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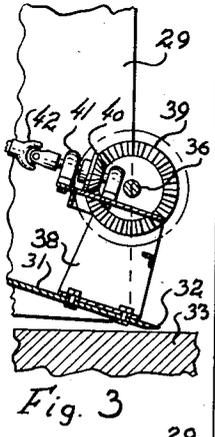
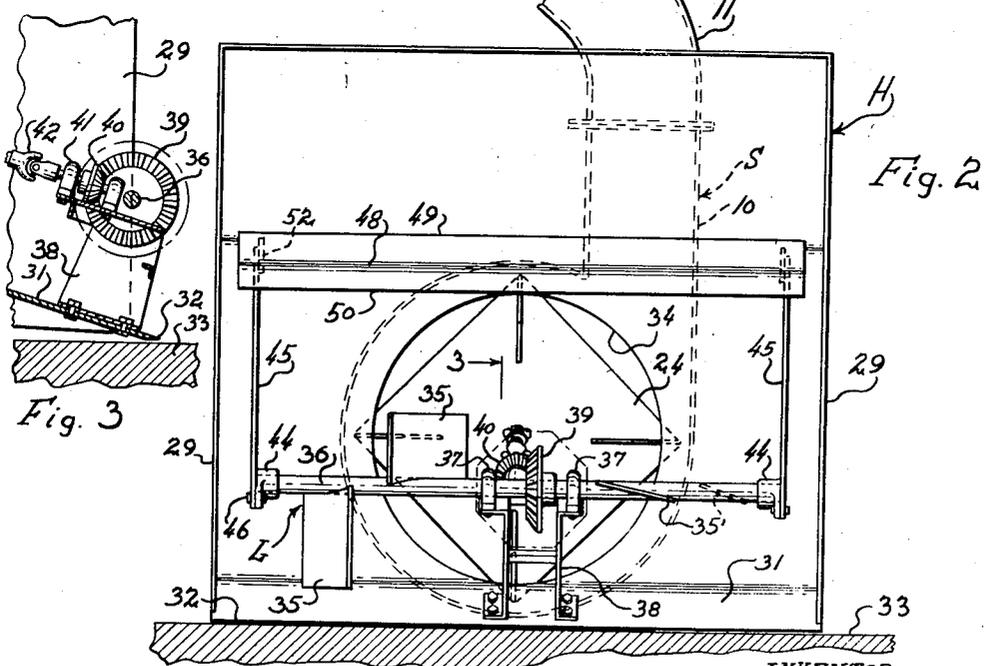
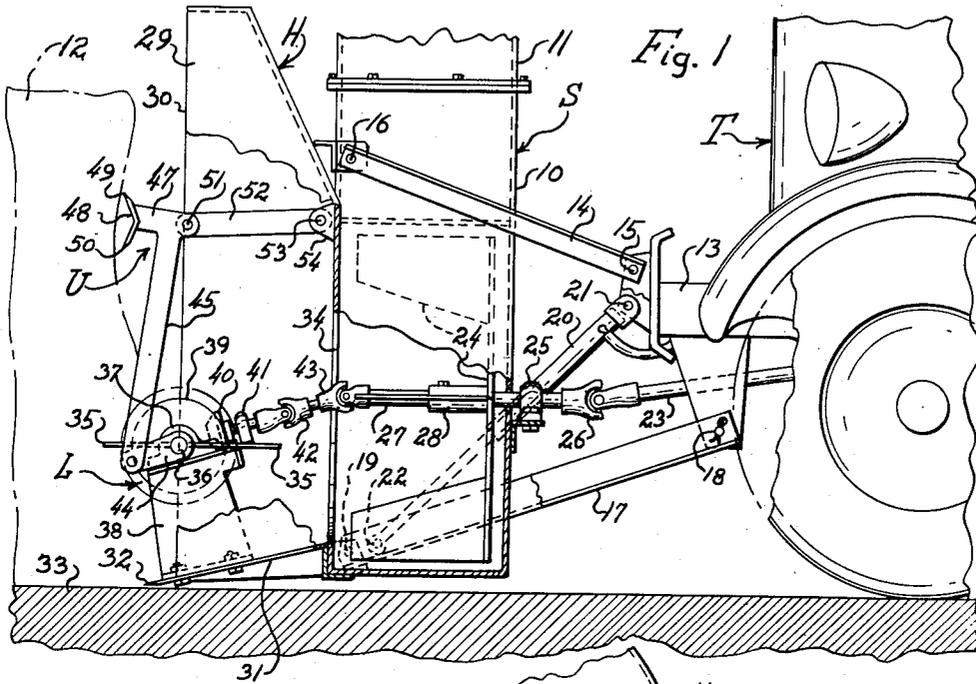
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CUTTER AND FEEDER MECHANISM FOR BLOWER TYPE SNOWPLOWS

Filed Sept. 26, 1952

2 Sheets-Sheet 1



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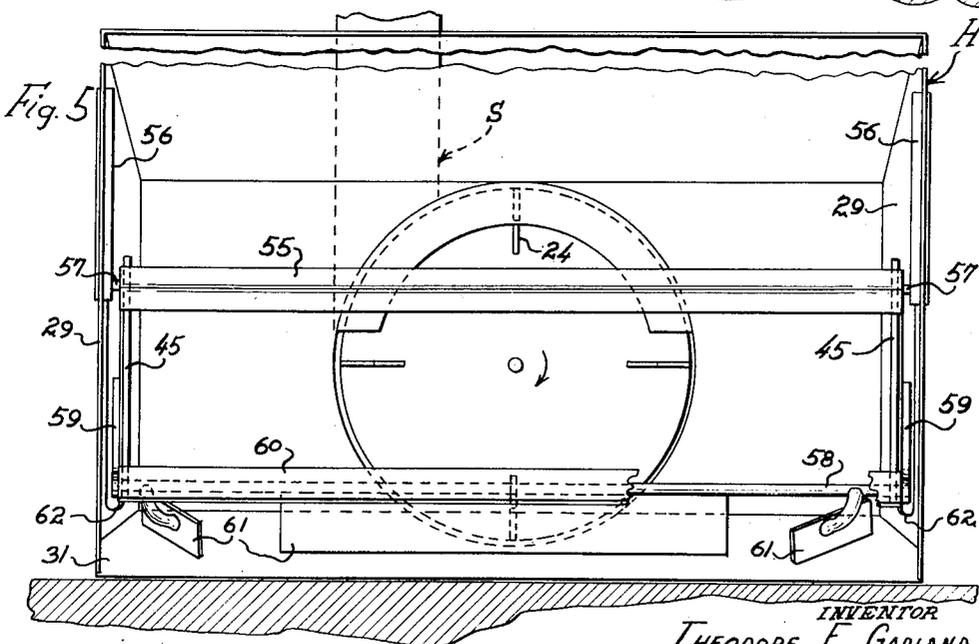
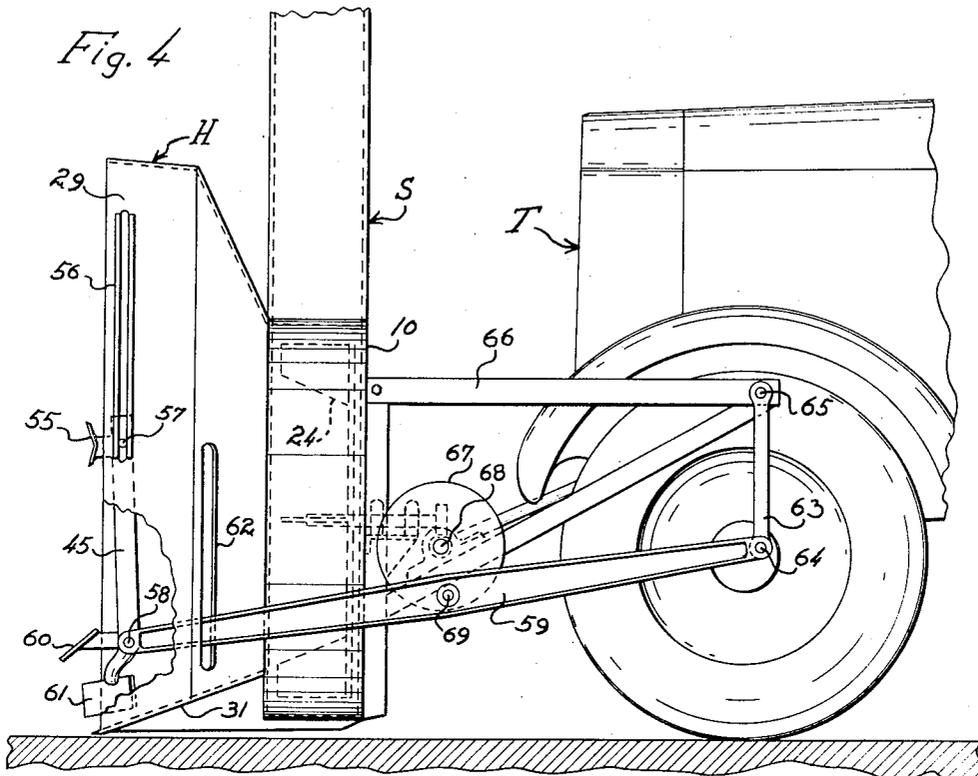
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## CUTTER AND FEEDER MECHANISM FOR BLOWER TYPE SNOWPLOWS

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4 Claims. (Cl. 37—43)

This invention relates to an attachment for snowplows which will assist in the removal of snow and more particularly to a cutter and feeder mechanism adapted to be attached at the front of a blower type snowplow.

In the use of conventional type snowplows and especially plows of the blower type, deep and compacted snowdrifts are often encountered. When the snowplow comes in contact with such a snowdrift, the forward speed thereof may be lessened and the general efficiency of the device greatly impaired. The cutting edges of the mold boards or housing surrounding the front of the snowplow must be pushed and pressed into the drifts without the assistance of moving parts and hence much power is lost in the forward travel of the conventional blower type plow which does not have additional mechanism. In order to help break and loosen snow and ice from deep drifts various rotating breaker and cutter arms have been employed, all operating in advance of the blower fan. Usually a single rotating element is employed covering an area which is a compromise between that requiring a moderate amount of power and that which will give complete pulverizing of the entire area of the drift. If the radial arms are too long, it is obvious that the snowplow will lose a great deal of the power required for the ejection of snow by the fan. On the other hand, if the arms are too short, only a portion of the drift will be preconditioned and the caked snow and ice from the top of the drift must be contacted by the mold boards and housing of the snowplow in order to break down the drift. When thus broken down, the drift will yield large chunks of caked snow which will fall into the blower, often breaking or straining parts of the snowplow and greatly lessening the efficiency of operation. Furthermore, the moving element is often a screw type conveyor which must laboriously wear its way into the snow bank thus requiring still additional power.

It is therefore an important object of my invention to provide a dual cutter and feeder mechanism which will supply the proper treatment to drifted snow at both high and lower levels for obtaining an efficient operation of the blower type snowplow to which the mechanism is attached.

It is a further object of the invention to provide an attachment of the class described which will conserve the power required for forward movement of a rotary snowplow while at the same time reducing the particle size of the packed snow and ice in a snowdrift for easy disposal through the blower fan.

It is a still further object to provide a mechanism operable from a common power source on a rotary snowplow which will prevent undue shock and strain upon the snowplow and which at the same time will operate efficiently through vibratory or wobbling action created by momentum of oscillating parts and driving connections to conserve power and do a complete job of snow removal even in drifts of an unusually deep and compacted nature.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings

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wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a side elevation of my cutter and feeder mechanism attached to a conventional blower type snowplow which in turn is mounted at the fore of a vehicle;

Fig. 2 is a front elevation of my mechanism;

Fig. 3 is a segmental view in vertical section of the drive mechanism taken on the line 3—3 of Fig. 2;

Fig. 4 is a side elevation of another embodiment of my cutter and feeder mechanism; and

Fig. 5 is a front elevation of the embodiment shown in Fig. 4.

Referring now more particularly to the drawing, the blower type snowplow is indicated generally at S and is mounted in conventional manner to a vehicle such as truck T. The snowplow S has a forwardly facing blower housing 10 with a spout 11, not shown in its entirety, for lateral ejection of snow from a bank 12 through which a pathway is being cleared. The supporting structure or framework 13 on vehicle T may be attached to the snowplow S by such means as a pair of upper arms 14 pivoted to the frame at 15 and to the snowplow housing at 16. A lower attachment arm 17 may be similarly pivoted at 18 to the frame 13 and at 19 to the snowplow housing. Hydraulic ram 20 may be pivoted at point 21 of the frame 13 and to a lower point 22 on the snowplow S. The bracing means will thus operate to raise the entire snowplow S under the influence of hydraulic ram 20 and allow it to be lowered as the case may require. A source of power such as takeoff shaft 23 is connected to the rotary blower device 24 through shaft 27 which is journaled through a bearing assembly 25 and operably connects through a universal joint 26 to the source of power 23. The universal joint 26 thus serves to drive shaft 27 and the blower 24 attached thereto by its hub member 28. The forwardly facing housing H provides a snow-engaging and penetrating structure which may be a part of the conventional blower type snowplow S or may be a separate attachment as shown in the drawing. The housing H comprises a pair of side boards 29 having forwardly facing cutting edges 30 for engaging snow 12. A downwardly and forwardly angled scoop element 31 has a leading edge 32 in close clearance with the road, sidewalk or other similar pathway to be cleared.

My invention comprises a cutter and feeder mechanism having a lower bladed element L for journaling across the inlet 34 of the blower housing 10 and an upper cutter element U which is reciprocable in relation to the lower bladed element L and the forward housing H. The bladed element L may comprise beater blades 35 secured in staggered relation along a shaft 36 which is journaled in bearings 37 which in turn are mounted upon a bearing support 38. The support is secured in turn to the upwardly facing plane of scoop element 31. Between the bearings 37 on shaft 36 is mounted a beveled gear 39 which is in driven contact with the beveled pinion driver 40 similarly journaled in bearing 41 as shown in detail in Fig. 3, and which is likewise mounted upon the bearing support 38. A connecting shaft 42 is universally connected at 43 to the forwardly projecting end of shaft 27 upon which the blower fan 24 is rotatably secured.

The shaft 36 extends across the blower opening 34 and the ends thereof terminate within the space defined by mold boards 29. A crank 44 is secured to the shaft 36 at each end and pivoted radially thereto is an arm or link 45 by means of pivots 46 on each of the cranks 44. The arms 45 terminate at their upper portion in a short T-shaped cross element 47 as shown in Fig. 1. One end of the cross element bears an obtuse V-shaped cutter bar 48 having a cutting edge 49 at the top thereof and another cutting edge 50 along the lower por-

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tion thereof. The rearward extending portion of the T-shaped cross member 47 is pivotally secured at 51 to guide means such as rocker arm 52 which is in turn pivotally secured at its other end 53 to a bracket member 54 mounted forwardly and upwardly of the blower 24 such as at the inner face of housing H. The T-shaped element together with its cutting blades and rocker arm constitute the cutter element U.

In the operation of my cutter and feeder mechanism the vehicle T is driven toward snow 12 and the hydraulic ram 20 is then operated to lower the entire snowplow together with my mechanism so as to operate in close clearance with the ground 33. The driving assembly is then set in motion, such as from power take-off 23, and the blower 24 will turn in a counterclockwise direction as viewed in Fig. 2. The extension of shaft 27 through the blower will cause the beveled pinion gear 40 to rotate the beveled driven gear 39 in a counterclockwise direction as viewed in Fig. 1. The rotation of the driven gear 39 will cause the beater blades 35 to contact the lower portion of drift 12, pulverizing chunks of snow which may fall thereupon and simultaneously therewith feeding the snow downwardly, then rearwardly over the scoop 31 and into the blower housing 10 from which it is ejected in the conventional manner. Since the cranks 44 rotate in unison with the shaft 36, the cutter element U will be oscillated laterally to the forward direction of travel of the snowplow and the rocker arms 52 will guide the movement thereof in a controlled manner. It will be noted that upon the down stroke of crank 44, as viewed in Fig. 1, the lower cutting edge 50 on bar 48 will slightly lead the trailing edge 49 so as to slice and cut snow from bank 12 into particles which will fall upon the beater blades 35 and be pulverized and fed into the blower 24. As the cranks 44 reach their lowermost position the arms 45 will have progressed to a rearward position, thus placing the upper edge 49 of bar 48 in the leading position with the edge 50 trailing. This condition prevails during the upward strokes of cranks 44 until the uppermost position has been attained, from which point the cycle is repeated as before noted. The function of the cutter element is to progressively cut and break down the upper layers of snow in a bank or drift so as to minimize the work of the housing H forcibly pressing its way into such a bank. It is also a function of the cutter element U to supply continuously snow chunks of moderate size from the upper portion of the snowdrift to the beater blades 35 which further pulverizes them and feeds them into the blower housing 10. The cutter element U takes a surprisingly small amount of energy to efficiently and progressively reduce the upper layers of a snowdrift while at the same time maintaining a constant and uninterrupted ejection of snow during the forward travel of the vehicle T.

Another embodiment of my invention is shown in Figs. 4 and 5, the cutter bar 55 being similar to the cutter bar 48 in the first mentioned embodiment but being slidably mounted in guideways 56 formed at each side 29 of housing H rather than pivoting on the rocker arm 52. A cooperating guided element 57 is secured to each arm or link 45 which in turn is pivotally secured each to low point 58 at a forward point on each of a pair of lever arms 59. Secured to the forward end of lever arm 59 are hoe or blade means such as the central blade 60 and side blades 61. The same type scoop element 31 is employed as in the first mentioned embodiment. The forward extending end of each of the lever arms 59 extend through an opening or slot 62 formed in each side 20 of the housing H so that the forward ends of arms 59 will be working within the housing H rather than in front and outside of the housing. The lever arms 59 are pivotally secured to the rocker link members 63 by pivot pins 64. The links 63 in turn are each pivoted at 65 to a supporting structure such as framework 66.

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An eccentric element or crank 67 has a shaft 68 which is journaled across the supporting structure 66 and bears at its lateral extremity a pin 69 which is journaled in each of the lever arms 59 at a point intermediate the ends thereof. Shaft 68 may be rotatably powered by the same source of power which drives the blower blades 24 or may be independently powered to accomplish the same purpose.

The operation of the second embodiment is similar to that of the first but the action of a portion thereof is somewhat different. Instead of a rotatable feeding mechanism there is a type of raking action which accomplishes the same purpose by bringing the bladed elements 60 and 61 down into snow which may be formed in a bank forwardly of the plow as well as loose chunks of snow which have been dislodged and fed from the upper reciprocating blade element 55. The blades 60 and 61 then pull rearwardly so as to positively pull a quantity of snow into the blower housing 10 and the cycle is repeated for each turn of the crank element 67. The cutter bar 55 operates in the same manner as in the first embodiment, a complete raising and lowering cycle occurring for each oscillating cycle of the arms 59.

Although the operation of the two embodiments is similar it will be noted that in the case of the bladed elements 60 and 61 in the second embodiment there is a reciprocating momentum established which is practically non-existent in the bladed element L of the first embodiment since the latter rotates circularly about a shaft. The weight of the arms 59 in moving backwardly and forwardly produces a wobbling action in the entire mechanism which tends to assist the advance of housing H and the cutter and feeder mechanism in general into a bank of snow which has become solidly packed. I prefer to employ the second embodiment in smaller plows such as sidewalk plows and small machines for clearing pathways or a small width of roadway. For heavy duty work such as on highways I prefer the first embodiment since the mass of arms 59 will produce an exaggerated vibration if applied to a piece of equipment of larger construction. In the first embodiment, a lesser but still useful vibration is created by the off-center oscillation of arms 45, cranks 44, rocker arms 52 and other parts of the cutter and feeder mechanism excepting the balanced bladed element L itself.

It may thus be seen that I have provided an extremely efficient cutter and feeder mechanism for blower type snowplows in which I have struck a useful balance between the portion of the mechanism which merely breaks down the upper portion of a snowdrift as compared to the more violent portion which contacts the lower portion of the drift while at the same time pulverizing and feeding all the snow contacted into the blower housing. In other words, I have managed to conserve the energy which is applied to the portion of the mechanism which requires the greatest amount of power.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. In a snowplow of the type having snow-engaging and penetrating structure, a rotary blower and a forwardly facing inlet for the introduction of snow to the blower, a cutter and feeder mechanism therefor comprising a rotatable shaft journaled transversely of said snowplow, a single-bladed cutter element disposed forwardly of said blower inlet in guided relation and oscillable in a direction lateral to the forward direction of travel of the snowplow, and a driving connection operably secured to said shaft at a position eccentric to the axis of the shaft for operating the oscillable cutter element and for vibrating the snow-engaging and penetrating structure whereby to cut, beat and feed in metered fashion to the blower element of the snowplow, compacted snow and ice.

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2. In a cutter and feeder mechanism for a blower type snowplow with a forwardly facing blower inlet for the introduction of snow, the combination of a housing having means for attachment to the front of said snowplow in a position registering with said blower inlet and further having side walls and a downwardly and forwardly disposed scoop at the bottom thereof, a bladed element mounted across the sides of said housing and forwardly of said inlet, the blades of said bladed element being movable in a cycle to contact the snow and to move downwardly and backwardly at least in a portion of its cycle of operation, a cutter bar mounted upon said housing above the bladed element for guided oscillating movement laterally of the forward direction of travel of the snowplow, and driving means operably connected to said bladed element and said cutter bar extending rearwardly from said housing to a source of power whereby hard and packed snow in drifted condition will be cut and fractured by the cutter bar so as to fall downwardly upon said bladed element and thence to be moved backwardly together with snow contacted at a lower level by the bladed element, the composite snow being preliminarily broken and fed thereby into the blower inlet.

3. A cutter and feeder mechanism adapted to be attached forwardly of the blower inlet of a blower type snowplow, comprising a bladed element mountable horizontally across said inlet, the blades of said elements being revolvable in a cycle to contact snow and the like and to move downwardly and backwardly at least in a portion of its cycle of operation, a cutter element mountable forwardly and upwardly of said inlet and above the bladed element for vertical oscillation and in a direction lateral to the forward movement of travel of said snowplow, a link member secured to the cutter element and pivoted at its lower end to the bladed element and revolvable therewith, and driving means operably connected to said bladed element for causing the bladed element to revolve and to disintegrate and feed snow and the like to said inlet, each revolution of said bladed element caus-

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ing a vertical oscillation of the cutter element in a downward and upward movement for cutting and fracturing hard and packed snow and causing it to fall downwardly upon said bladed element where it will be disintegrated and fed rearwardly to said inlet by means of the bladed element.

4. A cutter and feeder mechanism adapted to be attached forwardly of the blower inlet of a blower type snowplow, comprising a rotatable feeder having blades radially attached thereto and mountable horizontally across and forwardly of said inlet, each blade being rotatable in a cycle to contact snow and the like in at least a downward and backward portion of its rotation, a cutter bar mountable forwardly and upwardly of said inlet and above the rotatable feeder, said cutter bar being oscillable in a direction lateral to the forward movement of travel of said snowplow, said cutter bar further having a depending portion constituting a connecting link pivotally secured at a point eccentric to the axis of said rotatable feeder, and driving means operably connected to said rotatable feeder for causing the blades of the feeder to rotate and to disintegrate and feed snow and the like to said inlet each revolution of said rotatable feeder causing a vertical oscillation of the cutter bar in a downward and upward movement for cutting and fracturing hard and packed snow and causing it to fall downwardly upon said rotatable feeder where it will be disintegrated and fed rearwardly to said inlet by means of the rotatable feeder.

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