

March 6, 1928.

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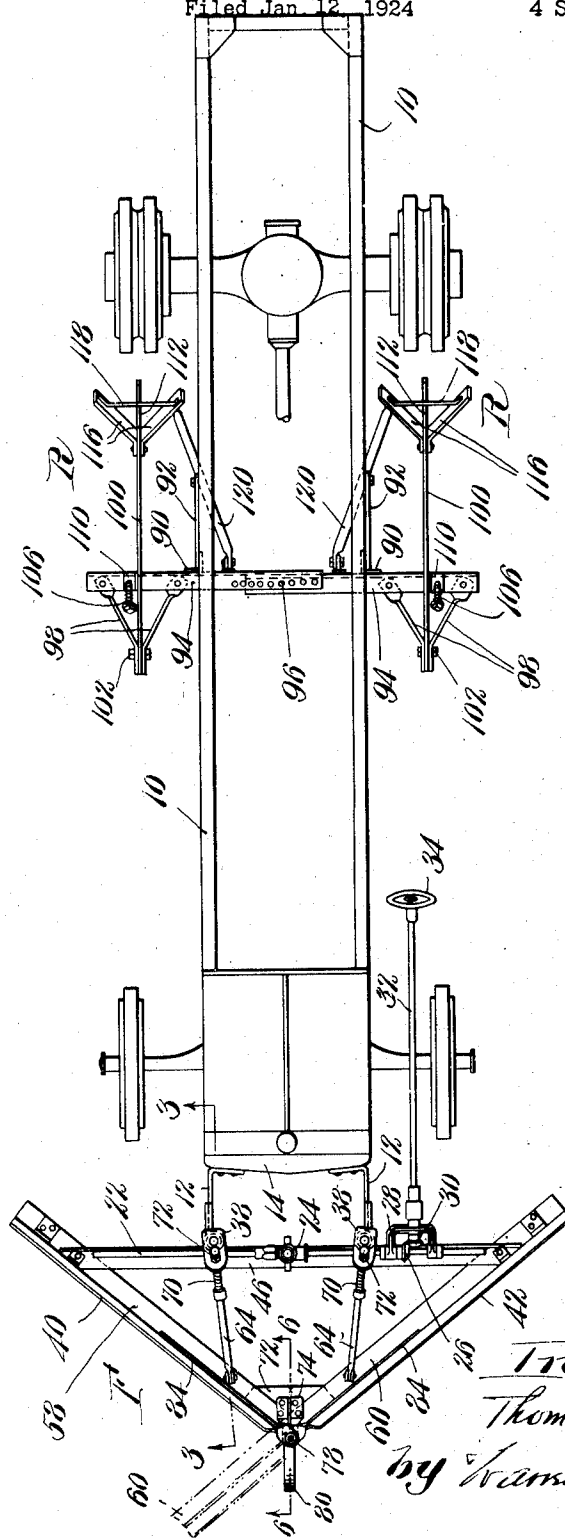
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HIGH SPEED TRACTION SNOWPLOW

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4 Sheets-Sheet 1

Fig. 1.



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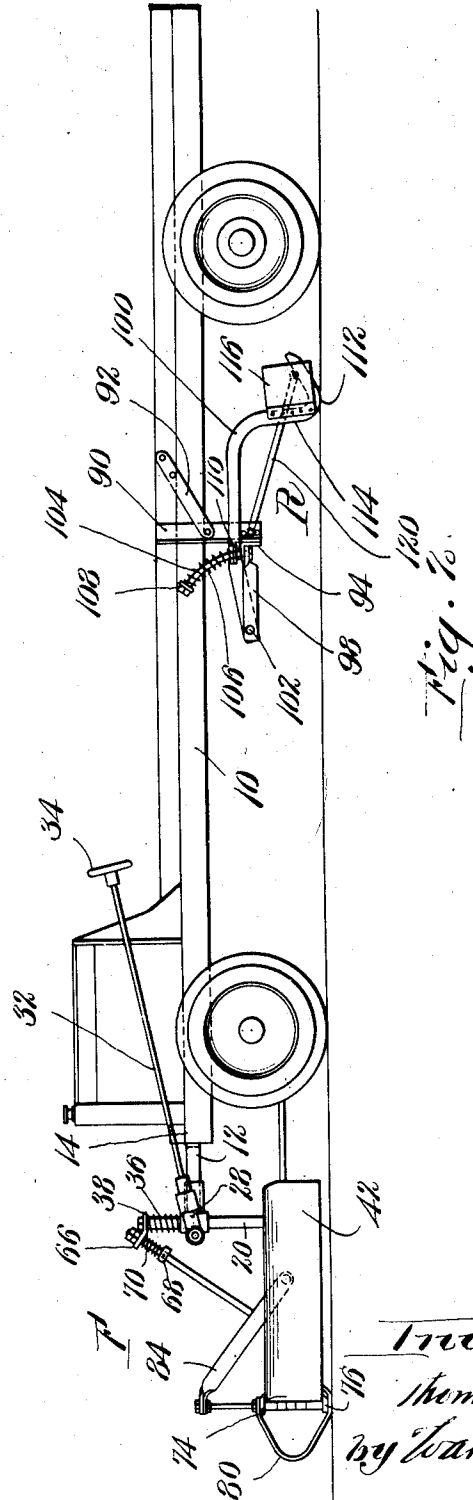
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Fig. 4.

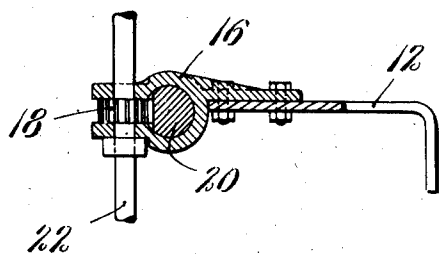
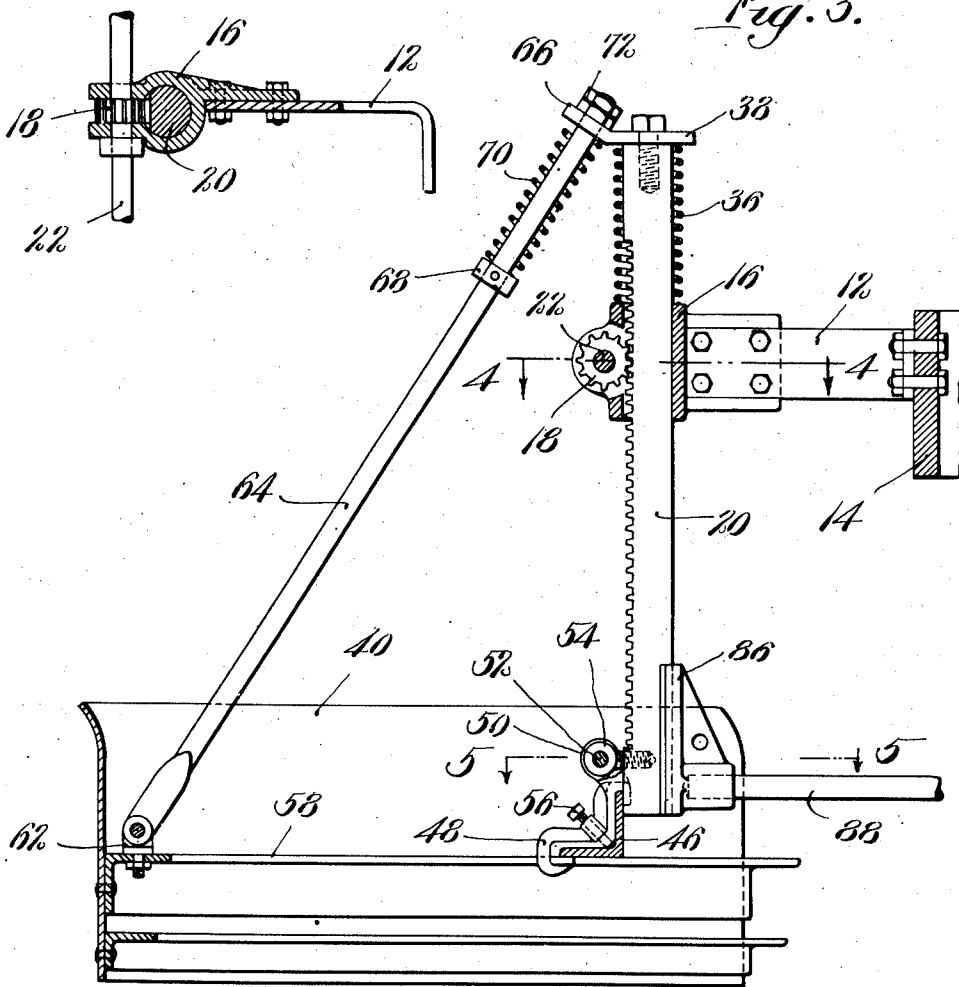


Fig. 3.



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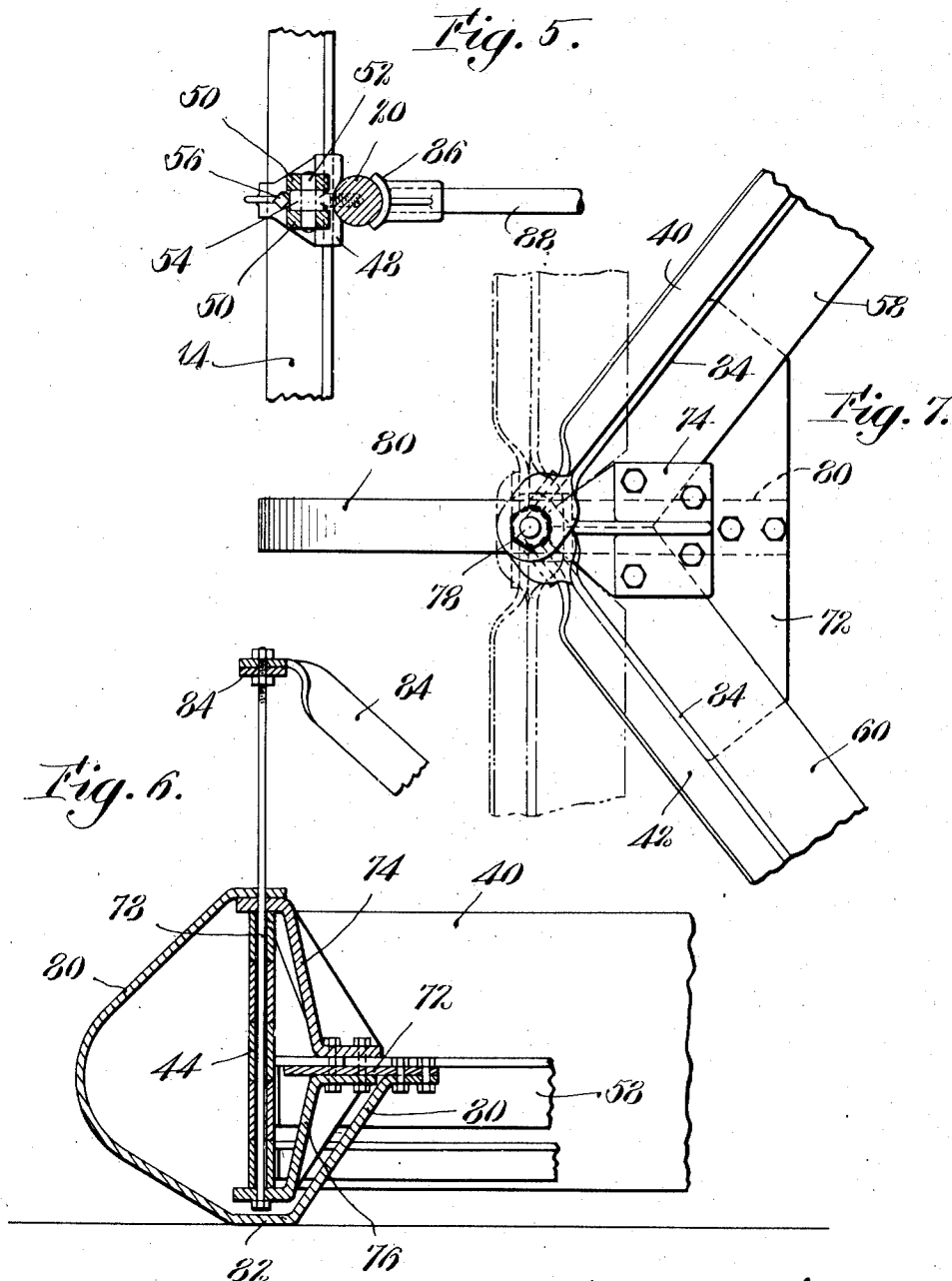
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HIGH SPEED TRACTION SNOWPLOW

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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HIGH-SPEED TRACTION SNOWPLOW.

Application filed January 12, 1924. Serial No. 685,925.

This invention relates to snow plows and more particularly to traction snow plows for use on high speed vehicles, such as motor trucks.

Trucking across the country, from city to city, has now reached such proportions that much profit can be obtained by trucking all the year round. During an open winter season, in latitudes where there is normally a snow-fall in winter, this is feasible with the ordinary equipment used in summer, but in such latitudes, when snow storms are frequent or the climatic conditions are such that the snow remains on the ground, it is always difficult for the trucks to get through to their destination unless provided with special equipment for avoiding the delays that follow from becoming stalled.

While various suggestions for traction snow plows have heretofore been made, so far as I am aware none are commercial. The object of the present invention is to provide a type of snow plow that will clear the snow from the highway, or road, scientifically and yet can be mounted, without strain and without the necessity of increased power, on any type of motor truck.

In carrying out this object, the traction snow plow of the present invention reverses the accepted idea of snow removal, when used as a road clearer, in that the snow is removed in layers from the top, down, after the fall of snow has ceased, instead of starting at the bottom or ground and thus having to travel the same ground over and over during the continuance of the storm. To accomplish this the front of the truck is provided with a snow plow, comparatively light in weight and rapidly adjustable for height, that can also be adjusted to cut through the snow, toss it to one side or the other of the road, or, under such conditions that the snow cannot be thrown to one side, push it straight ahead. It is obvious that my new method is the only feasible method for country work, and for long distances. My invention is not limited in its usefulness to complete road clearing but may be, and preferably is, used by trucks travelling singly to break a way through snow covered roads and provide a traction surface on the hard ground for the rear driving wheels. In accordance with this feature of the invention a separate snow plow is provided forward of each driving wheel, so designed as to cut a "rut" through the snow and thus provide

a traction surface on which the wheels can grip.

To the accomplishment of the object named and such others as may hereinafter appear, as will be obvious to those skilled in the art from the following description, the invention comprises the features and combinations of parts hereinafter described and then particularly set forth in the appended claims.

The preferred form of the invention is illustrated by the accompanying drawings, in which:

Figure 1 shows the chassis of a motor truck, in plan, with my novel front snow clearing plow, and my novel rear rut cutting snow plows mounted thereon;

Fig. 2 shows the parts illustrated by Fig. 1, in side elevation;

Fig. 3 is a detail of the front plow in elevation and partly in cross-section, on the line 3—3 of Fig. 1;

Fig. 4 is a horizontal section of a detail, taken on the line 4—4 of Fig. 3;

Fig. 5 is another horizontal section of a detail, taken on the line 5—5 of Fig. 3;

Fig. 6 is a vertical section through the nose of the front plow, taken on the line 6—6 of Fig. 1; and

Fig. 7 is a plan of the parts shown in Fig. 6 on a larger scale than used for Fig. 1.

In the embodiment of the invention illustrated in the drawings the novel snow plows are shown mounted on the chassis of a Packard motor truck, but it will be understood that the invention may, with slight changes within the skill of the ordinary mechanic, be mounted on any motor truck, and to render the invention universal in this respect various adjustments are provided which will be described in detail hereinafter.

A description will be given first of the construction and function of the front plow, then of the rear plows and finally I will set forth how the two different plows co-operate with each other in clearing a way for the truck through deep snow.

In mounting the front plow, designated generally by F, its entire weight is sustained by the chassis 10, rather than by the front axle of the truck. Accordingly two parallel brackets 12 project horizontally from some portion of the chassis, conveniently from each end of the front bumper 14 and bolted to each bracket is a sleeve 16 (Fig. 3). Each sleeve has a pair of ears at its for-

ward side which house a pinion 18 meshing with teeth on the forward side of a vertical rack bar 20 adapted to slide vertically within each sleeve 16. The ears of the sleeves 16 afford bearings for a horizontal cross shaft 22, on which the two pinions are keyed, and which is considerably longer than the distance between the two rack bars 20, see Fig. 1. The shaft 22 is provided, centrally, with a universal joint 24 the purpose of which will be described later. Outside of one of the rack bars, and more conveniently at the left hand end of the shaft 22, the shaft carries a driving unit best illustrated in Figs. 1 and 2. This is of well known construction and comprises a bevel gear 26 keyed to the shaft 22 and journaled in one of the two bearings of an angularly movable frame 28 which suitably supports a second intermeshing bevel gear 30. Projecting rearward from the bevel gear 30 is a rod 32 carrying a hand wheel 34. As illustrated the rod 32 is outside the engine hood and is of such length that the hand wheel is convenient to the driver when sitting in the cab. It is obvious that the frame 28 may be placed anywhere along the length of the horizontal rod 22 and that the hand-wheel 34 may be located within the cab at either side that may be convenient.

The front plow F is secured to the two ends of the rack bars 20, and the hand wheel 34, and its connections, is used to raise and lower the plow F at the will of the operator. Before describing the manner in which the plow F is mounted it is pointed out that the raising of the plow is assisted by coiled springs 36, one on each rack-bar. Each spring 36 is confined between the upper end of sleeve 16 and the under side of a cap plate 38. These two springs are compressed when plow F is in its lowered position, as shown by Fig. 2, and while not strong enough to lift the weight of the plow, their expansion, as the rack bars 20 move upward when hand wheel 34 is rotated counter clockwise, assists the upward movement. The gearing is designed to impart a six inch plow lift from one turn of the hand wheel. Any convenient form of lock, such as a simple pawl and ratchet, may be provided on the hand wheel 34 to hold the plow F at any desired elevation against the gravitational force of its own weight.

As stated, the front plow F is supported by the vertical rack bars 20 and to this end the two wings 40 and 42 that are connected at their forward ends by a hinge 44 (Fig. 6), are bolted to the ends of a transverse angle iron 46 that is secured to the lower ends of the rack bars. This construction provides a V-shaped front plow for cutting through the snow. It is important that the plow F be so mounted as to be permitted to yield if an obstruction is encountered that cannot

be swept aside. Accordingly the angle iron 46 is connected to the rack bars through hinges, best shown in Figs. 3 and 5. Each hinge comprises a casting 48 having hooked ends to embrace the flanges of the angle iron and a central upper lug 50 presenting two wings, bored to receive a pin 52 which holds an eyebolt 54 therebetween. The eyebolt is threaded into the front side of the rack bar. The castings 48 are slid onto the angle iron from one end, and held in the required transverse position to receive the eyebolt by a set screw 56. The means for securing the angle iron 46 to the plow wings 40 and 42 is by bolting its ends to the rear ends of angle irons 58 and 60 secured to the inner faces of the wings. Toward the forward ends of the braces 58 and 60 are forked lugs 62 (Fig. 3) to each of which is pivotally connected the lower end of an oblique brace 64 the upper end of which slides through a hole formed in an angular extension 66 of the rack bar cap plate 38. Between this plate 66 and a collar 68, fixed on the oblique rod, there is mounted a coiled spring 70. Lock nuts 72 hold the rods 64 in their position shown in Fig. 3 and permit the rods to yieldingly slide upward whenever the nose of the plow is lifted, the springs 70 returning the plow to its normal position when the obstruction is passed.

When the plow is being used in its lowermost position the hand wheel 34 may be left unlocked and then, on encountering an obstruction, the whole plow F may rise on the rack bars, if necessary after having first been tilted upward on its hinges.

The forward ends of the angle irons 58 and 60 are connected by a horizontal brace plate 72 to which are bolted upper and lower castings 74 and 76, flanged and drilled to support the hinge pintle 78 and give rigidity to the forward end of the plow. The plow is also provided with a forwardly extending cutter 80, of the form shown in Figs. 6 and 7, supported at its upper end on the hinge pintle and bolted at its lower and rear end to the brace plate 72. This cutter is flattened at 82 and provides a shoe for supporting the plow in its lowermost position, as well as a protection for the hinge in all positions of the plow. The hinge pintle is extended upward (see Figs. 2 and 6) and secured to its upper end are two diagonal wing braces 84 the lower ends of which are riveted to the plow wings above the angle irons 58 and 60.

Each wing may desirably have an outward flare at its upper edge, as shown in Fig. 2.

Means is provided to prevent tipping of the rack bars 20 during their vertical adjustment and thus maintain their alignment in the sleeves 16. This is necessary in order to prevent binding and permit easy and rapid adjustment. Accordingly a shoe 86

(Figs. 3 and 5) is provided at the rear of each rack bar, having a concaved surface to fit the bar, and firmly braced against rearward movement. The particular manner of bracing is unimportant so long as the rack bars are guided vertically and the rod 88 indicates a portion of this brace which may come from the front axle or any other convenient part of the truck frame. It will be understood that the shoes 86 remain in a fixed vertical position and the lower ends of the rack bars slide thereagainst.

The universal joint 24 centrally of the shaft 22, heretofore mentioned, permits a tipping of the truck chassis while maintaining the front plow F horizontal. There is sufficient play in the sleeves 16 to permit them to slide slightly on the rack bars.

The rear plows R, which cut ruts through the snow to provide a suitable traction surface for the driving wheels of the truck, are both alike and one only will be described. Referring to Figs. 1 and 2 an angle iron 90 depends from the outer side of the chassis frame bar and is braced by a strut 92, as shown. A horizontal angle bar 94 is bolted to the lower end of support 90, and extends inward beneath the truck frame. The two bars 94 overlap each other at 96 and a plurality of bolt holes are provided so that the rear plows may be properly positioned and supported on any truck chassis. Two horizontal braces 98 extend forwardly from the bar 94 and a plow support 100, the form of which is best shown by Fig. 2, is mounted with its forward end between them. A bolt 102 holds these three parts together in a manner to permit pivotal movement of the support 100 relative to the braces 98. Bolted to the cross brace 94, just beside the plow support 100, is an upwardly extending rod 104 curved on an arc of which the pivot bolt 102 is the center. This curved rod carries a coiled spring 106 confined between a collar 108 at the outer end of the rod and a side flange 110 on the support 100 through which flange the rod passes. The plow R may thus rise yieldingly by movement of its support about the pivot 102 if the shoe 112 encounters an obstruction. The rear end of the support 100 has a vertical portion 114 to which the two wings 116 are bolted in a manner to form a V-shaped plow being braced rearwardly by a cross bar 118 (Fig. 2). The plow R is further supported by a radius rod 120 bolted at its rear end to the inner plow wing and pivotally connected at its forward end to the rear side of the cross brace 94. It will be observed that the vertical bar 114 of the plow support forms a powerful cutting edge for breaking through packed or frozen snow. The spring 106 maintains the nose of the plow R down to its work, in like manner to the springs 70 on the front plow F, but provides for in-

stantaneous relief from undue strain. The position of the spring 106 is such that minimum compression results from a considerable lift of the plow. The plows R operate automatically without adjustment or attention on the part of the driver, and if not needed they may be chained up out of operating position. In addition to the adjustment for the width of different types of trucks, provision is also made in the supports 90 for adjustment for height. Attachment and detachment of the plows R is a matter of but a few moments time and their simplicity of construction renders them practically fool proof.

In the use of the invention either the front or rear plows may be used alone or they may be used together, according to the condition of the road to be travelled. Also a series of trucks, equipped with my novel snow plow, may be used to completely clear a road of snow, the first truck taking off a top layer and the succeeding trucks having their front plows adjusted to increasingly lower levels. The plow F may have one of its wings unbolted and then braced in oblique alignment with the other wing, as indicated by dotted lines on Fig. 1, thus throwing the snow to one side of the road; or both wings may be braced to extend horizontally across the road, as indicated by dotted lines on Fig. 3 and the plow used to push the snow against a wall, as when clearing a yard or court. When using both front and rear plows the front plow will be raised to cut deep snow down to a depth of about fourteen inches, and the rear plows can then readily cut a track for the rear truck wheels through snow of such depth. It is obvious that with my novel snow plow attached, a truck can get through any snow fall and can even travel through deep snow at the side of the road, if necessary, to pass a stalled truck not equipped with my invention. My snow plow is designed to first, put the truck through to its destination, and second, to clean the road of snow, thus reversing the present accepted idea of winter travel. My snow plow may be manufactured so as to be light in weight, because it clears snow from the top down, rather than from the bottom up, and this is a great advantage as will be obvious to those skilled in the art.

It will be clear to those skilled in this class of machines and with the general objects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment of the invention being intended as an exploitation of its underlying essentials, the features whereof are definitely stated in their true scope in the claims herewith.

That which is claimed as new, is:—

1. In combination with a motor vehicle, a snow plow frame mounted at the forward

end of the chassis including two vertically slidable plow supporting bars guided in fixed sleeves, a snow plow pivotally connected at its rear portion to the lower ends
5 of said bars permitting the plow to tilt on meeting an obstruction by turning upward on said connection to said bars and then to lift bodily by sliding said bars upward through their sleeves, and means operatively
10 connected to said bars under control from the cab for adjusting the height of the plow at will.

2. In combination with a motor vehicle, a snow plow frame mounted at the forward
15 end of the chassis including two parallel vertical fixed sleeves, a rack-bar slidable in each sleeve, a freely rotatable pinion associated with each sleeve and meshing with the teeth of the rack-bar therein, a snow
20 plow pivotally connected at its rear portion to the lower ends of said rack-bars, and means under control from the cab for rotat-

ing the pinions and thus maintaining the plow at the desired distance from the ground, but permitting the plow to tilt freely on its pivotal connection and automatically to lift bodily on meeting an obstruction. 25

3. In combination with a motor vehicle, a snow plow frame mounted at the forward end of the chassis including two vertically
30 slidable plow supporting bars guided in fixed sleeves, a snow plow pivotally connected at its rear portion to the lower ends of said bars permitting the plow to tilt upward on said connection on meeting an ob- 35 struction and then to lift bodily by sliding said bars upward through their sleeves, means normally tending to maintain the plow in a horizontal position and partially resisting any plow-tilting force, and means
40 normally tending to balance the weight of the plow and assisting any force for lifting the plow bodily.

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