W. L. STADIG.

SNOW PLOW.

APPLICATION FILED APR. 10, 1913.

1,093,493. Patented Apr. 14, 1914.

3 SHEETS—SHEET 1.

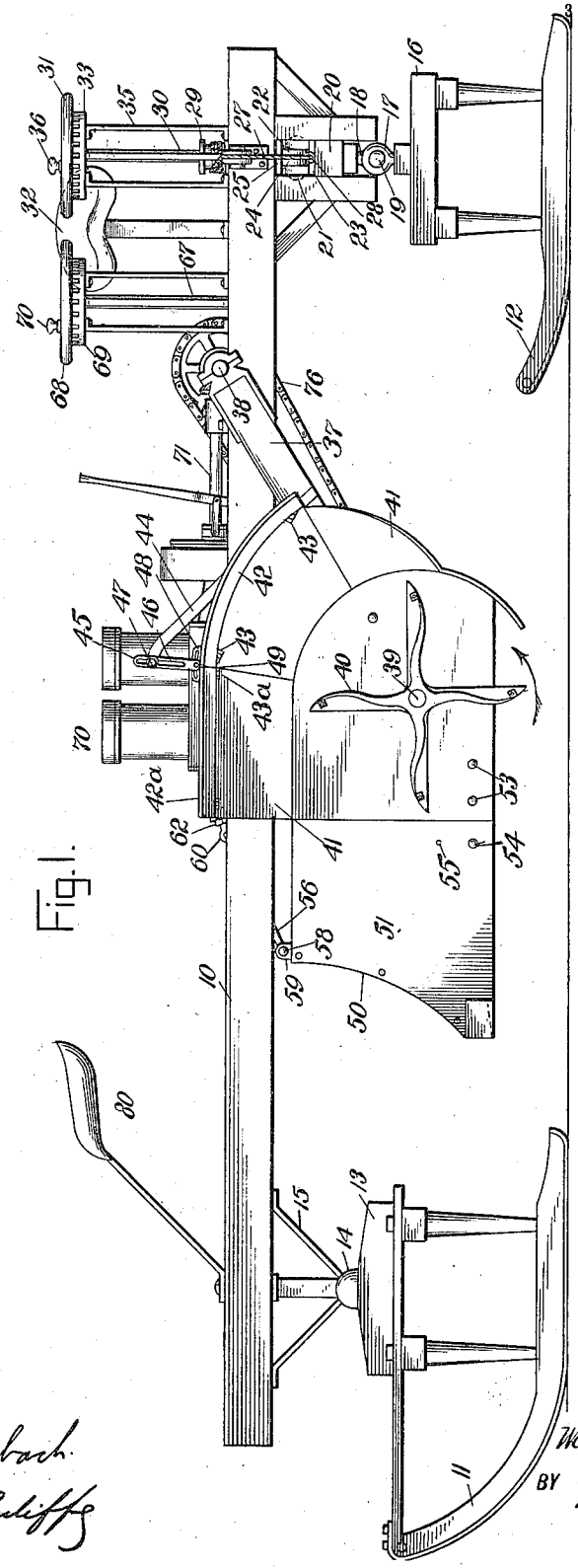


Fig. 1.

WITNESSES

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3 SHEETS—SHEET 2.

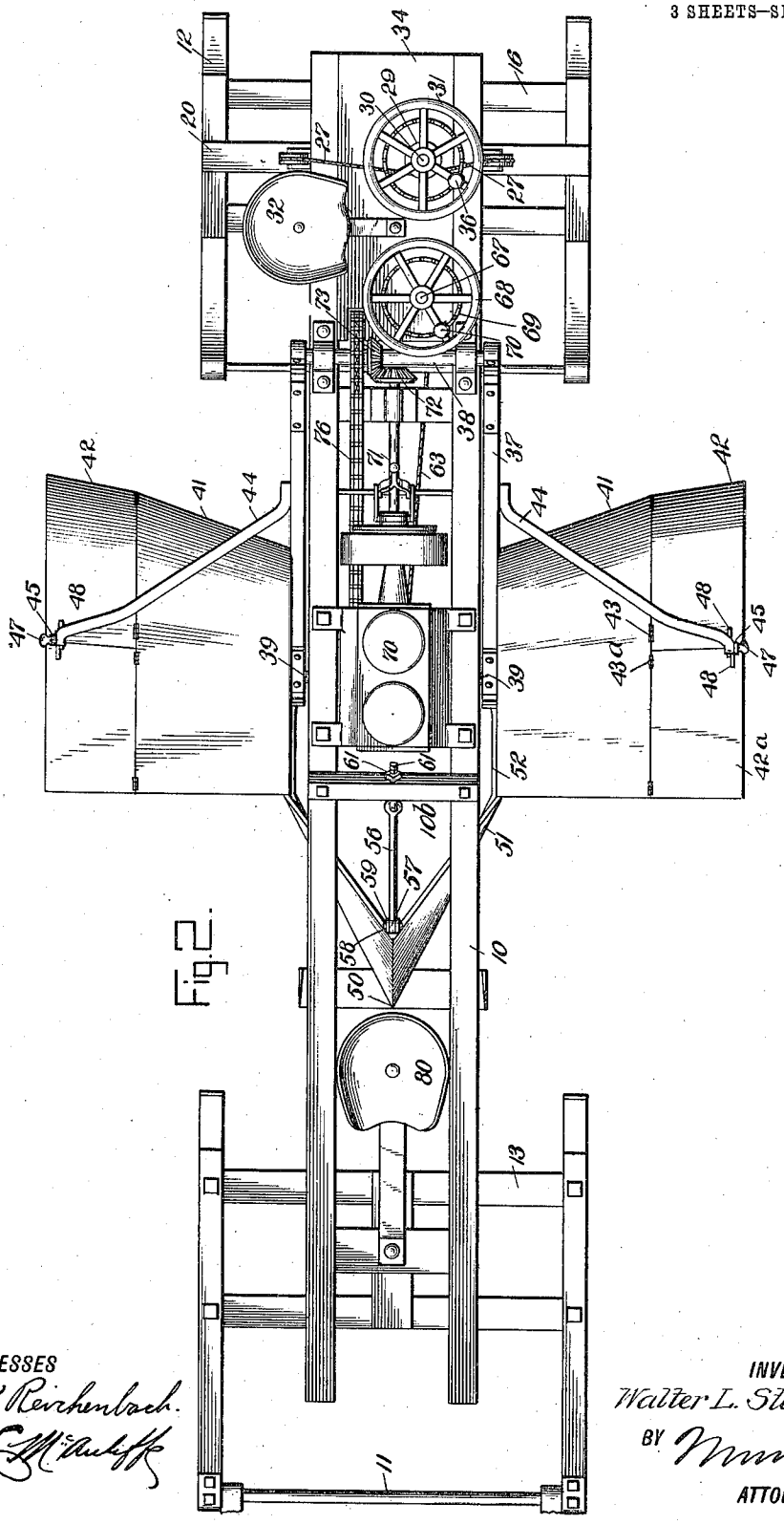


Fig. 2.

WITNESSES

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3 SHEETS—SHEET 3.

Fig. 3.

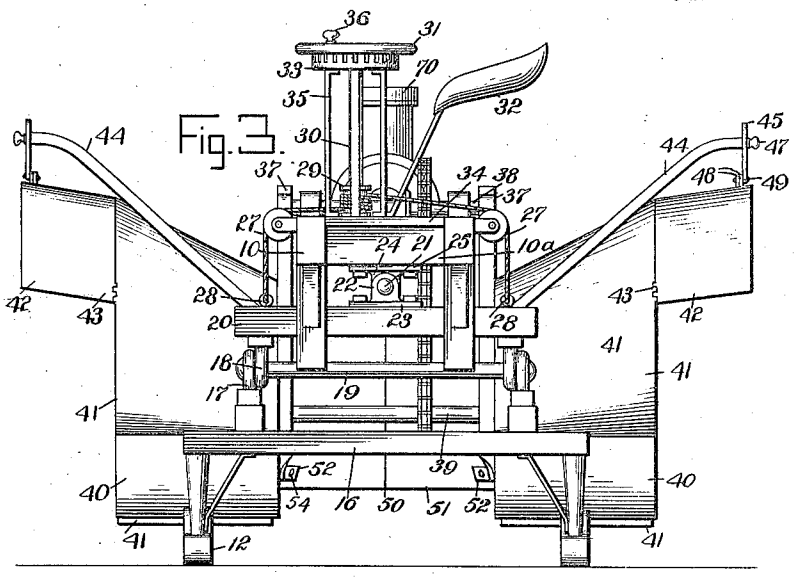


Fig. 4.

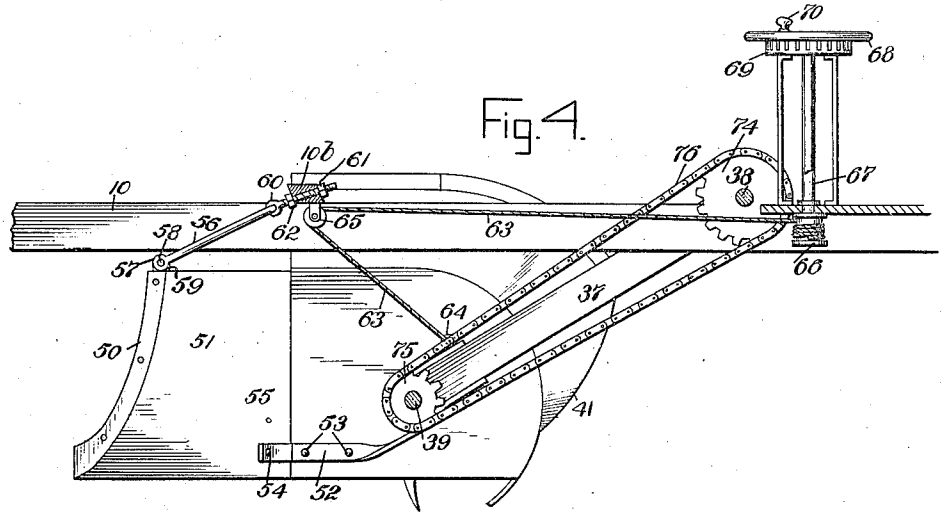


Fig. 5.

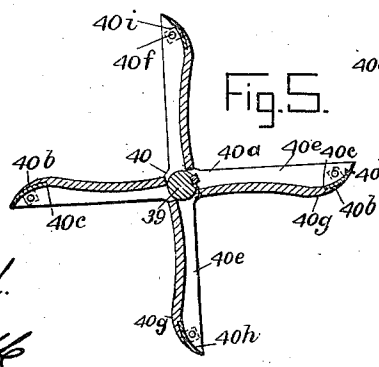
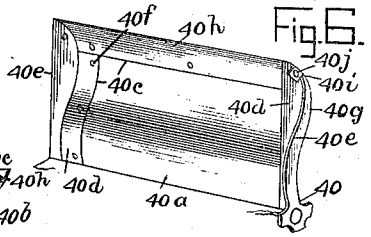


Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER LESLIE STADIG, OF ST. FRANCIS, MAINE.

SNOW-PLOW

1,093,493. Specification of Letters Patent. Patented Apr. 14, 1914.

Application filed April 10, 1913. Serial No. 760,173.

To all whom it may concern:

Be it known that I, WALTER L. STADIG, a citizen of the United States, and a resident of St. Francis, in the county of Aroostook and State of Maine, have invented a new and Improved Snow-Plow, of which the following is a full, clear, and exact description.

My invention relates to snow plows having a plow, and co-acting rotary means for taking up the snow and causing it to be raised and deflected to the side of the road.

It is a design of my invention to provide an improved apparatus of the indicated character adapted for removing snow from highways, logging roads and the like.

It is furthermore a design of the invention to provide an improved means associated with the rotary elements, and adapted to gather the snow to the latter, the said means being arranged for adjustment to remove the snow substantially to the road level, or to leave a "comb" in the center of the road.

It is also a design of my invention to provide for tilting the snow-removing means, to cut into the snow lower at one side of the road than at the other.

It is also a design of my invention to improve devices of the indicated character to the end that efficiency in operation may be promoted, as well as economy in manufacturing and simplicity of adjustment and control.

The distinguishing features of my invention, and the important structural elements characterizing the preferred embodiment which is illustrated as an example, will be more particularly explained in the specific description hereinafter to be given.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a snow plow embodying my invention; Fig. 2 is a plan view thereof; Fig. 3 is a rear end view; Fig. 4 is a fragmentary longitudinal vertical section given principally to show the means for raising and lowering the operative elements; Fig. 5 is a transverse sectional view of the rotary cutter; and Fig. 6 is a fragmentary perspective view showing one of the arms or blades of the said cutter.

In constructing a snow plow in accordance with the particular embodiment illustrated as an example, a main frame 10 is provided, and is supported by the fore sled 11 and the rear sled 12. The knee 13 of the fore sled desirably is connected with the frame 10 in practice, by ball and socket joint, of which the ball 14 is carried by a hanger frame 15 and suitably socketed in the top of the knee 13; the described connection of the fore sled however, is not claimed herein.

The rear sled 12 desirably is mounted to rock forward and back on a suitable connection with the overhead frame 10. In the example shown, the knee 16 of the rear sled has eyebolts 17, and through these eyebolts and through similar eyebolts 18 supported from the main frame 10, a transverse pin 19 passes, so that the sled may rock forward and back with the pin 19 as a center.

In order that the overhead frame 10 may be tilted laterally on the sleds, the eyebolts 18 are secured to the under side of a bolster 20, which is pivoted to the said frame 10 by a horizontal pivot, the axis of which ranges lengthwise of the machine. The pivot connection may be effected in any suitable manner; in the form shown a pin 21 extends through the upright member 22 of a bracket 23 on the bolster 20, and through a similar depending member 24 on a bracket 25 suitably bolted to the under side of a cross bar 10^a of the frame 10.

To tilt the frame relatively to the bolster 20 and the rear sled, wire ropes 27 or any equivalent members are secured to the bolster 20, at each side thereof, by eye-bolts 28 or equivalent means, said ropes winding oppositely on a vertical drum or capstan 29 on an operating shaft 30, which is provided with a hand wheel 31 at the top adjacent to a seat 32 for the operator. Beneath the hand wheel 31, a circular crown rack 33 is supported on a suitable platform 34 provided on the frame 10, the supporting means in the present case being in the form of standards 35. A locking pin 36 is carried by the wheel 31 and is adapted to engage the crown rack 33, to lock the parts in adjusted position. It will be obvious that by turning the hand wheel 31, the capstan 29 will wind in on one rope 27 and pay out the rope 27 at the opposite side so as to tilt the frame 10 laterally with the pin 21 as a center.

The snow-gathering, cutting and deflecting elements are supported on the frame 10 between the fore and rear sleds, and comprise a vertical rocking suspension frame comprising side arms 37 arranged outside of the frame 10 and mounted to rock on a transverse shaft 38. On the lower ends of the arms 37 is journaled a transverse shaft or arbor 39, hereinafter termed a shaft, provided at each end with a rotary snow plow or cutter 40, hereinafter termed a cutter. On the arms 37 and shaft 39 of the suspension frame there is a shear or housing 41 in the form of a hood opening laterally at the outside, provided at each side of the machine in connection with the cutters 40, each shear having an outward flare, as best seen in Figs. 2 and 3, which deflect outward to the side of the road the snow thrown up by the cutters 40. Desirably in connection with the shears or housings 41, wing extensions 42, 42^a are hinged at the outer edge of the shears at the top, as at 43, 43^a, which may have any serviceable expedient provided for holding the said extensions in adjusted position. In the example shown the means consists of an arm 44 on the side arms 37 of the suspension frame, a vertical bracket or depending link 45 on the outer end of the arm 44 and connected thereto by a slot and pin connection 46, 47. The connection between the link 45 and the wing extensions 42, 42^a, may be effected in any suitable manner, as by slotted lugs 48 on said extensions and a pin 49 on the link 45. The pin 47 serves to fasten the slotted link 45 at different heights on the arm 44, according to the position of the wing extensions 42, 42^a. The arrangement of the shears and the described wing extensions enables the operator to provide such an adjustment as will not cause the snow to be thrown too far to the side.

The plow 50 is arranged in front of the cutters 40, the wings 51 diverging rearwardly to points in line with the inner side of the shears 41 to deflect the snow to the cutters 40. The plow, as best seen in Fig. 4, is supported on arms 52 secured to the forward lower ends of the arms 37 by bolts 53 or the like, the arms being secured by a pivot bolt 54 to the respective wings 51 of the plow. There may be provided a second bolt hole 55 at a higher point on the wings 51, whereby the bolt 54 may be withdrawn from the position shown in Fig. 4, and the plow dropped sufficiently to have the bolt pass through the upper hole 55, whereby to pivotally secure the wings 51 in a lower position when it is desired to cut substantially to the road level. With the plow arranged on a level with the shears 41, as in the several figures, a "comb" or ridge of snow may be left at the center.

The plow 50 is hung from the frame 10 by any suitable means, desirably by means of a link 56, having an eye 57 through which a bolt 58 passes, the bolt passing also through lugs 59 on the plow 50, at the apex thereof. The upper end of the link is connected to an eye-bolt 60 which passes through a suitable cross bar 10^b on the frame 10, said bolt having lock nuts 61, 62, the arrangement being such that by adjusting the said nuts the plow 50 may be raised or lowered to level it according to the position of the bolt relative to the arms 52.

In order to raise or lower the snow-removing unit comprising the snow plow, cutters and shears, and the arms 37 and appurtenances, a rope, chain or equivalent 63 is connected to the suspension frame, as at 64, and passes over an overhead sheave 65 on the frame 10, and thence rearwardly to a vertical drum or capstan 66, the spindle 67 of which is provided with a hand wheel 68 in connection with a crown rack 69, and a locking pin 70 are provided, as described in connection with the capstan 29.

The cutters 40 are motor-driven from any suitable motor 70, the motor being conventionally shown. A direct drive shaft 71 from the motor is suitably geared to the driven shaft 38, as by beveled pinions 72, 73, and the driving connection from the shaft 38 to the cutter shaft 39 may be by means of a sprocket wheel 74 on the shaft 38, a sprocket pinion 75 on the cutter shaft 39, and a sprocket chain 76 running over said sprockets. The cutter 40 is preferably in the form shown more particularly in Figs. 4, 5, and 6, in order that it may have the necessary action to cut the snow as fast as it is received from the plow 50, and cause the snow to be deflected from the outer ends of the arms of the cutter and thrown outwardly against the deflecting shears 41. Thus the cutter comprises a head, suitably fastened to the shaft 39 and comprising a plurality of arms 40^a, four in the present instance.

Each arm preferably is in the form of a broad plate, and separate knives are let into the plate at the side edges and at the front edge, for which purpose the solid center of the plate of each arm is of greater thickness than the edge portions, the latter being of reduced thickness as at 40^b, which may be considered a flange, thereby producing a shoulder 40^c, which extends at three sides of the plate. On each reduced side portion is seated the flange 40^d of the knife 40^e, which is approximately perpendicular to the securing flange 40^d, and the latter is held in place by bolts 40^f or their equivalent. The plate 40^a is in the form of a compound curve having a concavo-convex form near the outer end, as at 40^g, the convex side being outermost. The base flanges 40^d are formed to correspond. The front edge of each arm or plate 40^a has a separate knife 40^h to fit

the front reduced edge 40^b, and to lie against the front shoulder 40^c flush with the central raised portion or body of the plate, the outer edge of the knife projecting beyond the cutter head and conforming to the general incurve of the flange 40^b. The side knives are bolted or otherwise secured to the front knife, for which purpose an end of one knife has a lug bent to overlie the adjacent end of an adjacent knife. Thus in the form shown, the front knife 40^h is formed with a lug 40^i at each end, at approximately right angles to the knife to overlie the adjacent end of each side knife 40^e, and be secured thereto as by a bolt 40^j, or its equivalent. With the described construction the rapidly revolving cutter will cut the snow delivered by the plow 50 and freely discharge it from the outer end of each of the cutter blades against the shears.

In practice the cutter may revolve in the direction of the arrow (Fig. 1) or in the opposite direction; in either case the concave curve of the knives will face the direction of rotation, so that if the rotation be reversed, the cutter head must be removed from its shaft or arbor 39, and reversed end to end. When the cutter is revolved in the direction of the arrow (Fig. 1) it has the advantage that it will assist in the propulsion of the apparatus.

The apparatus may be drawn by draft animals or by a tractor; in the drawings I have illustrated a driver's seat at 80.

I wish to state in conclusion that although the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the mechanical details herein illustrated, since manifestly the same can be considerably varied without departure from the spirit of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A snow plow having a driven rotary cutter mounted on a horizontal axis and provided with radial curved blades, the blades carrying side knives, and a front knife, and a flaring shear in the form of a hood extending over and behind the cutters, and the said cutter serving to raise the snow and discharge the same by centrifugal force against the inner surface of the said shear.

2. In a snow plow, driven rotary cutters turning on a laterally extending horizontal axis, the cutter having radial blades each provided with knives at opposite side edges approximately perpendicular to the plane of the blade, and a front knife extending transversely between the side knives approximately parallel with the axis of the cutter, in combination with a hood extending over and behind the rotary cutter and opening at the outside.

3. In a snow plow, the combination of an elevated frame, a suspension frame mounted on the main frame for rocking movement on the latter, and a snow-removing unit comprising a plow having diverging wings, driven rotary cutters turning on a laterally disposed horizontal axis at the rear of the plow and outside the wings of the latter, and hoods extending in flaring form continuously over and behind the cutters and opening at the outside, the hoods being disposed in the general direction of the axis of the rotation of the cutters and the flare being with respect to the said axis of rotation.

4. In a snow plow, the combination of a supporting main frame, a snow-removing unit comprising a suspension frame, driven rotary cutters turning on a horizontal axis on the suspension frame, a flaring hood opening at the outside and extending over and behind the cutters, a plow having diverging wings, arms on the suspension frame, means for rockably supporting the plow on said arms at different heights, and connecting means between the first-mentioned frame and the apex of the plow for raising and lowering the apex to suit the adjustment between the wings of the plow and the mentioned arms.

5. In a snow plow, the combination of front and rear sleds, an overhead frame mounted to tilt laterally on said sleds, a snow-removing unit having support from said frame and comprising driven rotary cutters at the sides of the main frame, a snow plow in front of the cutters and having diverging wings leading to the latter, and connections between the main frame and one of the sleds serving to tilt the main frame and with it the snow-removing unit relatively to the sleds to cause the cutters at one side to cut deeper than the cutters at the opposite side.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER LESLIE STADIG.

Witnesses:

RANDOLPH EDWIN STADIG,

ALPHONSE STADIG.