Aug. 15, 1939. R. E. COLE 2,169,224

SNOW PLOW

Original Filed July 24, 1936 2 Sheets-Sheet 1

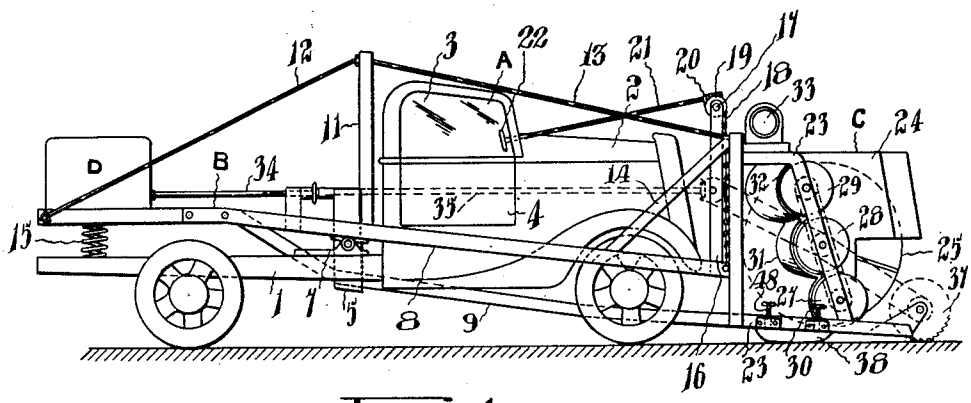


Fig. 1

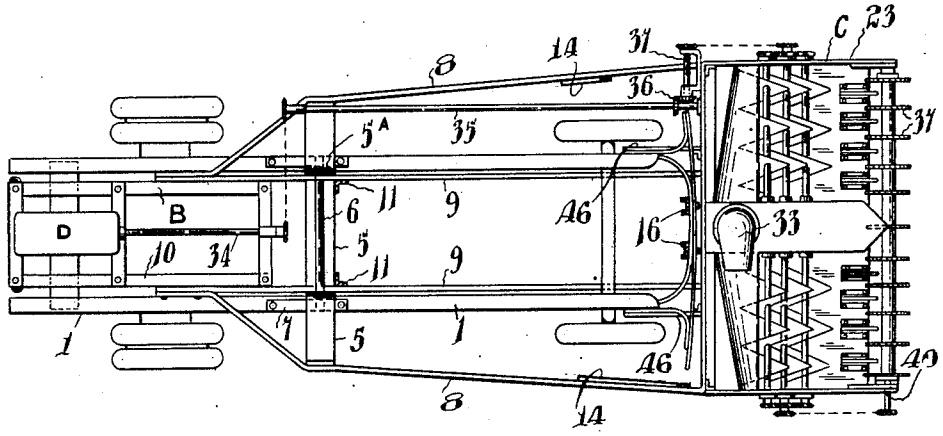


Fig. 2.

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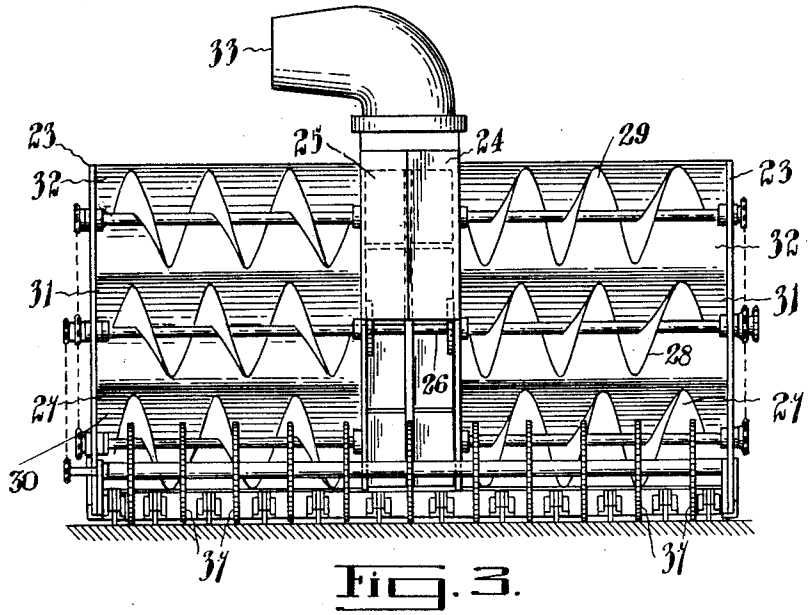


Fig. 3.

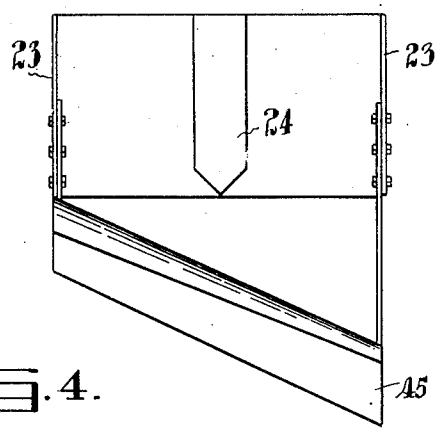


Fig. 4.

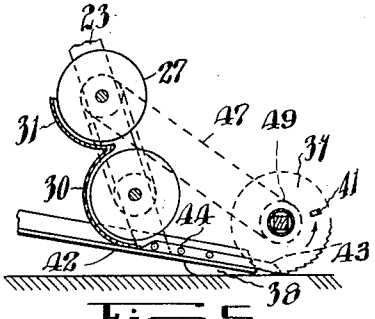


Fig. 5.

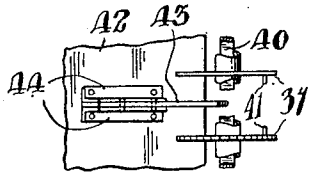


Fig. 6.

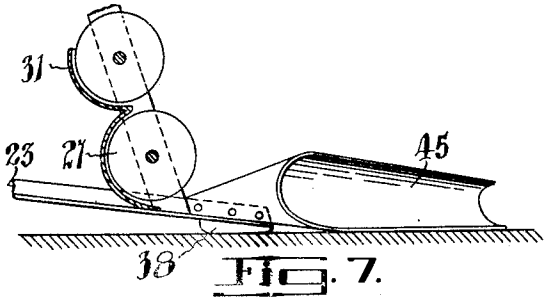


Fig. 7.

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Patented Aug. 15, 1939

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UNITED STATES PATENT OFFICE

2,169,224

SNOW PLOW

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14 Claims. (Cl. 37—43)

Snow plows as commonly used have generally been of the type employing a scraper mounted at the front of a truck or tractor to scrape the snow to the side of the road. This type of snow plow is very objectionable as it results in the formation of banks at the side of the road, which form deep ruts, which readily fill in with drifting snow and make conditions worse than before.

Of recent years attempts have been made to devise snow plows capable of distributing the snow over a considerable area at the side of the road and thus avoid the formation of the objectionable high banks, but such devices have not proven satisfactory in actual use.

My object is to devise a snow plow which will satisfactorily remove snow to any depth likely to be encountered under any normal conditions and distribute it over a large area at the side of the road to avoid the formation of high banks, and to provide such a plow with means for loosening and conditioning "packed" snow or ice so that it may be handled by the regular equipment of the plow.

Another object is to construct a plow so that it may be mounted on an ordinary commercial truck chassis and removed therefrom when desired so that the truck may be used in the summer season for other purposes.

A further object is to devise a novel formed mounting for the plow and its power unit, so that the mounting is used to impart weight above the drive wheels of the truck to increase the tractive effect of the latter and thus avoid the use of weights of various kinds usually employed with snow plows of the old type to give the truck drive wheels the necessary traction.

I attain my object by means of the construction hereinafter described and illustrated in the accompanying drawings in which

Fig. 1 is a side elevation of my improved snow plow applied to a truck;

Fig. 2 a plan view of the same;

Fig. 3 a front view of the plow;

Fig. 4 a plan view of a modified arrangement;

Fig. 5 a sectional detail showing the mechanism for moving packed snow;

Fig. 6 a detail of the same in plan;

Fig. 7 a side view of the mechanism shown in Fig. 4.

In the drawings like numerals of reference indicate corresponding parts in the different figures.

A indicates a motor truck of ordinary construction, 1 being the chassis frame, 2 the engine hood and 3 the driver's cab which is provided with the usual doors 4.

B indicates a supporting frame which is pivoted intermediate its ends on the chassis frame 1, preferably just to the rear of the cab 3.

To the forward end of this frame B is connected the snow removing apparatus C and on the rear end of this frame is mounted the motor or engine D by means of which the snow removing apparatus is driven. It will then be seen that the weight of the engine D is used to in part counter-balance the weight of the snow removing apparatus and thus reduce its frictional engagement with the road surface.

The frame B comprises a cross member 5, which extends below the chassis frame, is then bent upwardly at each side of the chassis frame and then bent outwardly. The upwardly bent portion 5a are provided with bearings for a transverse shaft 6 which is mounted in bearings 7 secured to the chassis frame 1.

8 are longitudinal members, the forward ends of which are secured to the rear of the frame of the snow removing apparatus and extend along each side of the truck outside the fenders, secured intermediate their ends to the ends of the cross member 5 and then directed inwardly and rearwardly over the chassis frame. 9 are other longitudinal members which are positioned below the chassis and have their forward ends secured to the frame of the snow-removing apparatus. These members 9 are connected with the lower central part of the cross member 5 and then inclined upwardly and rearwardly and are joined with the longitudinal members 8 to support a platform 10 on which the engine D is mounted. The members 8 and 9 below the engine platform may be cross braced in any convenient manner to give the necessary rigidity and strength to the structure.

Extending upwardly from adjacent the shaft 6 are uprights 11 secured to the members 5 and from the upper part of these uprights extend truss rods 12, the rear ends of which are secured to the rear end of the frame B, and also truss rods 13 the forward ends of which are connected to the upper part of the plow frame C. A brace 14 at each side connects the top of the plow frame C with the frame members 8.

Positioned between the chassis frame and the rear end of the frame B are heavy coil springs 15, the purpose of which is, when there is any tendency of the snow removing apparatus to lift under working conditions, to increase the pressure on the rear end of the chassis and thus increase

the tractive effect of the rear drive wheels of the truck.

When it is desired to move the truck from place to place on cleared roads, it is desirable that the snow removing apparatus be lifted out of engagement with the road. I therefore secure to the forward part of the truck chassis uprights **16**, between which extends a shaft **17** on which may be wound chains **18**, the free ends of which are connected with the lower part of the plow frame. This shaft is provided with a worm gear **19** which is operated by means of a worm **20**, on a spindle **21**, which spindle is provided with a hand wheel **22** located in a position convenient for operation by the driver. It will be seen that by operating the hand wheel, the shaft **17**, will be rotated to wind and unwind the chains **18**, to raise or lower the forward end of the frame B with the snow removing apparatus secured to its forward end.

To prevent side movement of the forward part of the frame B relative to the truck A, I provide braces **46** extending from the side members **8** and provided with uprights which bear against the side of the chassis frame **1**.

The snow removing apparatus which as before stated, is secured to the forward end of the pivoted frame B comprises a frame **23** adapted to support the various moving parts. This frame comprises a back and sides. Secured to the front of the back is the blower housing **24**, the front portions of which is removable to permit the positioning and removal of the fan **25**, with its shaft **26**.

The fan is preferably formed with a central disk or partition and a series of blades is arranged at each side of the disk. The snow from the conveyors at one side does not therefore interfere with the snow from the conveyors at the other side.

Feeding into each side of the blower are conveyors **27**, **28**, and **29**. The conveyors **28** are preferably arranged co-axially with the blower shaft **26**. The shaft of each conveyor **28** may be either an extension of the blower shaft or it may be tubular and sleeved on the blower shaft. The last mentioned construction, however, is preferred as the conveyors **28** and fan may in that use be driven different speeds.

The conveyors **27**, **28** and **29**, as will be seen from Fig. 1, are arranged in a somewhat inclined line and the conveyors **27** and **29** have one end journalled in the end of the frame **23** and the other end journalled in the side of the blower housing **24**.

Co-operating with the rear sides of the conveyors **27**, **28** and **29** are the housings or troughs **30**, **31**, and **32**, which may be combined to form a unitary construction. The conveyors **27** and **29** discharge into the path of the fan blades, but the housings **31** and **32**, are slightly offset as shown immediately adjacent the blower housing to permit the snow therefrom to be delivered into the path of the fan blades to facilitate its discharge through the outlet **33**, which is located at the top of the blower housing and is provided with a swinging discharge pipe which may be arranged to discharge to either side of the apparatus.

The delivery of the snow into the side of the blower housing at a point within but adjacent the periphery of the fan so that it is engaged by the ends of the blades is very important as the travel of the snow is reduced and there is a "batting" or "striking" of the incoming snow by the fan blades which knocks the snow towards the outlet.

The lower part of the blower housing at the front may be left open, but the upper part, and also the lower part if closed, is wedge shaped to divert any snow encountered by the fan housing to one side or the other into the path of the conveyors.

The blower and conveyors are driven as follows: **34** is the shaft of the engine D from which shaft is driven by means of sprocket chains or otherwise a shaft **35** extending along the side of the truck where it is geared by bevel gearing **36** to a stub shaft **37** journalled on the plow frame having a gear on its end from which is driven by means of sprocket chain the blower shaft **26** and also the conveyors **28**. The conveyors **27** and **29** are driven by means of gears and sprocket chains from the shaft **26**.

The conveyors **27**, **28** and **29** may have continuous flights or may be sectional as may best suit special conditions.

The plow frame **23** is preferably provided with shoes or skids **38** of comparatively large size and having inclined or rounded sides or edges to facilitate sliding over the road surface while removing snow.

On heavily travelled highways the falling snow is rapidly packed to a considerable depth and often forms into ice. This packed snow is difficult to remove, and I therefore provide special means for loosening or breaking up this packed snow or ice into small pieces capable of being carried off by the conveyors and blower.

In the preferred form this means comprises a shaft **40**, journalled on and extending across the front of the frame **23**.

On this shaft is mounted a series of circular saws **37** adapted to saw into the snow. I show the saws formed with projections **41** on their sides for the knocking off of the packed snow or ice.

Instead of the circular saws I may substitute cutter knives of any convenient type. The cutter knives and pick arms are formed with forked shaft engaging portions with bolts passing through the parts of fork to hold them in place. This arrangement permits the replacement of any damaged knife or arm without dismantling or removing the shaft.

Immediately behind the ice or hard snow cutter is a tooth support **42**, the teeth **43** of which project forwardly and assist in chipping off the ice or snow close to the roadway. The teeth **43** are bolted between lugs **44** on the support.

The cutter shaft **40** is preferably made removable so that it may be removed if desired when the apparatus is working in unpacked snow. The cutter shaft **40** is provided with a gear **49** on its end by means of which it is driven from the conveyor **27** by means of a chain **47**.

In Figs. 4 and 7, the cutter shaft is omitted and in place thereof is secured a scraper **45** which may be used in cleaning the road of a light fall of snow.

The conveyor housings or troughs **30**, **31** and **32** or the interior of the blower housing or other parts with which snow contacts may be lined with aluminum, on account of the lesser danger of snow sticking to this material.

The drive means for the upper conveyors **29** is preferably arranged so that these conveyors need not run unless working in very deep snow or drifts.

The engine of the truck is subjected to little, if any, extra load, and the truck may be advancing as slowly as desired, as the engine D takes care of the driving of the fan and conveyors.

The ends of the conveyor flights immediately adjacent the blower are preferably formed with a slight bend which tends to kick the snow into the path of the fan blades of the blower.

The shoes **38** are preferably adjustable relative to the frame **23**, so that the latter may, if desired, be raised relative to the shoes as desired to regulate the spacing between the snow cutting and removing apparatus and the surface of the road. The shoes may be mounted on the lower ends of screws **48** threading through brackets on the frame **23** and provided with hand wheels or other means for adjustment purposes.

What I claim as my invention is:

1. In snow removing apparatus, the combination of a supporting frame; a blower mounted centrally of said frame with its axis arranged transversely of the frame; and a plurality of feed conveyors extending transversely of the frame at each side of the blower in spaced vertical relation and discharging directly into the side of the blower; each conveyor being arranged slightly in advance of the conveyor above it.

2. In snow removing apparatus, the combination of a supporting frame; a blower housing mounted centrally of said frame; a fan journalled in said housing with its axis arranged transversely of the frame; and a feed conveyor extending transversely of the frame at each side of the blower housing in axial alinement with the fan and discharging directly into the side of the housing; and a second conveyor at each side of the housing below and paralleling the first mentioned conveyor and also discharging into the side of the blower housing.

3. In snow removing apparatus, the combination of a supporting frame; a blower housing mounted centrally of said frame; a fan journalled in said housing with its axis arranged transversely of the frame; and a feed conveyor extending transversely of the frame at each side of the blower housing in axial alinement with the fan and discharging directly into the side of the housing; and a second conveyor at each side of the housing below and paralleling the first mentioned conveyor and also discharging into the side of the blower housing; said lower conveyors being slightly in advance of the first mentioned conveyors.

4. In snow removing apparatus, the combination of a supporting frame; a blower mounted on said frame with the axis of its fan arranged transversely of the frame; and a plurality of feed conveyors extending transversely of the frame at one side of the blower in spaced vertical relation and discharging directly into the side of the blower; each conveyor being arranged slightly in advance of the conveyor above it.

5. In snow removing apparatus, the combination of a supporting frame; snow gathering means carried by said frame; and snow and ice loosening means in front of said gathering means; comprising a horizontal rotary shaft, and cutter blades carried by said shaft; a support below and between said shaft and said snow gathering means; and forwardly directed prongs on said support.

6. For use with a motor driven truck, a supporting frame comprising a transverse support adapted to be pivoted on the truck chassis; a pair of upper longitudinal members secured intermediate their ends to said transverse support; a pair of lower longitudinal members secured intermediate their ends to said transverse support, the rear ends of said lower longitudinal members being connected with said first longitudinal members; and a frame for snow removing apparatus, said lower longitudinal members being connected with said last mentioned frame adjacent its bottom and said upper longitudinal members connected with said last mentioned frame above the lower members.

7. For use with a motor driven truck, a supporting frame comprising a transverse support adapted to be pivoted on the truck chassis; a pair of upper longitudinal members secured intermediate their ends to said transverse support; a pair of lower longitudinal members secured intermediate their ends to said transverse support, the rear ends of said lower longitudinal members being connected with said first longitudinal members; and a frame for snow removing apparatus, said lower longitudinal members being connected with said last mentioned frame adjacent its bottom and said upper longitudinal members connected with said last mentioned frame above the lower members; vertical members extending upwardly from said transverse support; and truss members connecting from the upper parts of said vertical members with the rear parts of the upper longitudinal members and the upper part of the frame of the snow removing apparatus.

8. The combination with a motor driven truck of a supporting frame comprising a transverse support pivoted on the truck chassis; a pair of upper longitudinal members secured intermediate their ends to said transverse support; a pair of lower longitudinal members secured intermediate their ends to said transverse support, the rear ends of said lower longitudinal members being connected with said first longitudinal members; and a frame for snow removing apparatus, said lower longitudinal members extending between the front wheels of the truck below the axle and being connected with said last mentioned frame adjacent its bottom and said upper longitudinal members extending along the outside of the forward part of the truck and connected with said last mentioned frame above the lower members.

9. In snow removing apparatus, the combination of a supporting frame; a blower housing mounted centrally of the frame, a fan rotatable in said housing on an axis arranged transversely of the frame; and a feed conveyor extending transversely of the frame at each side of the blower housing, said conveyors being arranged to discharge directly into the side of the blower housing within but adjacent to the periphery of said fan.

10. In snow removing apparatus, the combination of a supporting frame; a blower housing mounted centrally of the frame, a fan rotatable in said housing on an axis arranged transversely of the frame; and a plurality of feed conveyors extending transversely of the frame at each side of the blower housing, said conveyors being arranged to discharge directly into the side of the blower housing within but adjacent to the periphery of said fan.

11. In snow removing apparatus, the combination of a supporting frame; a blower housing mounted centrally of the frame; a fan rotatable in said housing on an axis arranged transversely of the frame; and a feed conveyor extending transversely of the frame at one side of the fan housing, said conveyor being arranged to discharge directly into the side of the blower housing within but adjacent to the periphery of said fan.

12. In snow removing apparatus, the combina-

tion of a supporting frame; a blower housing mounted centrally of the frame, a fan rotatable in said housing on an axis arranged transversely of the frame; and a plurality of feed conveyors extending transversely of the frame at one side of the fan housing conveyor, said conveyor being arranged to discharge directly into one side of the blower housing within but adjacent to the periphery of said fan.

13. In snow removing apparatus, the combination of a supporting frame, a blower housing mounted centrally of the frame, a fan rotatable in said housing on an axis arranged transversely of the frame; and a feed conveyor extending transversely of the frame at each side of the blower housing, and a guide trough extending from each side of said blower housing in which said conveyors operate, said guide trough communicating with the side of the housing within but adjacent the periphery of said fan.

14. In snow removing apparatus, the combination of a supporting frame; snow gathering means carried by said frame; and snow and ice loosening means in front of said gathering means comprising a horizontal rotary shaft and cutter blades on said shaft, said blades having projections on their sides spaced from the ends of the blades adapted to engage the material between the cuts effected by the blades.

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