

May 3, 1938.

E. B. JONES ET AL.

2,116,351

SNOW PLOW

Filed Sept. 11, 1936

2 Sheets-Sheet 1

Fig.1.

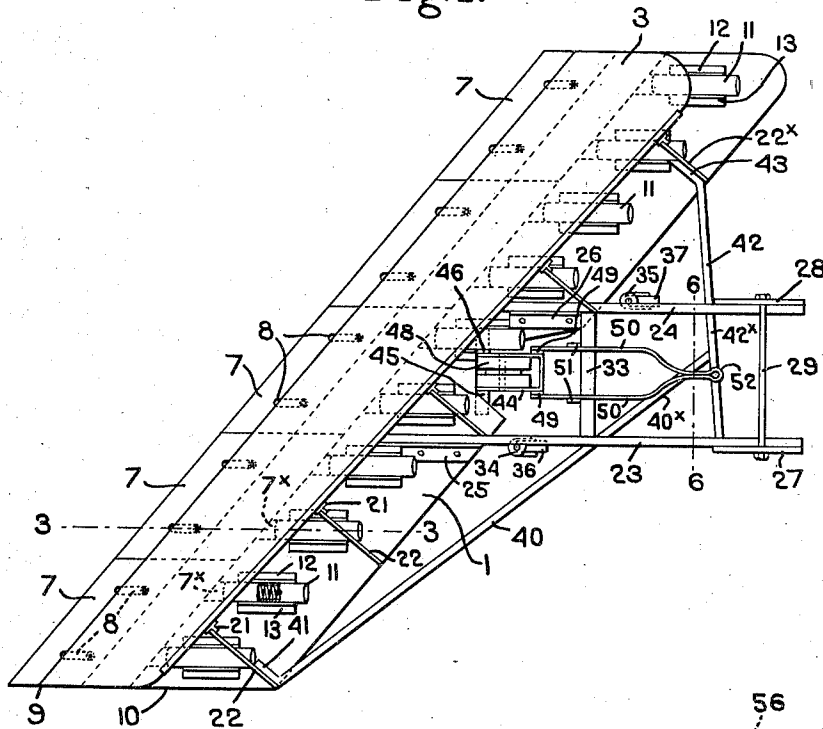
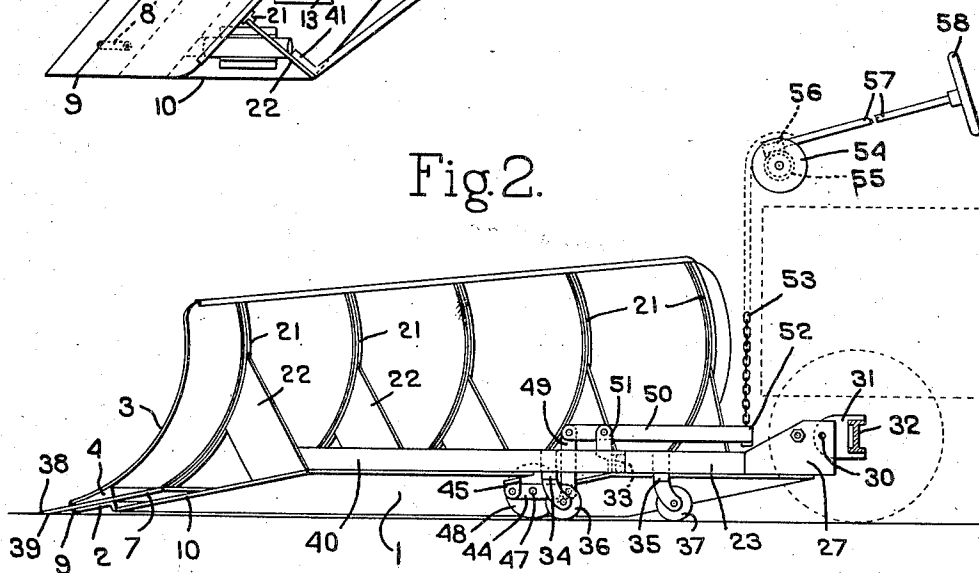


Fig.2.



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2 Sheets-Sheet 2

Fig.3.

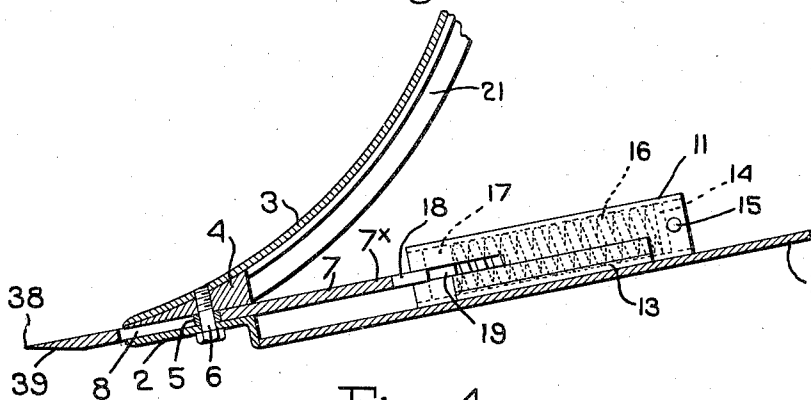


Fig.4.

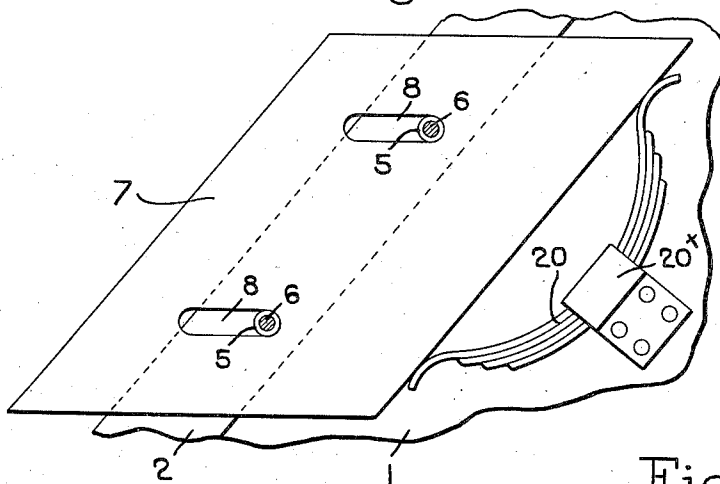


Fig.6.

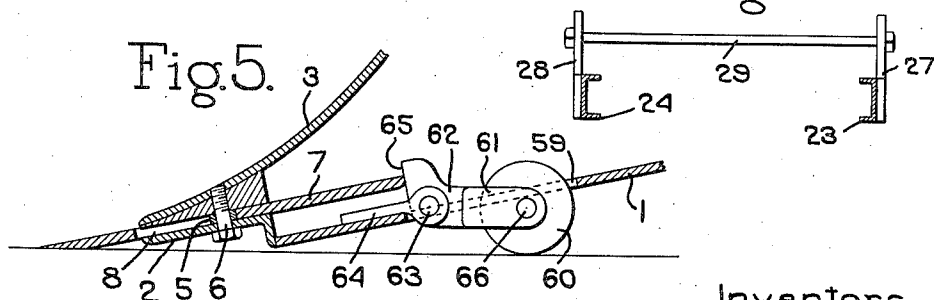


Fig.5.

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UNITED STATES PATENT OFFICE

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SNOW PLOW

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12 Claims. (Cl. 37—42)

This invention relates to improvements in snow
plows and the principal object of the invention
is to provide a snow plow which will be more
efficient in operation and will require less power
of propulsion than snow plows of like capacity
heretofore constructed.

More specifically the invention comprises a
snow plow having a flat base provided with a
sectional cutting blade, the sections of which are
yieldably mounted upon said base and movable
yieldably in parallelism therewith upon engage-
ment with an obstruction, thereby enabling the
section so engaged either to pass over the ob-
struction or by its yielding movement to permit
the weight of material imposed upon the obstruc-
tion to be lifted so that the blade will either dis-
place, cut through the obstruction, or pass over it.

Snow plows as heretofore constructed have
either been provided with a rigid scraping or
plowing edge, or with sectional blades or plows
pivotally connected to the front edge of the mold
board in such manner that when a scraper sec-
tion encountered an obstruction it would swing
beneath the body of the plow, thus raising it until
it had passed over the obstruction and thereupon
be brought back into normal position by a spring
or springs.

The present invention differs from prior con-
structions in that the plow is provided with true
cutting blades which slice through accumulations
of snow or ice and when an obstruction is en-
countered are forced backwardly temporarily
while the forward movement of the plow lifts
the weight upon the obstruction and permits the
obstruction to be displaced, cut through, or to
pass beneath the blade section.

A further object of the invention is to provide
means for supporting the plow in such position
that the cutting blade will be maintained nor-
mally in parallelism with and in proximity to
the surface of the road, in combination with
means for permitting yielding movement of the
blade as aforesaid.

A further object of the invention is to provide
novel means for lifting the snow plow away from
the road surface to any desired height and which
lifting means is controlled conveniently by the
operator driving the motor vehicle to which the
snow plow is attached.

A further object of the invention is to provide
novel mechanism operable by yielding blade sec-
tions to lift the cutting edge of the snow plow
when an obstruction is encountered by said yield-
ing blade section.

These and other objects and features of the

invention will more fully appear from the follow-
ing description and the accompanying drawings
and will be particularly pointed out in the claims.

A preferred embodiment of the invention is
illustrated in the drawings, in which,

Fig. 1 is a plan view of a snow plow adapted
to be attached to the front end of a motor ve-
hicle, the term "motor vehicle" being employed
to define any kind of a propelling mechanism,
such as a motor truck, an automobile, a tractor,
or the like;

Fig. 2 is a side elevation of the construction
illustrated in Fig. 1;

Fig. 3 is a vertical detail sectional view on lines
3—3 Fig. 1, illustrating the manner in which the
yielding blade is slidably mounted between the
base and the mold board, and a spring housing
and spring maintaining the cutting blade in nor-
mal cutting position;

Fig. 4 is a fragmentary detail view showing
the different form of spring mechanism for hold-
ing the cutting blade section in normal position;

Fig. 5 is a vertical sectional view illustrating
a different form of yieldable mechanism for main-
taining the cutting blade in normal position, but
which upon the yielding movement of a blade
section when an obstruction is encountered raises
the front end of the plow to enable it to pass over
the obstruction; and,

Fig. 6 is a sectional view of the supporting
frame on lines 6—6 Fig. 1, viewed from the left
toward the right.

The snow plow embodying a preferred form of
the invention illustrated in the drawings com-
prises a base 1 preferably in the form of a flat
steel plate which is so mounted upon the frame,
to be hereinafter described, as to be slightly in-
clined to the road surface, and which has an up-
wardly offset front edge portion 2 lying in a plane
substantially parallel to the plane of the base
plate 1. A mold board 3, preferably of the usual
concavely curved type, is secured to the base
plate 1 in such manner that its forward edge is
coincident with the forward edge of the base
plate. Desirably a wedge-shaped filler 4 having
a concaved upper surface complementary to the
front portion of the mold board is interposed
between the mold board and the front portion
of the base plate in substantially tangential rela-
tion to the lower edge portion of the concavely
curved mold board, but is separated therefrom
by spacing collars 5 through which bolts 6 extend
and serve to clamp the base plate, the filler and
the mold board firmly together.

The plow thus constructed is provided with a

cutting blade formed of like sections 7 each of which is provided with parallel slots 8 which slidably fit upon the collars 5 which surround the bolts 6. Desirably each of the cutting blade sections is provided with at least two of such slots 5 which in cooperation with the collars 5 form guides for the cutting blade. Yieldable means are provided for maintaining the cutting blades in normally extended position so that the collars 10 5 engage the rear ends of the slots, as illustrated in Figs. 1 and 3.

Desirably the base plate 1 is in the general form of a parallelogram which retreats from a leading acute angle 9 and the sections of the blades are in the form of parallelograms having front and rear edges parallel to the front edge of the base plate and extending therebeyond and closely abutting ends in parallelism with the forward side edge 10 of the base plate 1, thereby presenting blades which, when the plow is moved forward, will produce a shearing cut upon the snow, ice or material being displaced.

Any suitable means may be provided for maintaining the cutting blades in forwardly extended position. In the preferred construction illustrated in Figs. 1 and 3 tubular spring housings 11 are rigidly secured to the upper face of the base plate 1 preferably by angle irons 12 and 13 engaging the sides of the tubular housing 11 and welded to the housing and to the base plate 1. The rear end of each housing 11 is closed by a plug 14 or like device which may be held in place by a pin 15 extending through the housing and plug. A coiled spring 16 is mounted in the housing and abuts at its rear end against the plug 14 and at its front end against a plunger 17 having a cross plate or fin 18 slidably mounted in diametrically opposite slots 19 in the tubular housing 11. The plate or fin 18 abuts against an extension 7x of the blade section, the rear end of said extension being at right angles to the axis of the spring housing, thereby enabling pressure to be applied by the spring in the direction of the longitudinal axis of the slot 8. By reason of this construction any blade section which engages an obstruction during the forward movement of the plow may be forced back in parallelism with the base plate 1, so that its edge will be raised upwardly relatively to the road surface, thereby applying to the obstruction a force tending to lift it upwardly and also a force tending to move it sidewise by virtue of the inclination of the edge of the blade relatively to the direction of movement of the plow. This yielding movement of the blade also enables the blade section and mold board to lift the material superimposed upon the obstruction so that the obstruction may be moved, cut through or passed over by the yielding blade section.

An alternative form of spring mechanism for maintaining the blade section in normal position, while permitting it to yield in parallelism with the base plate upon engagement with an obstruction, is illustrated in Fig. 4. In this construction the blade section 7 is mounted in the manner heretofore described and illustrated in Fig. 3, but is held in extended position by a leaf spring 20 mounted centrally in a suitable bracket 20x riveted or welded to the base plate 1. The ends of the long leaf of the leaf spring engage the rear edge of the blade 7 and normally hold it in extended position, but permit the blade to yield in the manner heretofore described when an obstruction is encountered.

Desirably the mold board is provided at suit-

able intervals with reenforcing means, such as angle irons 21 complementary to the rear face of the mold board and secured thereto preferably by welding. The structure desirably is further strengthened by struts in the form of plates 22, 5 the upper ends of which are secured to the rearwardly projecting flanges of the ribs 21 and the lower ends preferably secured to the base plate 1 by welding.

The plow structure thus assembled is supported 10 upon a suitable frame which is adapted to be attached to the chassis of a motor vehicle. In the preferred construction the frame comprises a pair of structural bars, preferably channel bars 23 and 24, the front ends of which are secured by angle 15 irons 25 and 26 to the base plate 1. The rear ends of said channel bars desirably have wider plates 27 and 28 secured to them and extending upwardly above them, the plates 27 and 28 being connected by a shouldered bolt 23. The plates 20 27 and 28 are adapted to be mounted upon a rod or bolt 30 which is mounted in brackets 31 secured to the front axle 32 of the motor vehicle which is conventionally illustrated in dotted lines in Fig. 2.

The cross girder 33 connects the channel bars 23 and 24 together in proximity to the connection 26 between the channel bar 24 and the base plate 21. The channel bars 23 and 24 are provided respectively with brackets 34 and 35 in 30 which are journaled the stems of casters 36 and 37. The casters and their supports are of such height that they will, in cooperation with the pivotal connection of the channel bars 23 and 24 with the axle of the motor vehicle, maintain the cutting blade normally in close proximity to the surface of the road, so that as the snow plow is moved forwardly the blades will shear the snow and ice closely to the road surface and as the snow plow is moved forwardly will cause the accumulated mass to ride upwardly and rearwardly on the mold board, so that the latter will deliver it at the side of the road.

The cutting blade sections 7 are so constructed that their cutting edges 38 will lie in the plane of the flat upper surface of the blade and the beveled surface 39 of the edge will be in approximate parallelism with the surface of the road. By reason of this construction such engagement as may occur between the cutting blade and the road surface will serve to sharpen rather than dull the cutting edge of the blade section.

The frame desirably is provided with suitable braces, such for example as a brace 40 of structural iron having a bent end portion 41 preferably secured by welding to the base 1 and forward end strut 22 and welded at its opposite end to the channel bar 23, and a brace 42 connected and welded to the channel bar 24 and having a laterally bent end 43 welded to the base 1 and to the last strut 22x which connects the mold board to the base plate 1, with braces 40x and 42x interposed between the channel bars 23 and 24.

Means are also provided for lifting the plow 65 away from the road surface to any desired height thereby enabling the plow to cut through the snow and ice at a somewhat higher level than that normally accomplished when the plow is supported upon the casters 36 and 37, or to be raised to a greater height when the plow is to be transported from one place to another.

In the preferred construction illustrated herein a supplementary lifting frame 44 is pivotally connected at its front end to brackets 45 and 75

46 which are fixedly secured to the base plate 1 or to a suitable frame member. The axle 47 of a wheel 48, which is journaled in the wheel frame 44, is adapted to rest upon the road surface. The rear end of the lifting frame 44 is connected by links 49 to parallel members 50 of an actuating lever which is fulcrumed upon suitable brackets 51 secured to and extending upwardly from the cross girder 33 of the frame.

Any suitable means may be provided for operating the actuating lever 50. In the preferred construction illustrated the rear end of the members of the actuating lever 50, which converge together and are provided with an eye 52, are operated through a chain 53 which extends upwardly over a suitable winch 54 which may be mounted in the front portion of the motor driven vehicle and rotated in any suitable manner.

In the preferred construction the shaft of the winch 54 is provided with a worm gear 55 which is actuated by a worm 56 having a shaft 57 provided with a wheel 58 which is located in a convenient position to be operated by the driver of the motor driven vehicle.

In the operation of the snow plow elevating mechanism the shaft 47 of the wheel 48 serves as a fulcrum for the wheel frame 44, so that as the winch is operated to raise the rear end of the actuating lever 50 the links 49 will be depressed, thereby forcing down the end of the lifting frame to which the links 49 are connected and consequently raising the forward end of the wheel frame and the base plate to which it is pivoted. By reason of the leverage provided by this compound lever mechanism and the winch, the plow can be readily raised bodily from its normal position with respect to the road surface as the plow will be swung upwardly about its pivotal connection 30 to the brackets upon the front axle of the vehicle.

A modified embodiment of the invention is illustrated in Fig. 5 in which the yielding movement of one or more of the sections of the blades upon encountering an obstruction will raise the front end of the plow and its cutters relatively to the road surface. In this construction slots 59 are provided in the base plate 1 of sufficient width to permit the passage of a lifting wheel 60 and its bracket through the slot. The wheel is provided with a forked bracket 61 an extension 62 of which is pivotally mounted upon a shaft 63 in a bracket 64 which is welded to the base plate 1. The extension 62 of the wheel bracket 61 projects upwardly and is provided with a flat forward face 65 normally engaging the rear edge of the cutting blade section 7 which is slidably mounted between the offset forward portion of the base plate 1 and the mold board in the manner above described. When the cutting blade section engages an obstruction it will be forced rearwardly so that its rear edge, acting upon the vertical face 65 of the extension 62, will force the same rearwardly, thereby causing the wheel-supported bracket to act as a lever having as a fulcrum the shaft 66 and acting through the pivotal connection 63 to the base plate to lift the plow sufficiently to displace the obstruction, or cut through or pass over it.

By reason of the construction above described a snow plow is provided in which the blade sections have a true cutting action as distinguished from a scraping action. As a consequence, the snow plow may be propelled forwardly by a motor vehicle with less consumption of power than is possible with snow plows of other construc-

tions. By reason of the yieldability of the blades in parallelism with the base plate of the plow, the plow will more easily displace, cut through or pass over obstructions than is possible in usual types of snow plows, thus avoiding to a very great measure the stopping of the plow by reason of obstructions upon the road surface. The adjustment of the plow relatively to the road surface enables it to be conveniently operated over surfaces which have thick accumulations of ice or hard-packed snow, and also enables the snow plow to be transported from place to place without engagement of the blades with the road surface. The mechanism is such that the plow can be conveniently raised and lowered with a minimum effort upon the operator and by reason of the worm and worm gear construction the plow may be set at any desired height without the provision of any special locking mechanism for retaining it in adjusted position.

It will be understood that the particular embodiment of the invention shown and described herein is of an illustrative character and is not restrictive, and that various changes may be made in construction and arrangement of parts within the spirit and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A snow plow comprising a base, a concavely curved mold board fixedly mounted thereon, a cutting blade formed in sections each of which is yieldably mounted upon said base in substantially tangential relation to the curve at the lower end of the mold board and movable in parallelism with said base upon engagement of the blade section with an obstruction, a supporting frame rigidly secured to said base, and means for connecting said frame to a motor vehicle.

2. A snow plow comprising a base, a concavely curved mold board fixedly mounted thereon, a cutting blade formed in sections each of which is yieldably mounted upon said base in substantially tangential relation to the curve at the lower end of the mold board and movable in parallelism with said base upon engagement of the blade section with an obstruction, a supporting frame rigidly secured to said base, means pivotally connecting the rear end of said frame to a motor vehicle, and casters on said frame acting in cooperation with said pivotal connection normally to maintain said cutting blade in close proximity to the road surface.

3. A snow plow comprising a base, a concavely curved mold board fixedly mounted thereon, a cutting blade formed in sections each of which is yieldably mounted upon said base in substantially tangential relation to the curve at the lower end of the mold board and movable in parallelism with said base upon engagement of the blade section with an obstruction, a supporting frame rigidly secured to said base, means pivotally connecting said frame to a motor vehicle, casters on said frame acting in cooperation with said pivotal connection normally to maintain said cutting blade in close proximity to the road surface, a supplementary lifting frame pivotally mounted on said main frame and having ground-engaging wheels and manually operable means for adjusting said lifting frame thereby to adjust the cutting blade relatively to the road surface.

4. A snow plow comprising a frame having a flat base plate slightly inclined to the road sur-

face, a convexedly curved mold board rigidly mounted upon said frame and base plate, a flat cutting blade formed in sections each slidably mounted between the front edge of said mold board and said base plate and extending forwardly in substantially tangential relation to the curve of the lower end of said mold board and movable in parallelism with said base plate, and yieldable means mounted on said base plate engaging each blade section and normally holding the same in forwardly extended position.

5. A snow plow comprising a frame having a flat base plate slightly inclined to the road surface, a convexedly curved mold board rigidly mounted upon said base plate, a flat cutting blade formed in sections each having its cutting edge in the plane of the upper surface of said blade and beveled from said edge in substantial parallelism with the road surface, each of said sections being slidably mounted between the front edge of said mold board and said base plate and extending forwardly in substantially tangential relation to the curve of the lower end of said mold board and movable in parallelism with said base plate, and yieldable means mounted on said base plate engaging each blade section and normally holding the same in forwardly extended position.

6. A snow plow comprising a flat base plate slightly inclined to the road surface having an offset front portion, a mold board mounted upon said front portion with a filler therebetween, struts connected to said mold board and said plate, a flat cutting blade formed in sections each slidably mounted between said filler and the offset portion of said base plate, and yieldable means mounted upon said base plate engaging the rear edge of each blade section normally holding said section in forwardly extended position.

7. A snow plow comprising a flat base plate slightly inclined to the road surface having an offset front portion, a mold board mounted upon said front portion with a filler therebetween, struts connected to said mold board and said plate, a flat cutting blade formed in sections each slidably mounted between said filler and the offset portion of said base plate, and spring housings mounted upon said base plate containing coiled springs engaging the rear edge of each blade section normally holding said section in forwardly extended position.

8. A snow plow comprising a flat base plate in the form of a parallelogram and inclined slightly upwardly from the horizontal plane of a front edge which retreats from a leading acute angle, a mold board mounted on said base plate with its front edge substantially coincident with the front edge of said base plate, a sectional cutting blade comprising a series of flat blades of parallelogram form slidably mounted between adjacent front edges of said mold board and said base and movable in substantial parallelism with said base, and yieldable means normally holding said blade sections in extended position.

9. A snow plow comprising a flat base plate in the form of a parallelogram and inclined slightly upwardly from the horizontal plane of a

front edge which retreats from a leading acute angle, a mold board mounted on said base plate with its front edge substantially coincident with the front edge of said base plate, re-enforcing ribs secured to said mold board at predetermined intervals, bracing struts connecting said ribs to said base plate, a sectional cutting blade comprising a series of flat blades of parallelogram form slidably mounted between adjacent front edges of said mold board and said base and movable in substantial parallelism with said base, and yieldable means normally holding said blade sections in extended position.

10. A snow plow comprising a base plate slightly inclined to the road surface, a cutting blade formed in sections each of which is yieldably mounted upon said base plate and movable in parallelism therewith, a mold board, a supporting frame rigidly secured to said base plate and extending rearwardly therefrom, means pivotally connecting said frame to the chassis of a motor vehicle, a lifting frame pivotally mounted at one end upon said supporting frame and fulcrumed upon the axis of a lifting wheel which engages the road surface, and means for depressing the other end of said lifting frame thereby to raise the plow from its normal position relatively to the road surface.

11. A snow plow comprising a base plate slightly inclined to the road surface, a cutting blade formed in sections each of which is yieldably mounted upon said base plate and movable in parallelism therewith, a mold board, a supporting frame rigidly secured to said base and extending rearwardly therefrom, means pivotally connecting said frame to the chassis of a motor vehicle, a lifting frame pivotally mounted at its forward end upon said supporting frame and fulcrumed upon the axis of a lifting wheel which engages the road surface, an actuating lever fulcrumed upon said frame, a link connecting the forward end of said actuating lever to the rear end of said lifting frame, and means for manipulating said actuating lever to cause the lifting frame to raise or lower said snow plow.

12. A snow plow comprising a base plate slightly inclined to the road surface, a cutting blade formed in sections each of which is yieldably mounted upon said base plate and movable in parallelism therewith, a mold board, a supporting frame rigidly secured to said base and extending rearwardly therefrom, means pivotally connecting said frame to the chassis of a motor vehicle, a lifting lever pivotally mounted upon said base frame and fulcrumed upon the axis of a lifting wheel which engages the road surface, an actuating lever fulcrumed upon said frame, a link connecting the forward end of said actuating lever to said lifting lever, a chain connected to the rear end of said actuating lever and to a windlass mounted upon said motor vehicle, a worm gearing for actuating said windlass, and a manually operable wheel connected to the worm of said worm gear.

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