

March 28, 1967

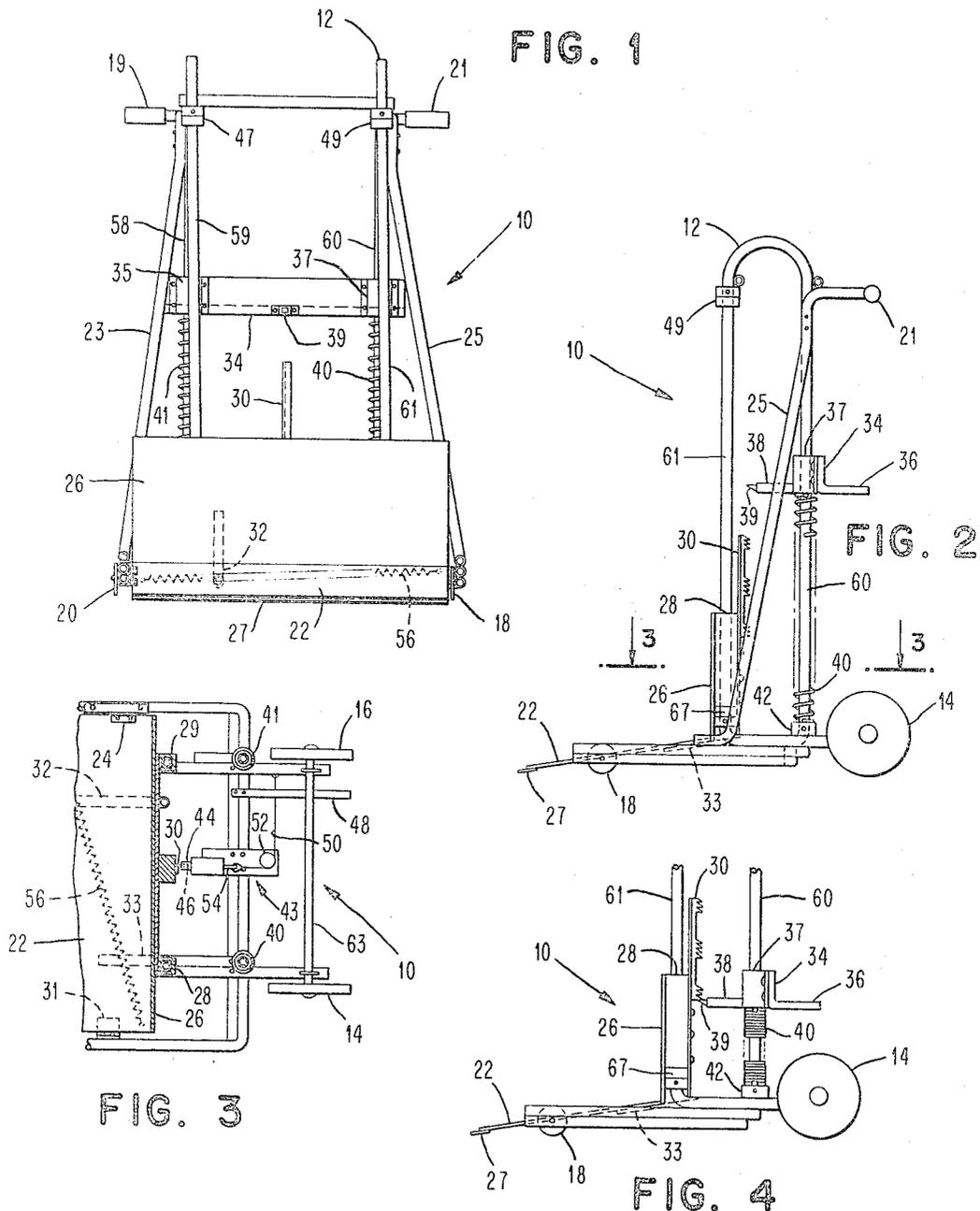
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3,310,891

SNOW REMOVER

Filed Feb. 17, 1964

2 Sheets-Sheet 1



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FIG. 5

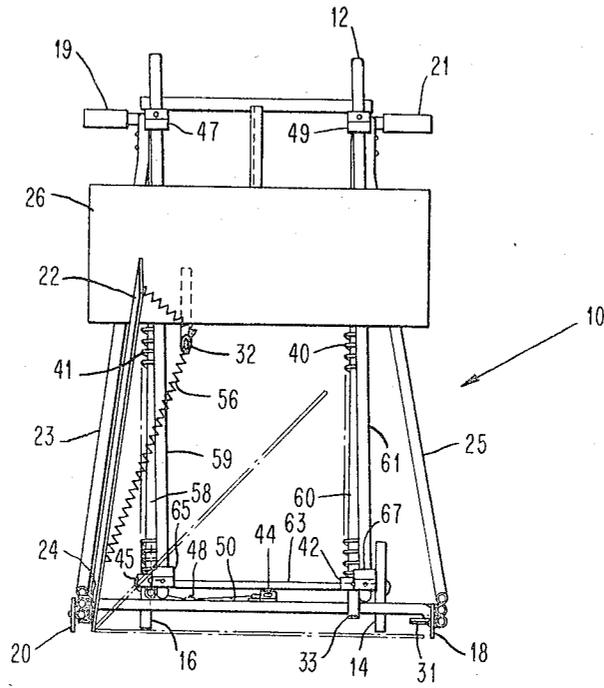
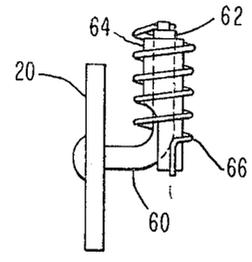


FIG. 6



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SNOW REMOVER

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Filed Feb. 17, 1964, Ser. No. 345,174
8 Claims. (Cl. 37-53)

This invention relates to devices for removing snow, and more particularly to such devices for removing snow rapidly with a minimum amount of physical effort on the part of the user.

Snow removing devices have taken many and varied forms ranging from an ordinary shovel to gasoline driven and other automatic devices. In the main, the use of ordinary shovels by individuals requires bending, stooping and lifting, with the physical exertion often resulting in heart trouble for those not accustomed to physical labor, especially for those in the middle age and older groups. On the other hand, the automatic snow removing devices are generally too expensive for the average homeowner because of the initial expense, expense of operation and expense of maintenance.

It is an object of this invention to provide a novel snow remover for removing snow.

It is still a further object of this invention to provide a device for removing snow without requiring bending or lifting on the part of the user.

It is still a further object of this invention to provide a device for lifting and throwing snow wherein the user supplies the total energy for the operation of the device.

It is still a further object of this invention to provide a snow remover which will remove snow quickly without the need for electric or gasoline driven motors.

It is still a further object of this invention to provide a snow remover device which may be manufactured economically and which may be maintained with a minimum amount of care or expense by the owner.

It is still a further object of this invention to provide a snow remover which is relatively safe for the user.

In accordance with the present invention, a device for removing snow is provided. A scoop or tray for receiving snow is movably attached to a main body and normally disposed close to ground level. The tray is locked in a lowered position as an operator actuates biasing means which tends to cause the tray to be moved away from ground level to a tilted position. Additional means are provided to release the locking means to permit the applied bias to cause the tray to be suddenly tilted thereby causing any snow accumulated on the tray to be discharged out of the path of the device. The tray then returns to its normal lowered position.

Other objects and advantages of the present invention will be apparent and suggest themselves to those skilled in the art, from a reading of the following specification and claims, in conjunction with the accompanying drawing, in which:

FIGURE 1 is a front view of one embodiment of a snow removing device, in accordance with the present invention;

FIGURE 2 is a side view of the snow removing device illustrated in FIGURE 1;

FIGURE 3 is a partial top view of the snow removing device taken along lines 3-3 of FIGURE 2;

FIGURE 4 is a partial side view of the snow removing device in a different operating position than that illustrated in FIGURE 2;

FIGURE 5 is a front view of the snow removing device of the present invention illustrating the device during operation, and

FIGURE 6 illustrates a modification which may be in-

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corporated into the snow removing device of the present invention.

Referring to FIGURES 1 to 5 of the drawing, a snow removing device 10 includes a main body 12 having two main tubular portions bent at appropriate angles to receive the various other mechanical parts and connectors of the snow removing device. A pair of back wheels 14 and 16 and a pair of smaller front wheels 18 and 20 are suitably mounted by well known means to the main body. The snow removing device is adapted to be moved forward by an operator by means of handles 19 and 21. The handles are integrally connected to rods 23 and 25, respectively. The ends of the rods are suitably mounted to bottom portions of the main body.

A tray or scoop 22 is normally disposed close to ground level to receive snow thereon when the snow removing device is pushed along a snow path by an operator. A wear element 27, which may be a steel strip, for example, is connected along the edge of the tray 22. The tray 22 is held to the main body by means of a hinge 24 or other suitable means to permit it to be angularly moved to a tilted position, as will be described. A backboard or plate 26, which may be plywood, metal or other suitable material, is securely mounted to a pair of slide elements 28 and 29 adapted to surround and to slide up and down the front tubular portions 59 and 61 of the main body. Under appropriate conditions, to be described, the slide elements 28 and 29 move up the tubular portions of the main body to cause corresponding movements of their various associated parts.

A toothed rack 30 is securely attached to the rear of the backboard 26. A rod element 32 is attached to the backboard 26 by suitable means and extends outwardly under the tray 22 to help to hold the tray and to lift the tray to a tilted position when desired. Thus it is seen that the backboard 26, the slide elements 28 and 29, the rack 30 and the extending rod 32 are all in fixed relationship with respect to each other and are disposed to be moved as a single unit. The rod 32 extending beneath the tray 22 and in physical contact therewith is disposed to lift the tray 22 to a tilted position about the hinge 24 when the rod 32 is lifted. Additional means for supporting the tray 22 when it is in a lowered position include an element 31 mounted to the main body beneath the tray and a flattened extended section 33 forming an integral part of the portion 60.

A movable element 34 is slidably mounted to the rear tubular portions of the main body 12 on a pair of slidable elements 35 and 37 which also act as spring retainers. The elements 35 and 37 may be "Teflon" or other suitable material. The element 34 includes a flat foot receiving pedal or lever portion 36 disposed towards the rear of the snow removing device so that it faces an operator during operation and is adapted to receive foot pressure. A rack engaging element 38, including a spring loaded latch 39, is disposed to engage the teeth of the rack 30 when the movable element 34 is lowered.

A pair of expansion springs 40 and 41 are disposed about the rear tubular portions 58 and 60 of the main body 12 between the movable element 34 and end elements 42 and 45. FIGURE 2 illustrates the spring 40 in an expanded position to maintain the movable element 34 in an up position. FIGURE 4 illustrates the spring 40 in a compressed or biased condition with the movable element 34 being in a down position.

The tray 22, the backboard 26, the slide element 28 and the rod 32 are normally locked to lowered position by means of a lock mechanism 43 including a spring loaded latch 44 normally biased towards its outward position to engage a latch receiving element 46 which is fixedly secured to the rear of the backboard 26. The locking mechanism 43 is adapted to be opened by means of the

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operation of a foot pedal 48 having a flexible cord or latch string 50 attached thereto. The cord 50 is disposed around a wheel 52 and connected to the handle 54 of the locking mechanism. When the operator pushes the foot pedal 48, the latch 44 is moved out of locking position from the element 46. The purpose of the locking mechanism 42 will be hereinafter described.

In operation, the tray 22 is normally locked to a lowered position close to ground level. As the operator pushes the device 10 forward into a snow pile, snow is accumulated on the tray 22. The rods 23 and 25 being connected to the handles 19 and 21 cause a downward force against the main body to prevent it from tending to be tilted during operation. After a sufficient load of snow has been accumulated on the tray 22, the operator then causes the tray 22 to be angularly moved or tilted to cause the snow to be thrown or slung out of the path of operation.

After a sufficient amount of snow has been accumulated on the tray 22, the operator pushes down the movable element 34 with his foot. As the operator pushes down, the springs 40 and 41 are compressed to produce a tension or bias upwardly against the movable element 34.

As the element 34 is lowered, the spring loaded retractable latch element 39 engages in locking relationship with the teeth of the rack 30. The element 34 is held in a lowered position at different levels dependent upon the amount of pressure exerted by the operator to counteract the tension of the springs 40 and 41. For relatively heavy snow loads on the tray 22, it is generally desirable to lower the element 34 as low as possible, as illustrated in FIGURE 4, in order to obtain a maximum force in tilting the tray 22 to accomplish removal of the snow, as will be seen. Of course, if light or medium loads are involved, it is only necessary to push the element 34 part of the way down. The rack 30 illustrates three sets of teeth for light, medium and heavy loads, although the teeth could be one continuous series.

After the element 34 is lowered to its lowermost position, the springs 40 and 41 exert a maximum amount of bias upward so that a maximum upward bias is maintained against the slidable element 28, the rack 30, the backboard 26 and the rod element 32. They will all remain in the lowered position under tension until the lock mechanism 43 is released.

FIGURE 5 illustrates the operation of the device after the locking means 43 is actuated and the tray 22 is angularly moved to a tilted position. The tray 22 is illustrated in different positions during the tilting or lifting operation.

When the operator desires to release the snow accumulated on the tray 22, he presses against the foot pedal 48 with his foot. When he does so, the latch 44 is moved out of locking engagement with the element 46. The springs 40 and 41 then suddenly release their energies becoming expanded to their normal positions illustrated in FIGURE 2. When the element 34 is being raised, the engaging element 39 maintains its locking relationship with the last positioned tooth of the rack 30 causing the rack 30 to also rise. The rack, being fixed to the backboard 26, causes the backboard 26 and the extending rod 32 to rise under the pressure of the springs 40 and 41.

As the rod 32 rises, the tray 22 is angularly raised about the hinge 24. When the tray 22 is raised, any snow accumulated thereon will be thrown to the side of the path through which the snow removing device 10 is being moved. Because of the relatively high tension of the springs 40 and 41, the tray 22 is raised very rapidly. A pair of resilient cushion like elements 47 and 49 are provided as stops for the backboard 26. Similar cushion like elements 65 and 67 are provided to receive the backboard when it is lowered.

A spring 56 is secured to the under side of the tray 22 at both ends of the tray. Of course, if desired, one end of the spring may be connected to a portion of the main

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body. The spring 56, being connected over the rod 32, serves to limit the movement of the rod element 32 in addition to minimizing the time for the return of the tray 22 to ground level after the snow is thrown.

After the snow is thrown from the tray 22, it returns to its lowered position because of gravity and the fact that no upward tension by the springs 40 and 41, or otherwise, oppose its return. It is noted that after the element 34 is lifted to a certain height, the engaging element 39 automatically becomes disengaged from the rack 30. The means by which the engaging element 39 becomes disengaged from the rack 30 may be seen by referring to FIGURE 1.

It is noted that the main body 12 comprises a pair of tubular elements which are bent in the appropriate places to receive the various parts of the snow removing device. The front tubular portions 59 and 61 and the back tubular portions 58 and 60 are disposed at slight angles with respect to each other. Thus it is seen that the engaging element 38, and its associated latch element 39, is slightly out of alignment with respect to the teeth of the rack 30 when the movable element 34 is in a raised position. The movable element 34 is slidably attached to the back portions of the elements 58 and 60. Thus, as the element 34 is pushed down, the latch element 39 moves closer towards alignment with the rack 30. At the point where the latch element 39 is at the same height as the top of the rack 30, it begins to engage the teeth of the rack. The element 39 is maintained in alignment with the rack 30 to maintain a locked relationship throughout the entire length of the rack. When the rack 30 is raised to a certain level, it again becomes disengaged from the latch 39.

While a specific embodiment of the present invention has been illustrated, it is apparent that the device may take a variety of different forms. For example, the springs 40 and 41 are illustrated as being the compression type. Actually, the springs may be expansion springs, connected above the movable element 34, if desired. The main purpose of the springs 40 and 41, as described, is to provide a bias to cause upward movement of the tray 22 upon release of a locking mechanism. Other means for providing such bias, such as hydraulic or various electromechanical means, may of course be employed to produce this bias or tension.

The rack 30 and latch 39 may also take different forms. The purpose of these elements is to provide a continuing locking action as the element 34 is lowered. Various other means for continuous locking may be employed. Also, the disengagement of the element 39 from the rack during a raising operation may be accomplished in numerous ways other than by angularly disposing the front and rear sections of the tubular portions 58 and 60.

The main body portion may also take different forms other than the tubular arrangements illustrated. One preferred embodiment involves a light weight aluminum, which is strong and may be bent at suitable places to minimize the cost of manufacture and assembly. However, other types of materials and mechanical configurations for the frame or main body may be employed.

The tray 22 and the backboard 26 may be made of plywood, aluminum or any other suitable material. The spring 56 is not absolutely essential and other means may be employed to limit the angular tilting of the tray 22 to assure that it returns to its normal lowered ground level position.

The foot pedal 48 for releasing the tray may be disposed close to the handle 19, if desired, so that the operator may effect a manual release of the tray.

It is noted that snow will be of various weights and volume, dependent upon the temperature at the time of the snowfall, the length of time it has laid and upon various other factors. The various tensions provided in the various springs and the structural strength of all the parts involved in the present invention should be con-

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sidered for the worst possible condition, i.e. when the snow is heaviest in weight.

It may be seen that the snow removing device illustrated may be conveniently operated without any bending or lifting on the part of the operator. The main physical exertion of the operator involves pushing the snow removing device into snow and pushing down the element 34 with his foot. The amount of this exertion is generally not enough to adversely affect the physical well being of the operator. Actually to assist the pushing of the snow removing device, the operator may press his foot on the axle 63 while moving forward so that the amount of forward pressure is added to that produced by the manual pressure against the handles.

In some cases, it may be desirable to have the tray 22 disposed slightly above the ground to permit the snow removing device to be pushed easily by the operator, while still avoiding the front edges of the tray 22 from being obstructed by irregular surface levels. A feature of the present invention involves the provision of a front wheel assembly, as illustrated in FIGURE 6. A pair of wheel assemblies utilizing the type of assembly illustrated in FIGURE 6 may be used in place of the fixed front wheels 18 and 20 illustrated in previous figures.

In FIGURE 6, the wheel is mounted to an axle 60 which is bent at substantially right angles with a portion 62 extending into a receiving element 64, which may be fixed to the main body by any suitable means, not illustrated. A spring 66 is securely mounted to the element 64 at one end, with the free end being connected to the top of the portion 62. It is seen that the wheel 20 is free to move small distances under the tension of the spring 66. Thus, if the arrangement of FIGURE 6 is incorporated into the front wheels of the embodiment described in connection with FIGURES 1 to 5, the tray 22 may be disposed slightly above ground level. When the tray is loaded with snow and the device is pushed by an operator, the tray 22 will tend to be moved slightly downward to ground level. In other words, the front wheels may be resiliently mounted, if desired. The various means for attaching the wheel arrangement of FIGURE 6 to the embodiment of the invention described are not illustrated since they would be obvious to any mechanic skilled in the field.

It has been seen that the present invention has provided a snow removing device which is relatively maintenance free and free of the troubles usually associated with gasoline and other automatic snow removers. It has provided a relatively inexpensive device which may be used by the average homeowner without serious physical injury to the heart and without any undue fatigue.

What is claimed is:

1. A device for removing snow comprising a main body, means for receiving snow movably mounted to said body and normally disposed close to ground level, a transfer element mounted on said main body in a position to engage said means for receiving snow, locking means for holding said transfer element close to ground level, energy storing means and connected to said transfer element, normally urging said transfer element away from ground level and means for releasing said locking means whereby energy stored in said energy storing means causes said transfer element to move said means for removing snow to cause any received snow to be removed from said means for receiving snow.

2. A device for removing snow comprising a main body mounted on wheels to permit said device to be pushed, a relatively flat receiving element for receiving snow hinged to said body and normally disposed close to ground level, said element being adapted to be tilted so as to discharge any snow accumulated thereon, a transfer element mounted on said main body in a position to engage said means for receiving snow, locking means for holding said transfer element close to ground level, biasing means for providing a bias against said transfer ele-

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ment tending to cause said snow receiving element to be moved away from ground level to a tilted position, and a pedal for actuating said locking means whereby the bias of said biasing means causes said transfer element to rise whereby said snow receiving element is tilted.

3. A snow removing device comprising a main body, a relatively flat element movably mounted on said main body and normally disposed close to ground level to receive snow thereon when said device is pushed by an operator, a transfer element mounted on said main body in movable engagement with said flat element, locking means for holding said transfer element in a lowered position close to ground level, spring means mounted on said main body in a position to normally produce an upward pressure against said transfer element, means for permitting an operator to push downwardly with his foot to produce tension in said spring means, and means for actuating said locking means to release said transfer element to permit the tension from said spring means to move said flat element away from ground level, and biasing means for returning said flat element close to ground level when the tension in said spring means has been released.

4. A device for removing snow comprising a main body mounted on wheels to permit said device to be pushed along a path covered with snow, a relatively flat tray mounted to said main body and normally disposed close to ground level to receive snow thereon when said device is pushed, said tray being hinged to said main body to permit said tray to be tilted when raised to dispense any snow thereon to the side of the path through which said device is pushed, a rack slidably mounted on said main body, a lifting element mounted in fixed relationship with said rack and extending below said tray, spring means adapted to bias said rack upwardly, a foot pedal to produce tension in said spring means to apply a bias upwardly against said rack tending to move said rack upwardly, locking means for holding said rack and its associated lifting element in a lowered position when tension is being produced in said spring means, and means for releasing said locking means to permit said rack and its associated lifting element to be lifted by the tension of said spring means.

5. A device for removing snow comprising a main body mounted on wheels to permit said device to be pushed along a path covered with snow, a flat tray mounted to said main body and normally disposed close to ground level to receive snow thereon when said device is pushed, said tray being hinged to said main body to permit said tray to be tilted when raised to dispense any snow thereon to the side of the path through which said device is pushed, a toothed rack slidably mounted on said main body, a rod fixedly attached to said rack and extending below said tray, means for applying a bias upwardly against said rack tending to move said rack upwardly, locking means for holding said rack and its associated rod in a lowered position when said bias is being applied, and means for releasing said locking means to permit said rack and its associated rod to be lifted by said biasing means whereby said rod lifts said tray angularly to cause any snow thereon to be released, said rack, its associated rod and tray returning to its lowered position when the bias from said biasing means is released.

6. A device for removing snow comprising a main body having tubular members, a pair of front wheels and a pair of back wheels mounted to said main body to permit said device to be pushed along a path covered with snow, a relatively flat tray mounted to said main body and normally disposed close to ground level to receive snow thereon when said device is pushed, a backboard disposed to permit said snow to be accumulated on said tray, said tray being hinged to said main body to permit said tray to be tilted when raised to dispense any snow thereon to the side of the path through which said device is pushed, a toothed rack slidably mounted on said main body, an elongated rod fixedly attached to said rack and extending below said tray, spring means mounted on said main body, a

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foot pedal mounted on said main body and adapted to move said spring against its bias including a latch element for engaging the teeth of said rack for applying a bias upwardly against said rack tending to move said rack upwardly, said latch element being locked to said rack during the application of said bias, locking means for holding said rack and its associated rod in a lowered position when said bias is being applied, and means for releasing said locking means to permit said rack and its associated rod to be lifted by said spring means whereby said rod lifts said tray angularly to cause any snow thereon to be released, said rack, its associated rod and tray returning to its lowered position when the bias from said spring means is released.

7. The invention as set forth in claim 6 wherein said front wheels are resiliently mounted to said main body to permit said front wheels to be moved slightly up and down under varying conditions of snow accumulations on said tray.

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8. The invention as set forth in claim 6 wherein said latch element moves at an angle with respect to the movement of said rack whereby said latch element automatically becomes disengaged from said rack after they move a predetermined distance.

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