

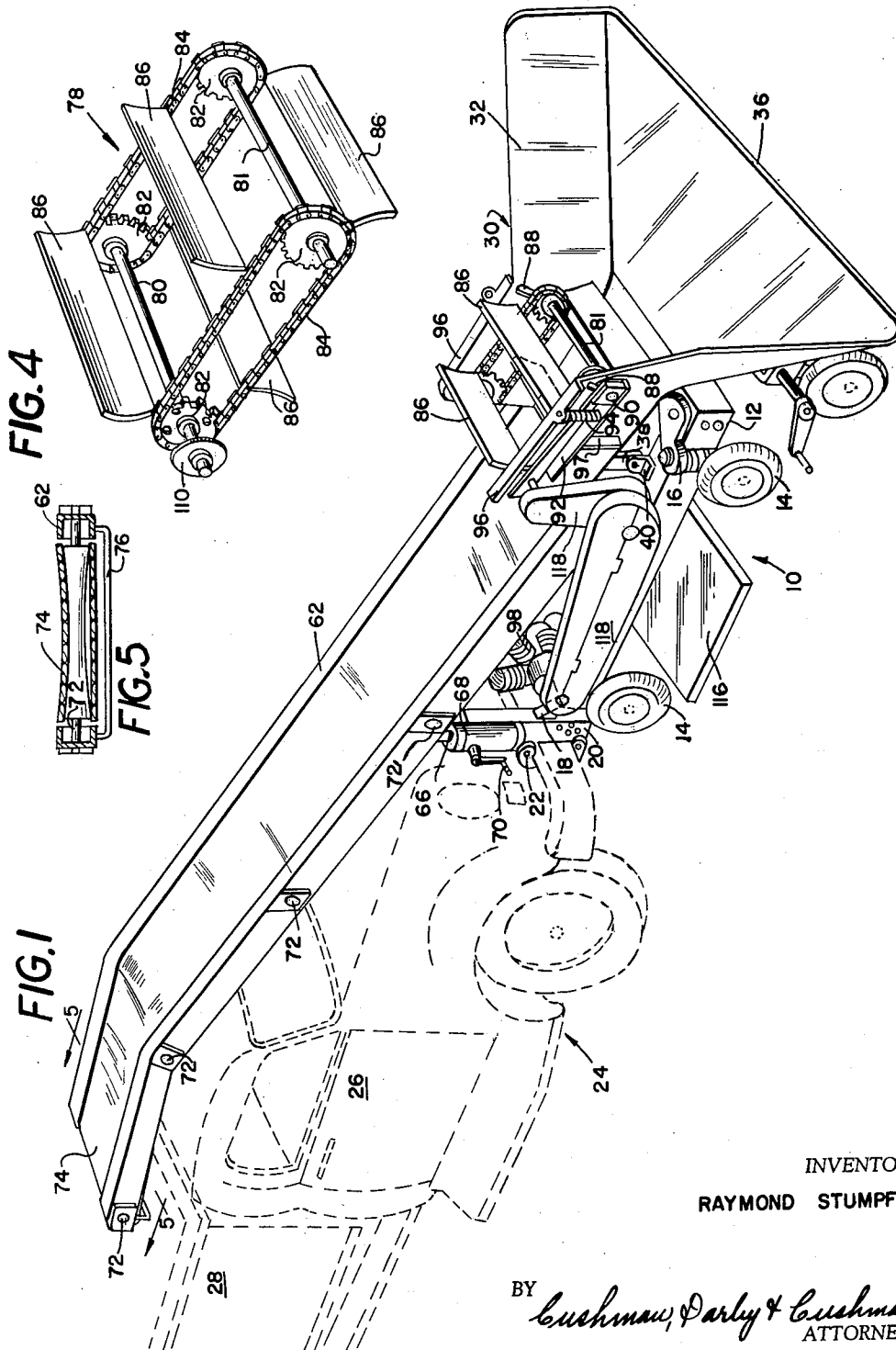
Dec. 5, 1961

R. STUMPF
SNOW REMOVER

3,011,273

Filed Feb. 12, 1960

2 Sheets-Sheet 1



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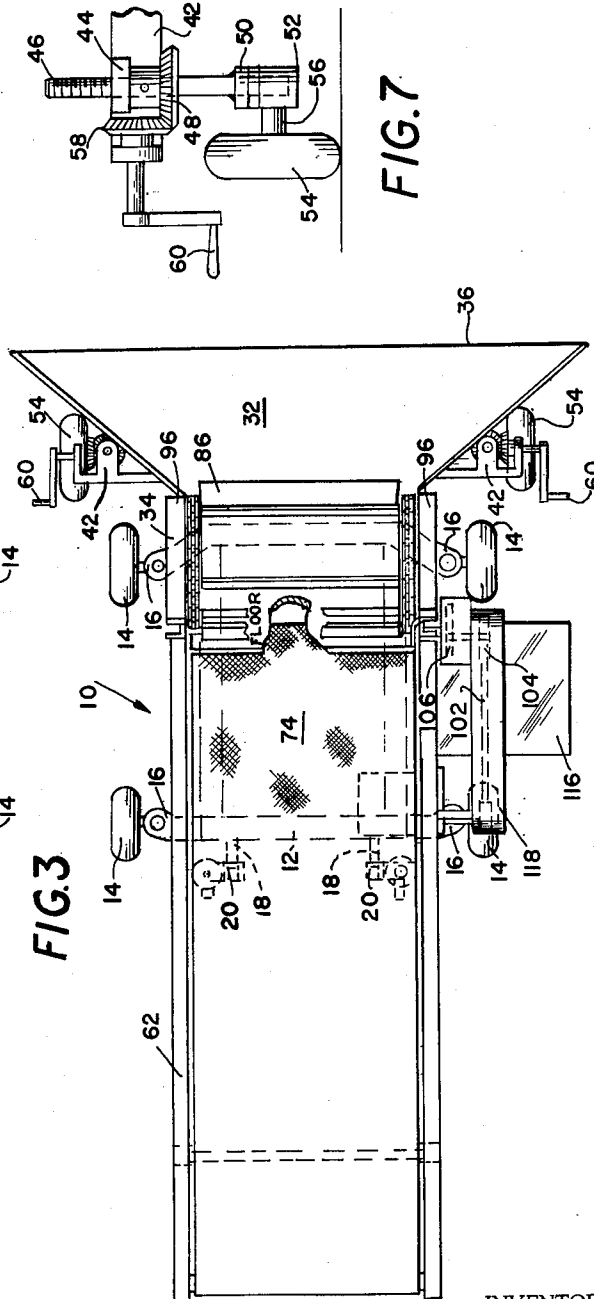
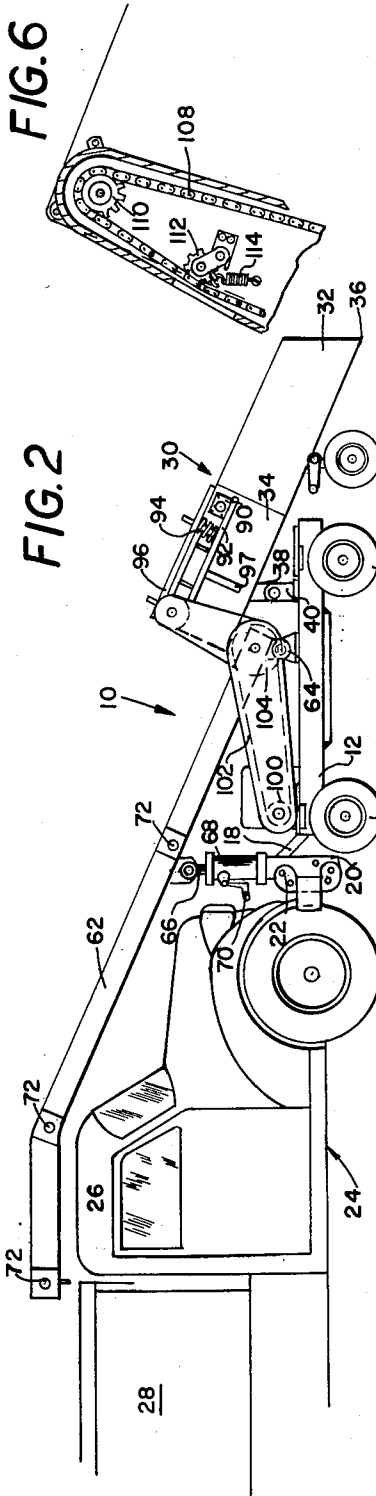
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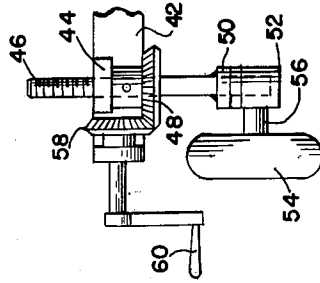
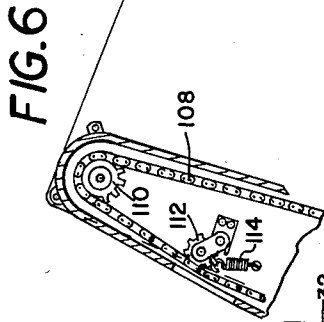
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2 Sheets-Sheet 2



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3,011,273

SNOW REMOVER

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5 Claims. (Cl. 37-45)

This invention pertains to snow removal apparatus and, more particularly, to a device novelly adapted to be utilized with a conventional load-carrying vehicle for the removal of snow from streets, highways, and the like. It is a primary object of the invention to provide a device constituting a compact, unitary assembly which can be readily attached to vehicles of a variety of sizes and shapes to adapt them for snow removal, and which can be easily disassociated from such vehicles when it is desired to utilize them for other purposes.

Another object of this invention is to provide a device of the type described which is highly efficient in operation and which may be quickly and easily adapted to a variety of operating conditions.

Related and more specific objects reside in the provision of a self-supporting snow remover of the type described having adjustable scoop means for removing snow from a street, etc., and adjustable conveying means for transferring the removed snow to the load-carrying body of a vehicle. The compact, self-supporting character of the device and the adjustability of the conveying means permits utilization of the snow remover of the instant invention with vehicles of a variety of sizes, shapes, and capabilities. Adjustability of the snow-removing scoop means of the invention permits optimum operating efficiency of the device to be maintained despite variance in the depth of snow to be removed.

Another object resides in the provision of pusher means associated with the scoop of the device for delivering a substantially constant volume of snow to the conveying means and for insuring against blockage of the scoop by the snow received therein.

A further object is the provision of a snow remover of the type described which can be quickly and easily coupled to and uncoupled from a vehicle by a single person, so that the vehicle can be adapted for snow removal or freed for other usage with a minimum of time and effort.

Still other objects and advantages will be in part evident and in part pointed out hereinafter in the following description of a preferred embodiment of the invention. This description should be read in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of a snow remover according to the invention, attached to a vehicle shown in dotted lines;

FIGURE 2 is a side elevational view of the snow remover and vehicle seen in FIGURE 1;

FIGURE 3 is a top plan view of the snow remover with parts broken away to better illustrate the construction, the vehicle not being shown;

FIGURE 4 is an enlarged perspective view of the pusher means shown in the throat of the scoop in FIGURE 1;

FIGURE 5 is a sectional view of the conveying means, taken along line 5-5 of FIGURE 1;

FIGURE 6 is an enlarged fragmentary view, partly in section, of the pusher drive means, showing the take-up mechanism therefor; and

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FIGURE 7 is an enlarged fragmentary view of the scoop elevating mechanism.

Referring more particularly to the drawings, the snow remover is indicated generally by the numeral 10 and includes a frame 12 supported by four independently-sprung ground-engaging wheels 14. As best seen in FIGURE 1, wheels 14 are mounted upon and spaced from the sides of frame 12 by ears 16, so that they may "track" freely without engaging the sides of the frame.

Secured to one end of frame 12 by means of supports 18 are a pair of upright members 20. Mounted upon each of the members 20 is a clamp 22, which preferably is adjustable to accommodate various size clamped members and which is quickly and easily operable during both coupling and uncoupling. While various types of clamps possess these requisite characteristics, the C clamps shown are satisfactory and, additionally, are relatively inexpensive. When C clamps are utilized, each is pivotally secured at one end to a member 20, and the other end of the clamp and member 20 are provided with a plurality of apertures. By aligning appropriate apertures in the clamp and member 20 and inserting a bolt or pin therethrough, the clamp can be quickly locked in various positions of adjustment.

When snow remover 10 is in operation, clamps 22 secure it rigidly to and forwardly of the front bumper of a conventional load-carrying vehicle, such as is identified generally in FIGURES 1 and 2 by the numeral 24, and which includes the usual load-carrying body 26 and driver's cab 28. When rigidly coupled to the front bumper of vehicle 24 by clamps 22, as shown, it is apparent that frame 12 will be pushed by the vehicle and "track" in response to turning movement therefor. Since frame 12 is supported by wheels 14, no massive vertical forces will be imposed upon the bumper of vehicle 24, and therefore this member need be but of conventional strength. Within reasonable limits, neither are the size or shape of the bumper critical. Bumpers of various widths and curvatures can be accommodated due to the aforementioned adjustability of clamps 22 and the fact that the clamps are offset, by supports 18, from the adjacent end of frame 12.

At the opposite end of snow remover 10 from clamps 22 is a snow-receiving scoop 30 having an outwardly flared portion 32 leading to a relatively narrow throat portion 34. Scoop 30 is connected to frame 12 by lugs 38 extending downwardly from the throat portion of the former and pivotally secured to lugs 40 extending upwardly from the latter. By virtue of this connection, scoop 30 is capable of vertical pivotal movement, but is otherwise restricted to simultaneous movement with frame 12. The outwardly flared portion 32 of scoop 30 overhangs the adjacent end of frame 12 and terminates in a leading edge 36 of a length approximately equal to one-half the width of an average roadway. Secured, as by welding, to the underside of flared portion 32 is a rigid brace 42 having integral threaded collars 44 (see FIGS. 3 and 7) at its opposite ends. Received within each of the collars 44 is a threaded rod 46 provided with a bevel gear 48 and thrust bearing 50. The lower ends of rods 46 are received within bearings 52 which bear against bearings 50 and support free-tracking wheels 54 upon stub axles 56. Bevel gears 48 each mesh with gears 58 which are also mounted upon the brace 42 and are actuated by rotation of cranks 60. It will be apparent that by rotation of the cranks 60, scoop 30 can be pivoted

about lugs 40 and the height of edge 36 above the ground or other surface can be adjusted to meet specific conditions of terrain and/or snowfall.

In addition to its permitting manual adjustment of the height of edge 36, the previously described mounting of scoop 30 also minimizes the possibility of damage to the snow remover which might be occasioned by an abrupt rise in the terrain. By virtue of the previously described arrangement, upon encountering such a rise wheels 54 will cause edge 36 to move upwardly over the same. If scoop 30 is rigidly mounted upon frame 12, however, edge 36 could respond to terrain variations only through leading wheels 14 of frame 12. Such a delayed response might well result in an abrupt encounter between edge 36 and the obstruction, with possible consequential damage to the former or transmittal of shocks therethrough to the frame 12 and vehicle 24.

Also an integral part of snow remover 10 is a conveying mechanism for transporting snow from scoop 30 to the load-carrying body 26 of vehicle 24. This mechanism includes an elongated frame 62 extending longitudinally to frame 12 and upwardly and outwardly from the rear end thereof. At its lower end frame 62 is pivotally secured to lugs 64 which extend upward from frame 12 beneath throat portion 34 of scoop 30. At any suitable point intermediate its length, frame 62 is pivotally connected to piston rods 66 of jack members 68 which are rigidly affixed to frame 12. Jacks 68 may be either manually or power operable; if the former, it is preferred that they be mounted upon upright members 20 for convenient access to their operating cranks 70. It is apparent that the elevation of the upper end of frame 62 can be adjusted by means of jacks 68 to accommodate vehicles of various heights, and it should also be noted that the conveying mechanism in no way engages or is supported by the vehicle 24. This not only permits the snow remover to be utilized with various type vehicles of standard construction, but additionally allows the apparatus to be quickly prepared for and retired from use.

Drivably mounted within frame 62 upon rolls 72 is an endless belt or apron type conveyor 74. As best seen in FIGURE 5, rolls 72 have a concave periphery, causing conveyor 74 to assume a trough-like shape which diminishes the possibility of snow falling off the conveyor while being conducted from scoop 30 to body 26. Mounted upon frame 62 beneath the upper end thereof is a wire or rod 76, which removes any snow from conveyor 74 that might otherwise tend to adhere thereto after belt 74 starts its return course.

It will be apparent that as vehicle 24 moves forwardly, snow received within the flared portion 32 of scoop 30 will be pushed upwardly thereon towards conveyor 74. This is, of course, the desired result. Should the forward speed of vehicle 24 become excessive, however, in view of the depth of the snow being removed and elevation of edge 36, the snow may either be deposited in excessive amounts upon conveyor belt 74 or become lodged within the relatively narrow throat portion 34 of scoop 30. To obviate these undesirable possibilities and to assure that only a proper quantity of snow is loaded upon belt 74, pusher means 78 are provided in throat portion 34. As best seen in FIGURE 4, pusher means 78 comprises shafts 80, 81 having sprockets 82 mounted thereon. Passing about the sprockets 82 are chains 84, between which are mounted a plurality of curved snow-engaging blades 86.

Shafts 80, 81 are mounted in throat portion 34 a suitable distance above the floor thereof so that the lowermost flight of blades 88 will engage the snow and urge an optimum quantity toward conveyor 74. It will be noted that the leading shaft 81 extends through vertical slots 88 in the walls of throat portion 34. The outer ends of shaft 81 are journaled within bearings 90, one of which may be seen in FIGURES 1 and 2. Bearings 90 are secured to arms 92 which are mounted against the walls of throat portion 34 so as to pivot about shaft 80.

Springs 94 act between the arms 92 and horizontally extending flanges 96 upon throat 34, tending to maintain shaft 81 in a downward position. Vertical flanges 97 limit this downward movement of shaft 81 so as to prohibit its engagement with the bottoms of slots 88.

The described arrangement successfully assures that a substantially constant volume of snow will be moved through throat portion 34 of scoop 30, even if the quantity of snow within flared portion 32 is temporarily excessive. As blades 86 engage such excess snow, they will urge shaft 81 upwardly against the influence of springs 94, while continuing to deliver snow to conveyor 74 and preventing blockage of throat 34. And as the excessive snow is gradually removed, springs 94 will return shaft 81 and blades 86 to normal operating position. In the meantime, and if necessary, the amount of snow entering flared portion 32 can be corrected. This will usually be by varying the speed of vehicle 24 but, as discussed heretofore, can also be effected by adjusting the height of edge 36.

A motor 98 suitable to drive both conveyor 74 and pusher 73 is mounted upon frame 12 so that the snow remover is in no way dependent upon vehicle 24 for power to operate these members. If power-operated jacks are desired, rather than the manually operable jacks 68 shown, they may conveniently also be driven by motor 98. The drive for conveyor 74 includes motor 98, sprocket 100, chain 102, and sprocket 104; the drive for pusher 78 additionally includes sprocket 106, chain 108, and sprocket 110. As seen in FIGURE 6, an idler sprocket 112 is mounted upon scoop 30 and biased by spring 114 so as to bear against chain 108. This effectively prevents chain 108 from becoming slack, as might otherwise occur due to pivotal movement of scoop 30.

Extending outwardly from one side of frame 12 is a platform 116. While it is not contemplated or necessary for an operator to be stationed upon snow remover 10 during its operation, platform 116 provides a convenient station upon which an operator might stand while making various adjustments to the device. To eliminate the possibility of accidental injury to an operator so stationed, chains 102, 108 are surrounded by detachable shields 118.

It will thus be seen that there has been provided by this invention a snow remover possessing the objects and advantages hereinbefore noted. Since variations and modifications may be made in practicing the invention as described in specific detail herein, without departing from its spirit and scope, it is to be understood that the invention is not too limited by the foregoing description, but only in accordance with the appended claims.

What is claimed is:

1. A snow remover for attachment to the front of a conventional vehicle having a cab, a front bumper, and a load carrying body rearwardly of the cab, comprising: a frame; a plurality of independently-sprung, free tracking, ground-engaging wheels supporting said frame forwardly of the vehicle; scoop means pivotally mounted to said frame and extending forwardly thereof, said scoop means having an outwardly flared portion terminating at its forward end in an edge adjacent the ground and leading at its other end to a relatively narrow throat portion; conveyor means on said frame extending from the region of said throat portion rearwardly to the load-carrying body of said vehicle; said frame means carrying means for detachably coupling the same to the front bumper of the vehicle; jack means operatively carried by said frame means and connected to said conveyor means to provide vertical adjustment thereof; engine means on said frame; and means drivingly connecting said engine means to said conveyor means so that snow deposited thereupon from said scoop is conveyed to the load-carrying body of the vehicle.

2. Snow remover defined in claim 1 including independently-sprung wheels carried adjacent the leading edge of

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said scoop, and means for adjusting the vertical position of said scoop with respect to said last-mentioned wheels.

3. Snow remover defined in claim 1 wherein said means for connecting said frame to the vehicle includes a C-clamp for connection to the front bumper of the vehicle; said jack means is operatively connected thereto in vertical relationship, and said conveyor means is pivotally connected at its underside to the upper end of said jack means. 5

4. Snow remover defined in claim 1 including pusher means mounted in the throat portion of said scoop for urging snow rearwardly from said scoop to said conveyor means, and means for driving said pusher means from said engine means. 10

5. Snow remover defined in claim 4 including spring 15

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means operatively connected to the forward end of said pusher means for urging the same downwardly toward said throat portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,148,954	Carr	Aug. 3, 1915
1,398,454	Daniels	Nov. 29, 1921
1,666,358	Souhigian	Apr. 17, 1928
2,116,945	Hitchens	May 10, 1938
2,587,719	Fratini	Mar. 4, 1952
2,729,002	Hedgecock	Jan. 3, 1956
2,885,069	Bowen	May 5, 1959