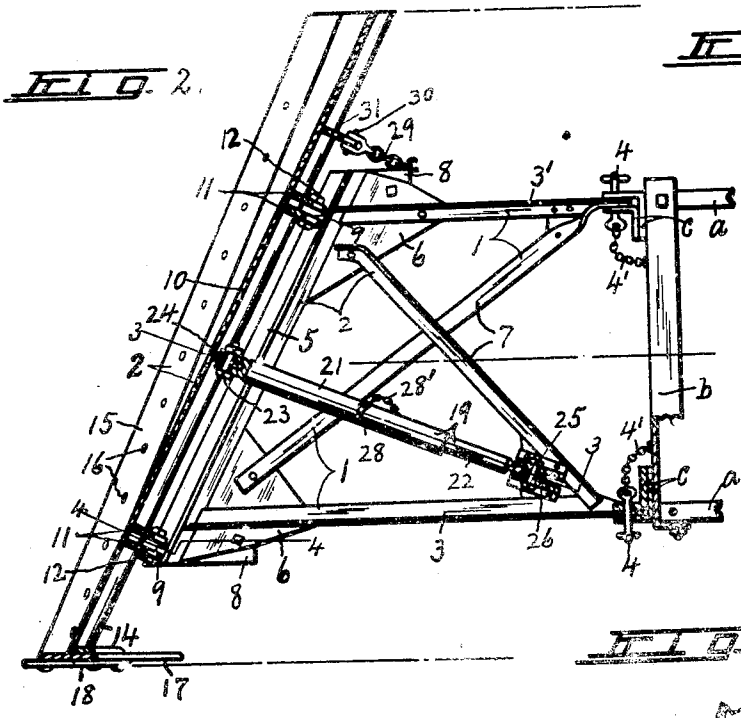


FIG. 5.

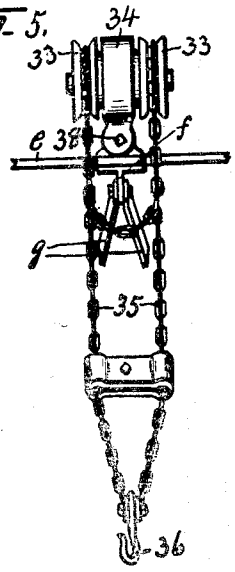


FIG. 4.

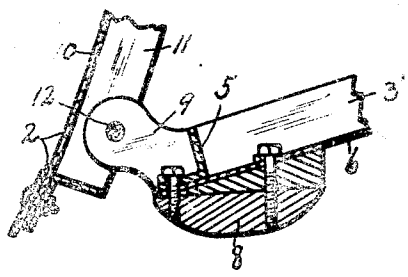


FIG. 3.

INVENTOR
C. H. Frink

WITNESS
J. I. Mains

BY
Denison & Thompson
ATTORNEYS

Patented May 1, 1934 1,957,103

UNITED STATES PATENT OFFICE

1,957,103

SNOWPLOW

Carl H. Frink, Clayton, N. Y.

Application May 27, 1932, Serial No. 613,399

1 Claim. (Cl. 37—42)

This invention relates to certain improvements in snow plows of the one-way type adapted to be mounted upon the front end of a motor truck with its moldboard arranged diagonally across opposite sides of the longitudinal center line of the truck for deflecting the snow and ice to one side of the roadbed.

These machines are adapted to be driven long distances at relatively high speed over widely varying road conditions in order to keep the road surface sufficiently free from snow and ice to assure practically continuous and safe travel for automobiles and other vehicles.

The main object is to construct the machine to meet these requirements with a greater degree of efficiency, less power and less strain upon the various parts than has heretofore been practised and at the same time to reduce the cost of operation and maintenance and incidentally to increase the life of the machine.

One of the specific objects is to provide the opposite sides of the front end of the plow supporting frame with wear shoes adapted to ride upon the surface of the road and thereby to serve the double purpose of taking the wear from the frame and causing said frame with the moldboard thereon to ride freely over irregularities in said surface.

Another specific object is to hinge the moldboard to the front end of its supporting frame to tilt forwardly and rearwardly to different vertical angles about a horizontal axis in close proximity to the rider shoes and in planes above and at the rear of the lower edge of the moldboard for varying the depth of cut.

In other words, I have sought to bring the lower edge and axis of movement of the moldboard and also the rider shoes into relatively close proximity to each other so that, when the moldboard is adjusted to bring its lower edge more or less closely to the surface of the road, the rider shoes riding upon said surface will cause the cutting edge of the moldboard to pass freely over any ordinary irregularities.

A further object is to provide simple means for easily and quickly adjusting the moldboard to different vertical angles about its axis and to firmly lock the same in its adjusted position.

Another object is to provide means for limiting the downward and rearward swinging movement of the plow-supporting frame about its pivotal connection with the truck and thereby to prevent accidental folding or jack-knifing of said frame beneath the truck in case the moldboard should encounter unusual obstructions.

Other objects and uses relating to specific parts of the plow will be brought out in the following description.

In the drawings:—

Figure 1 is a perspective view of my improved plow and adjacent front end of a motor truck to which it is attached, the plow being in its extreme down position ready for use.

Figure 2 is a horizontal sectional view, partly in top plan, of the plow and adjacent end of the truck frame taken on line 2—2, Figure 1.

Figure 3 is a vertical sectional view taken on line 3—3, Figure 2.

Figure 4 is an enlarged detail vertical section taken on line 4—4, Figure 2.

Figure 5 is an enlarged front elevation of the cables and sheaves for raising and lowering the plow.

In order that the invention may be clearly understood, I have shown the front end of a motor truck A having the usual chassis frame *a* upon which is mounted an upright crane B somewhat similar to that set forth in my pending application Serial No. 489,983, filed October 20th, 1930, in that it comprises a cross bar *b* which is rigidly secured to the front ends of the side sills of the chassis frame, a pair of upright angle irons *c* bolted or otherwise secured to the cross bar, and a pair of upright angle posts *d* having the lower ends secured to the angle irons and their upper ends rigidly connected to a horizontal cross bar *e*.

A crane arm *f* is rigidly secured to the central portion of the cross bar *e* to project forwardly therefrom and has its forward end bolted or otherwise secured to the upper ends of a pair of downwardly and rearwardly diverging brace bars *g*, the lower ends of which are bolted to the lower ends of the posts *d*, as shown in Figure 1, the posts being braced to the frame *a* and to the cross bar *e* by braces *h* and *i* respectively.

The snow plow attachment, forming the subject matter of this application, comprises a frame 1 hinged to the front end of the chasis frame *a* to swing vertically about a horizontal axis at right angles to the longitudinal center line of the truck to extend forwardly therefrom, and a moldboard 2 which is hinged to the front end of the frame 1 to rock forwardly and rearwardly about an axis diagonal to said longitudinal center line and extends parallel with said axis unequal distances to opposite sides thereof, together with suitable devices for separately adjusting said frame and moldboard about their respective axes.

The front left hand point of the plow is, of

course, the first to enter the snow and ice and therefore receives the greatest thrust resistance tending to deflect the plow in that direction, but this tendency is mainly counterbalanced by extending the moldboard a greater distance to the right hand side than to the left hand side of the longitudinal center line of the machine so that the resistance of the snow against the longer side will offset that at the shorter side and cause the plow to travel parallel with said longitudinal center line.

As illustrated, the frame 1 comprises a pair of laterally spaced parallel thrust bars 3 and 3' having their rear ends hingedly connected by pivotal bolts 4 to the angle irons *c* and their front ends rigidly connected to opposite ends of a diagonal cross bar 5 through the medium of triangular brace plates 6 which, in turn, are connected by crossing braces 7 to the rear ends of the thrust bars 3 and 3' as shown more clearly in Figures 1, 2 and 3, thus producing a strong and rigid frame for transmitting motion from the truck to the moldboard, presently described.

The frame 1 extends forwardly from the truck frame a greater distance than the crane arm *f* and in vertically spaced relation thereto sufficient to allow free vertical movement of the plow from its operative to its inoperative positions and is shorter on one side (in this instance the right hand side, than the other to bring the front cross bar 5 at the desired angle diagonally across the center line of the truck and thereby to support the moldboard at a similar angle.

A pair of rider or ground shoes 8 are bolted or otherwise rigidly secured to the under side of the front end of the frame 1 near the outer sides thereof to ride upon the surface of the road for supporting the front end of the frame and moldboard at the desired height when adjusted for use and also to relieve the plow from excessive wear and strains incidental to its operation.

The front diagonal cross bar 5 is provided near its opposite sides with forwardly projecting lugs 9 welded or otherwise rigidly secured thereto for supporting the moldboard 2 substantially parallel with said cross bar and, therefore, diagonal to the longitudinal center line of the machine in a manner presently described.

This moldboard is somewhat similar to that shown in my Patent No. 1,803,754 issued May 5th, 1931, in that it comprises a sheet metal section 10 which is concavo-convex in cross section vertically and is reinforced by separate pairs of flanges 11 welded or otherwise rigidly secured to the rear surface of the section 10 in laterally spaced relation corresponding to the spacing of the lugs 9 to which they are hinged by pivotal bolts 12 to permit the moldboard to swing forwardly and rearwardly about a horizontal axis parallel with the cross bar 5 and, therefore, diagonal to the longitudinal center line of the machine, as shown more clearly in Figures 2 and 3.

The moldboard section 10 is constructed to form a series of substantially longitudinally extending flat panels similar to that as set forth in my patent referred to for breaking up the snow crust or ice as it is deflected from the lower edge upwardly during the operation of the machine, the upper edge of the section 10 being returned rearwardly and downwardly to form an angular reinforcing flange 13.

The lower edge of the moldboard section 10 is straight and horizontal and is provided with a reinforcing angle iron 14, welded or otherwise rigidly secured to the rear face thereof, as shown more clearly in Figure 3.

A scraper blade 15 of hardened steel or equivalent material is rigidly secured by bolts 16 or equivalent releasable means to the front face of the lower edge of the moldboard section 10 to permit it to be replaced from time to time when worn or otherwise impaired, said scraper blade being extended the full length of the moldboard section as shown in Figure 1.

A deflector plate 17 is welded or otherwise rigidly secured at its forward end to the left hand side of the moldboard 2 to extend rearwardly therefrom and from top to bottom thereof in a plane substantially parallel with the longitudinal center line of the machine and is provided near its lower edge with a shearing blade 18, bolted or otherwise rigidly secured to the outer face thereof, and projecting forwardly therefrom, as shown more clearly in Figures 1 and 2 for shearing the snow and ice and thereby to facilitate the deflection of the same to the right hand side of the roadbed as the machine is propelled forwardly.

The blade 18 also serves as a rider shoe or nose to guide the front corner of the plow over car tracks and other obstructions which otherwise might be caught by the scraper blade.

It will be observed upon reference to Figure 2 that the moldboard extends laterally beyond the outer sides of its supporting frame 1 and ground shoes 8 for clearing the snow and ice from the pavement corresponding distances to opposite sides of the line of travel of the wheels of the truck.

It will be noted upon reference to Figure 3 that the pivotal bolts 12 for hingedly connecting the moldboard 2 to the front end of the frame 1 are coaxial and are located near and a short distance above the lower edge of the moldboard or just above the reinforcing angle iron 14 so that when the moldboard is tilted forwardly about the axis of the pivotal bolts 12 or rearwardly, the lower edge of the scraper blade 15 will be brought nearer to or farther from the surface of the roadbed for varying the depth of cut of the scraper blade, according to the condition of the snow or ice which is to be removed.

Suitable means is provided for adjusting the moldboard to different vertical angles about the axis of the pivotal bolts 12 and for holding said moldboard in its adjusted position and for this purpose a longitudinal adjustable brace rod 19 is employed to connect the upper portion of the moldboard to the rear portion of the frame 1, as shown more clearly in Figures 1, 2 and 3.

That is, the brace rod 19 is composed of sections 21 and 22, the front end of the section 21 being connected by a bolt 23 or equivalent releasable means to a reinforcing rib or flange 24 which is welded or otherwise rigidly secured to the rear face of the moldboard section 10 substantially midway between its ends, said rib being provided with a plurality of bolt openings 23' arranged one above the other for the reception of the bolt 23 thus permitting the front end of the brace bar to be adjusted to different positions vertically as may be required to position the moldboard at the proper angle.

The rear end of the brace bar section 22 is connected by a bolt 25 or equivalent releasable means to a bracket 26 on the rear end of the left hand side of the frame 1 just in front of

the hinge bolts 4 for said frame, as shown more clearly in Figures 2 and 3.

The rear end of the brace bar section 21 is preferably tubular while the front end of the brace bar section 22 is cylindrical and adapted to telescopically fit within the tubular portion of the section 21.

The sections 21 and 22 are, therefore, adjustable lengthwise of each other for varying the vertical angle of the moldboard about the axis of the pivots 12, the section 22 being provided with a plurality of bolt openings 27 arranged in longitudinally spaced relation and adapted to be brought into registration with a similar bolt opening 27' in the section 21 for receiving a locking pin 28 by which the two sections 21 and 22 may be held in their different positions of adjustment for the purpose of rigidly holding the moldboard in different positions of adjustment, as shown by dotted lines in Figure 3.

The locking pin 28 may be connected by a chain or equivalent attachment 28' to the brace section 21 to prevent loss or misplacement of the locking pin when detached from the brace section.

If necessary, the bracket 26 may be provided with a plurality of bolt openings 25' arranged in longitudinally spaced relation for receiving the bolt 25 and thereby permitting additional lengthwise adjustment of the brace bar and moldboard.

The front end of the brace bar 19 will always be disposed a considerable distance above the hinge bolts 12 for the moldboard to incline rearwardly and downwardly therefrom, to its connection with the frame 1 which latter is also slightly inclined forwardly and downwardly when in use to cooperate with the brace bar in resisting rearward pressure upon the moldboard when the machine is in use for clearing the roadbed from snow and ice.

It will be evident, however, that similar additional brace bars may be employed between the frame and moldboard, if necessary, without departing from the spirit of the invention.

It is obvious that when the frame 1 and its moldboard 2 are adjusted for use and the machine is being propelled forwardly, the greatest resistance of snow, ice and other obstacles will be applied to the lower edge or scraper 15 of the moldboard, thereby tending to rock the front end of the frame 1 downwardly about the points of engagement of the shoes 8 with the pavement as a fulcrum which incidentally tends to raise the rear end of the frame 1 and front end of the truck to which it is attached, and in order to counteract this movement which might result in folding or jack-knifing the frame or moldboard under the front end of the truck, I have provided a limiting means consisting of a chain 29 having one end attached by a bolt 30 to a flange 31 which is welded or otherwise secured to the rear face of the moldboard section 10 near the right hand side thereof, the upper end of said chain being connected to a grab hook (not shown) on the corresponding side of the upper cross bar *e* of the crane B, but similar to the grab hook 32 shown on the left hand side of said cross bar.

It is now clear that any tendency toward undue downward rocking movement of the front end of the plow about the fulcrum engagement of the shoes 8 with the pavement would be resisted by the tightening of the chain 29, thus preventing any possibility of the folding of the plow under the front end of the truck when in use.

Suitable means is provided for raising and lowering the front end of the plow about the axis of the pivotal bolts 4, said means being somewhat similar to that set forth in my pending application referred to in that it comprises a pair of sprocket sheaves 33 journaled upon a suitable gear case 34 on the front end of the forwardly projecting crane bar *f* for receiving a chain 35 which is connected to a grab hook 36, Figure 1.

An additional chain 37 is attached to the upper portion of one of the ribs as 24 above the adjacent end of the brace bar 19 and has its intermediate portion adapted to be engaged with the grab hook 36 so that when the sheaves 33 are rotated in one direction to wind the chain 35 thereon, the grab hook connection 36 with the chain 37 will rock the front end of the frame 1 and moldboard 2 thereon upwardly to any desired angle clear of the pavement while the reverse rotation of the sheaves will cause a corresponding lowering of the front end of the frame and moldboard.

Any suitable means may be provided for rotating the sheaves, but preferably consists of a worm and gear (not shown) within the gear case 34, the worm being adapted to be actuated by a shaft 38 which extends rearwardly to the driver's cab and is provided with suitable hand wheel (not shown) by which may be rotated.

Operation

When the plow is being transported from one place to another, the frame 1 with the moldboard thereon will be rocked upwardly clear of the pavement by the rotation of the shaft 38 and sheaves 33 which, in turn, wind the chain 35 thereon to raise the front end of the plow, it being understood that the engagement of the worm with the gear in the case 34 will hold the plow in its vertically adjusted position about the axis of the pivotal bolts 4.

When it is desired to use the plow for clearing the pavement from snow and ice, it will be lowered by the rotation of the sheaves 33 in the proper direction until the shoes 8 contact with the surface of the road at which time the lower edge of the scraper blade 15 of the moldboard will assume a definite relation to said surface.

If, however, it becomes necessary to vary the height of the scraper blade from the road surface, it may be accomplished by simply removing the locking pin 28 and then adjusting the brace bar sections 21 and 22 lengthwise of each other until the scraper blade is brought to the proper height after which the locking pin 28 may be reinserted in one of the registering holes 27 to hold the moldboard in its adjusted position, it being understood that during this adjustment the moldboard will be moved about the axis of its pivotal bolts 12 entirely independent of the adjusting means for the plow as a whole.

During the plowing operation the shoes 8 ride upon the surface of the pavement, thereby relieving the scraper blade 15 and moldboard together with the supporting frame 1 from excessive wear and strain, it being understood that the scraper blade may be replaced from time to time in case it should become impaired.

The construction shown and described is particularly simple, strong and durable and capable of being economically operated by trucks having conventional stock engines and that the plow may be easily and quickly attached to or detached from the truck by simply removing the pivotal bolts 4, unhooking the grab hook 36 from

the chain 37 and unhooking the grab link 32 from the chain 29.

What I claim is:

In a snow plow attachment for motor vehicles, the combination with the chassis frame of a vehicle, a supplemental frame hinged to the front end of the chassis frame to swing vertically about a horizontal axis and extending forwardly therefrom, ground shoes rigidly secured to the supplemental frame near the front end thereof, a moldboard hinged to the front end of the supplemental frame to swing about an axis diagonal to the longitudinal center line of the chassis in front of the ground shoes, a deflector plate secured to the forwardly projecting end of the moldboard and disposed in a plane substantially parallel with the longitudinal center line of the chassis to extend from the lower edge to the upper edge of the moldboard and rearwardly therefrom, a shearing blade secured to the outer face of the deflector plate near the lower edge thereof and projecting forwardly therefrom beyond the line of travel of the adjacent ground shoes, a brace bar having one end pivotally connected to the supplemental frame some distance to the rear of the ground shoes and its other end pivotally connected to the moldboard some distance above said ground shoes, means including a cable attached to the moldboard for rocking the supplemental frame and moldboard thereon vertically about the axis of movement of said supplemental frame, and additional means including a cable having one end connected to the chassis frame some distance above the axis of movement of the supplemental frame and its other end connected to the moldboard between the pivotal connections of the moldboard with the supplemental frame and with the brace bar for preventing undue downward and rearward movement of the supplemental frame.

CARL H. FRUNK.