

Sept. 7, 1937.

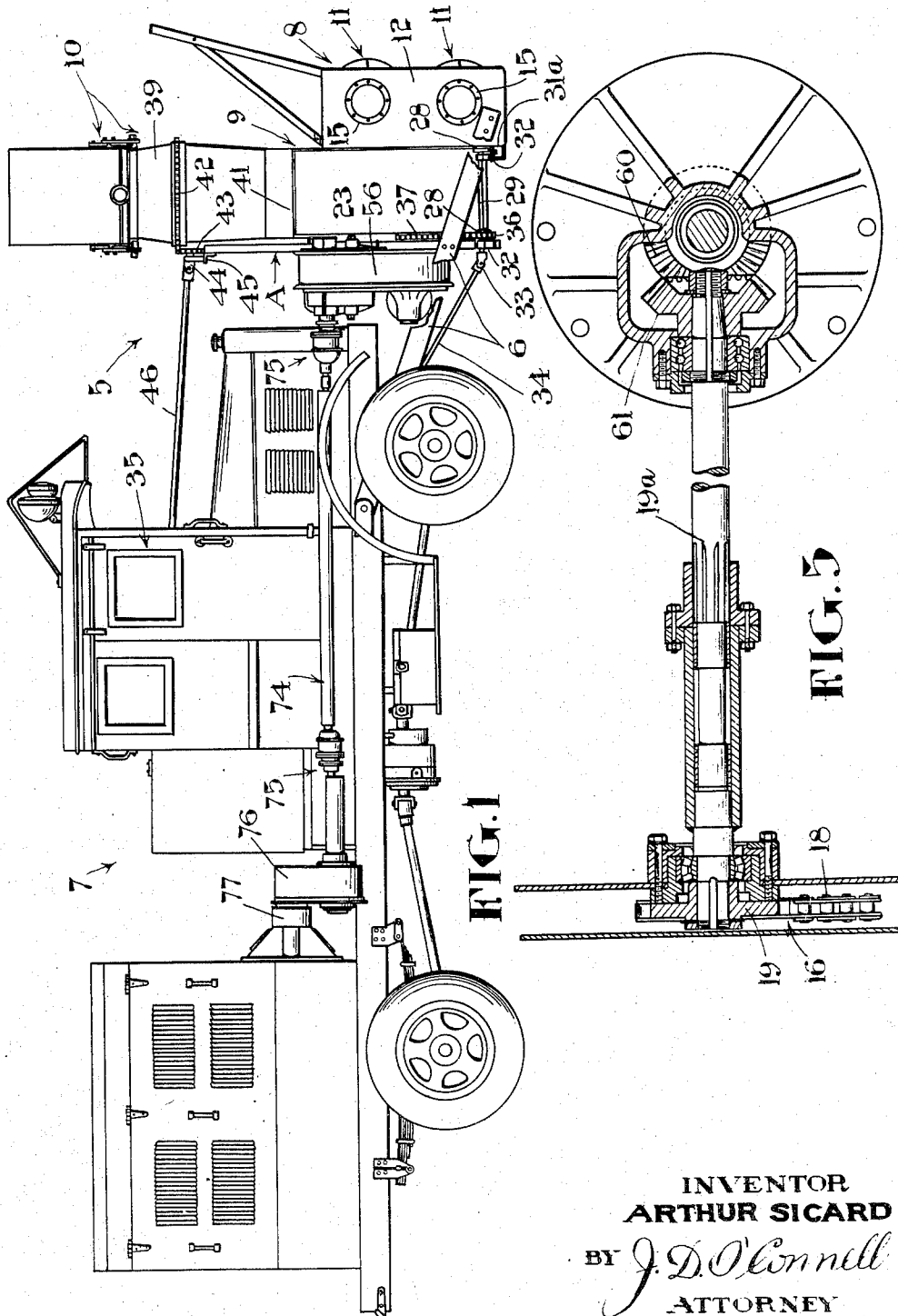
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2,092,536

SNOW REMOVING APPARATUS

Filed Jan. 15, 1937

5 Sheets-Sheet 1



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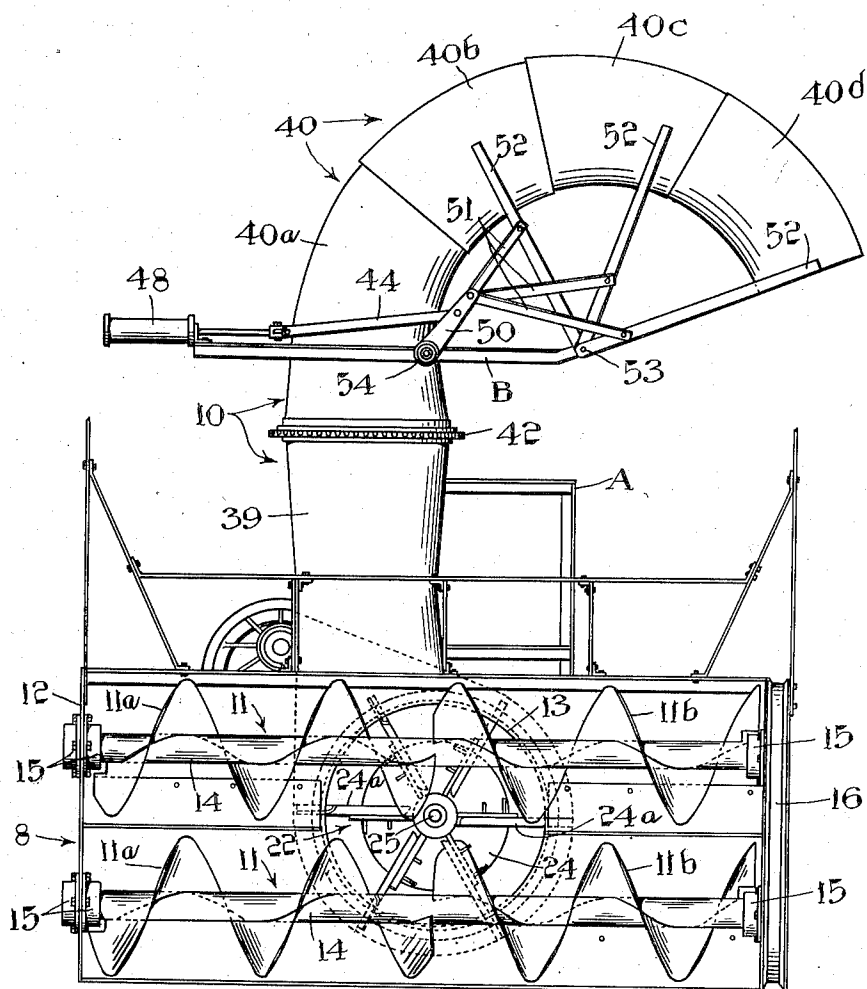


FIG. 2

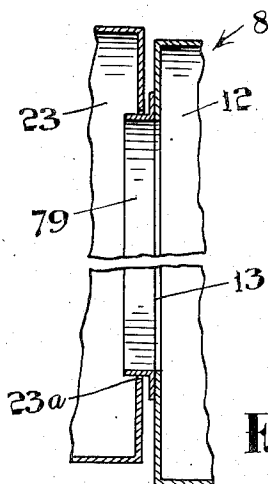


FIG. 7

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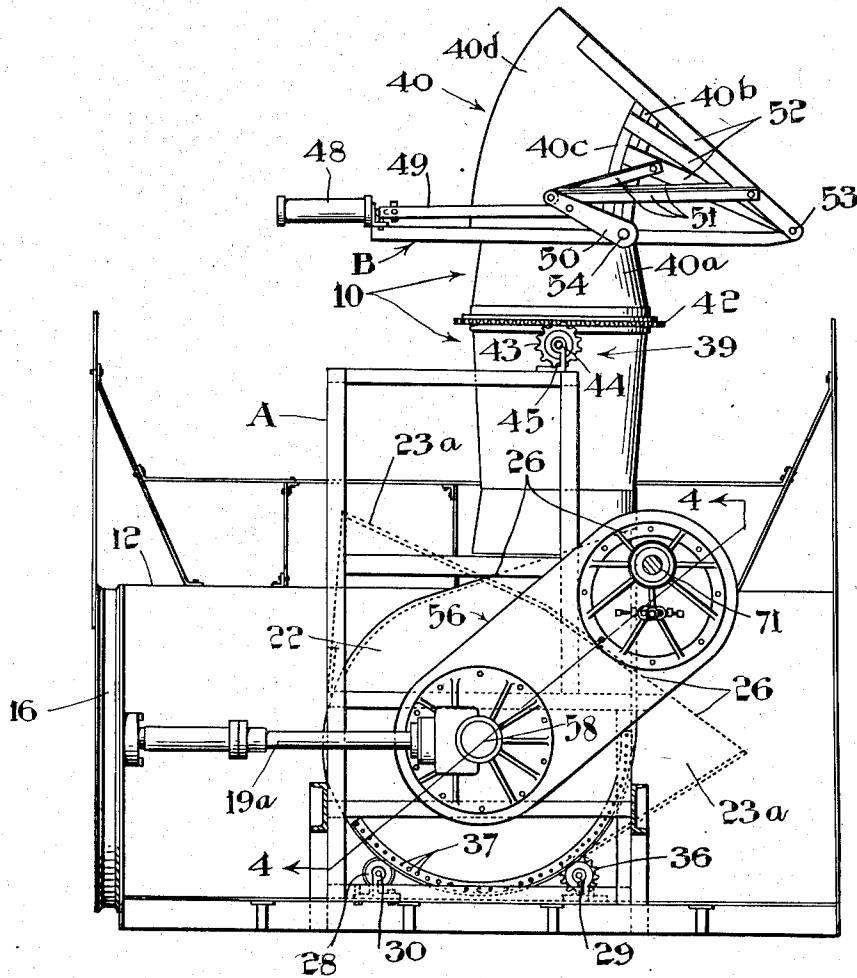


FIG. 3

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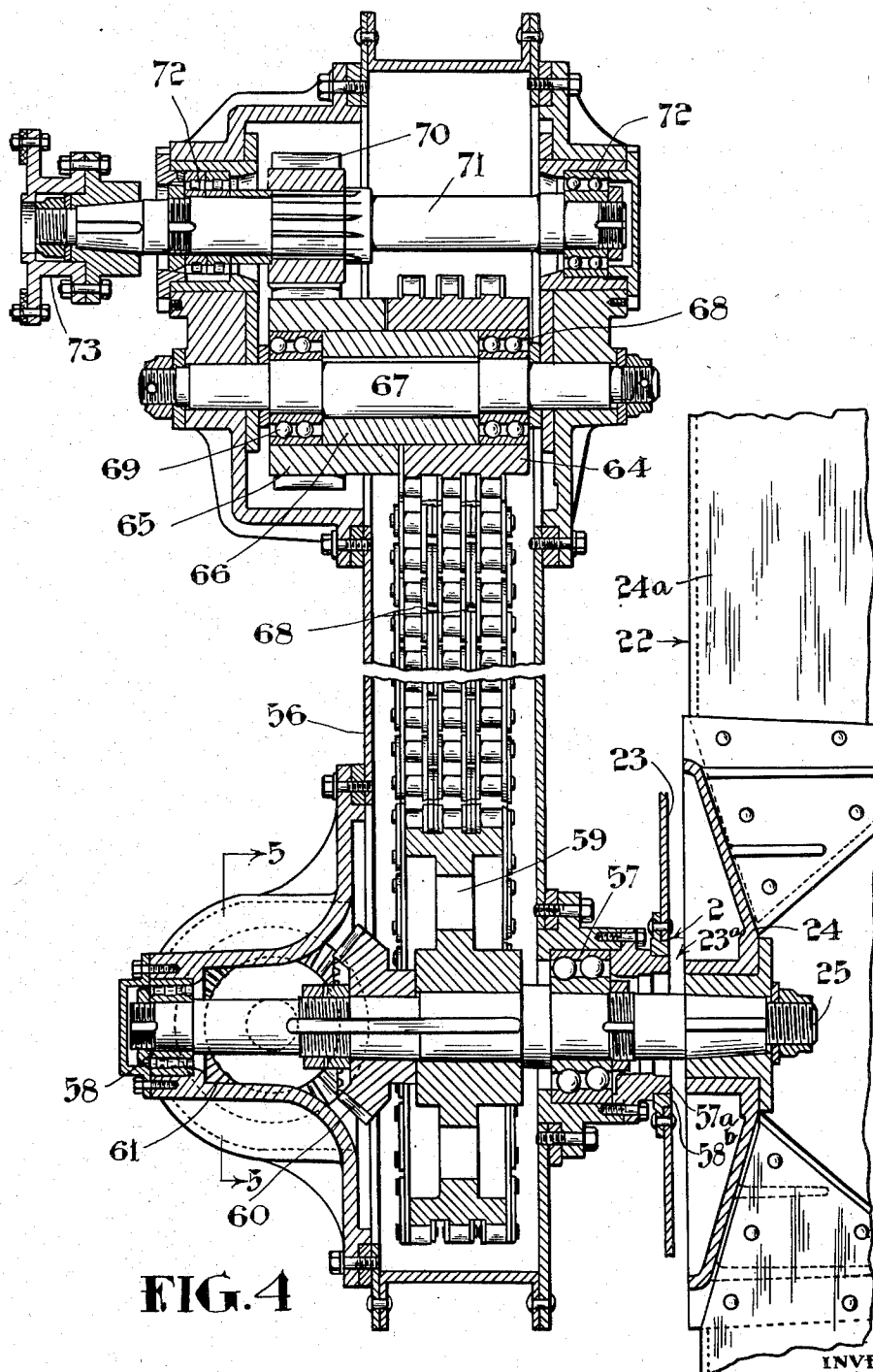


FIG. 4

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5 Sheets-Sheet 5

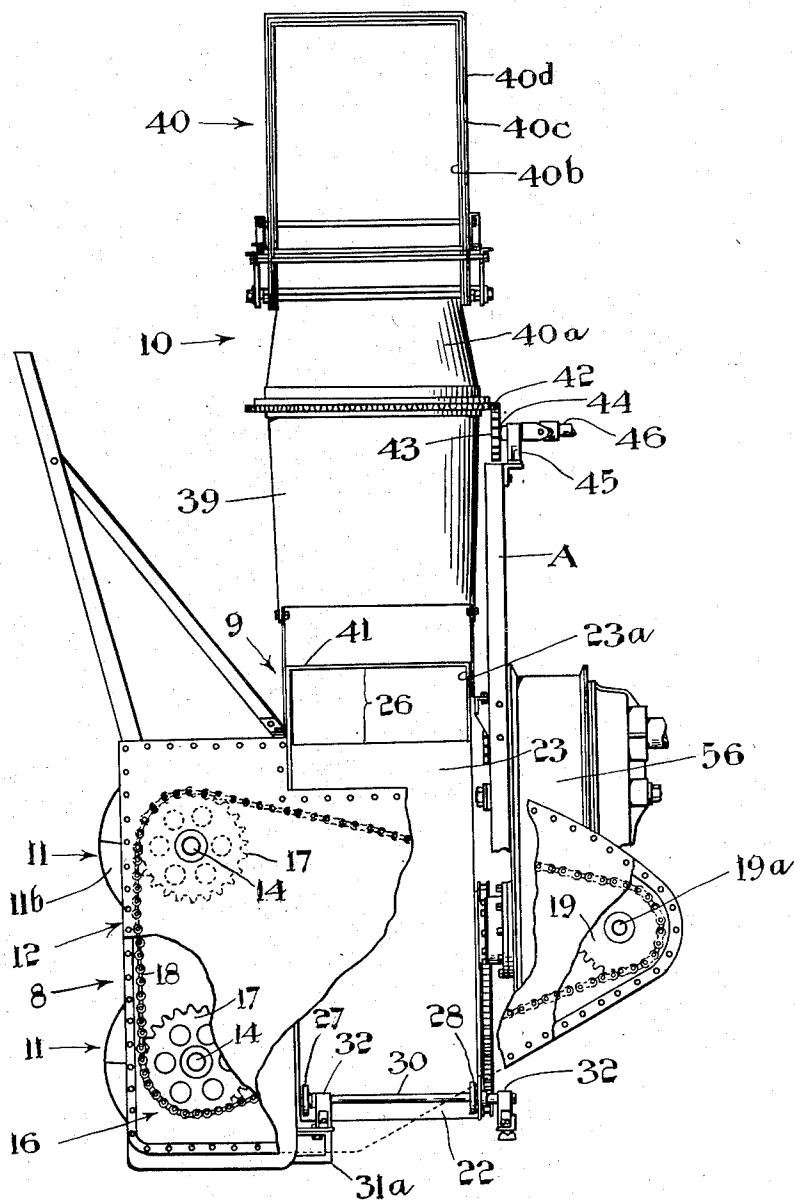


FIG. 6

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2,092,536

SNOW REMOVING APPARATUS

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Application January 15, 1937, Serial No. 120,767

14 Claims. (Cl. 37-43)

This invention relates to improvements in that type of snow removing apparatus in which a blower serves to blow the snow to either side of the roadway, or into a snow loading vehicle.

Such apparatus, when used for road clearing purposes, is generally mounted at the front end of a motor driven truck and comprises a blower into which the snow is fed by suitable conveying means during forward travel of the truck. In some instances the blower is provided with a stationary casing having an outlet communicating with either a stationary or rotatably mounted delivery spout through which the snow is delivered to a suitable point of discharge. In other instances the delivery spout is omitted and the blower casing rotatably mounted so that the peripheral outlet through which the snow is blown by the fan or impeller may be selectively directed toward either side of the roadway. In still other instances two spouts, arranged to direct the snow toward opposite sides of the roadway, are used in combination with a stationary blower casing and a valve which is operated to direct the snow from the blower into either of said spouts.

As distinguished from these prior arrangements, the present invention provides a snow removing apparatus in which a rotatably mounted telescopic delivery spout is used in conjunction with a blower of the rotary casing type. This arrangement combines all the advantages of the various types of snow removing apparatus heretofore employed and is more readily adaptable to the different conditions met with in the clearing of roads and highways. If the roadway is narrow the snow may be thrown a sufficient distance to either side of the road by merely turning the blower casing to direct the outlet opening thereof toward the desired side of the roadway. If the apparatus is working in the middle of a wide roadway the blower casing may then be turned to position its discharge outlet in line with the rotatably mounted delivery spout which enables the snow to be blown a greater distance than is the case when the snow is simply discharged through the outlet of the blower casing. The delivery spout, being rotatably mounted and of telescopic construction, may be extended and directed a considerable distance toward either side of the roadway or in the direction of a snow loading vehicle.

Further features of the invention reside in (a) the provision of improved means for supporting and rotating the blower casing; (b) the provision of novel and practical spout controlling means whereby the extension or collapse of the tele-

scopic spout and the rotation thereof to direct the snow toward the desired point of delivery may be easily and conveniently controlled from the operator's cab of the truck; and (c) the provision of a generally improved construction in which the blower, the snow cutting and conveying unit and the spout are assembled to form a compact unit which may be readily and conveniently mounted at the front of any suitable type of truck.

Proceeding now to a more detailed description of this invention reference will be had to the accompanying drawings, in which—

Fig. 1 is a side elevation of a motor driven truck equipped with my improved snow removing apparatus.

Fig. 2 is a front elevation of the snow removing apparatus per se. In this view the telescopic portion of the delivery spout is shown in extended condition.

Fig. 3 is a rear elevation of the assembly appearing in Fig. 2. In this figure the telescopic spout member is shown in collapsed condition.

Fig. 4 is a sectional view taken substantially along the line 4-4 of Fig. 3.

Fig. 5 is a sectional view taken substantially along the line 5-5 of Fig. 4.

Fig. 6 is a side elevation of the assembly shown in Fig. 2 with parts broken away to disclose interior parts.

Fig. 7 is a detail view of a flange construction by means of which the snow is guided into the blower from an adjacent snow cutting and conveying unit.

In these drawings the improved snow removing apparatus is generally indicated at 5 and is shown carried between vertically swingable supporting bars 6 projecting forwardly from the front end of a motor driven truck 7. Said apparatus 5 comprises, as its principal components, a snow cutting and conveying unit 8, a blower 9, and a delivery spout 10. The snow cutting and conveying unit 8 is positioned directly in front of the blower 9 which is below the delivery spout 10. These parts of the apparatus are mounted between the swinging supports 6 so that they may be conveniently raised or lowered as a unit with reference to the roadway. The raising and lowering means employed for this purpose is not shown since it forms no part of this invention.

The unit 8 comprises upper and lower snow conveying cutters 11 journaled in a casing 12 which is open at the front to serve as a scoop. Casing 12 is provided with a rear opening 13 (Fig. 2) through which snow is delivered to the

blower 9. Each cutter 11 comprises right and left spiral conveyors 11a and 11b fixed to a shaft 14 journaled in bearings 15 carried by the side walls of casing 12. One end of shaft 14 is extended 5 into a casing 16 at one side of the casing 12. These ends of the shafts carry the sprockets 17 which are driven by the chain 18 and the drive sprocket 19, the latter being mounted on a shaft 19a (Fig. 5) which is driven from the blower 10 shaft as hereinafter described. When shafts 14 are revolved by the driving chain 18, the cutters 11a and 11b serve to force the snow toward the centre of casing 12 and then through the opening 13 into the blower 9.

15 The blower 9 comprises a rotary fan or impeller 22 working in a rotatably mounted blower casing 23. The impeller 22 consists of a circular hub plate 24 provided with suitable impeller blades 24a. Hub plate 24 is fixed to the forward 20 end of a blower shaft 25 which projects through an opening 23a in the rear wall of the blower housing 23. The housing 23 is adapted to be turned about the axis of shaft 25 so that its peripheral discharge opening 26 may be directed 25 upwardly or toward either side of the roadway. To this end blower housing 23 is rotatably mounted on two sets of front and rear roller supports indicated at 27 and 28. These two sets of roller supports are respectively carried by two shafts 30 29 and 30 located at opposite sides of the blower shaft and journaled in suitable bearings 31 and 32. The rear end of the blower housing supporting shaft 29 is connected, by a universal joint 33, to the lower end of an operating shaft 34. The 35 upper end of shaft 34 is disposed within the operator's cab 35 where it is fitted with a suitable operating lever or hand wheel (not shown). A pinion 36 fixed to the rear end of shaft 29 meshes with a segmental rack 37 attached to the rear 40 wall of the blower housing 23. It is thus evident that, through the agency of the operating shaft 34, pinion 36 and rack 37, the blower housing 23 may be turned about the shaft 25 to shift the peripheral discharge opening 26 toward either side 45 of the roadway or to an intermediate position directly beneath the lower stationary section 39 of the discharge spout 10.

The discharge spout 10 comprises the previously mentioned lower stationary section 39 and an 50 upper rotatably mounted section 40. At its lower end the stationary section 39 is slotted to provide a passage 41 through which the outlet portion 23a of the blower housing 23 passes when said housing is turned about the shaft 25 to change the 55 position of the blower outlet opening 26. The stationary spout section 39 is carried by a suitable framework A (Figs. 1, 3, and 6) which also carries the rear bearings 32 of the blower housing supporting shafts 29 and 30, the front bearings 60 31 of which are carried, as shown in Fig. 6, by brackets 31a fastened to the rear of the cutter casing 12. The upper section 40 of spout 10 comprises a plurality of telescopic parts designated 40a, 40b, 40c and 40d. The part 40a of the telescopic spout section 40 is mounted to rotate on 65 the stationary spout section 39 and is provided with a circular rack 42 engaged by a pinion 43 fixed to a shaft 44. Shaft 44 is mounted in a bearing 45 on frame A and is operated from 70 within the cab 35 by means of a suitable operating rod 46. The telescopic spout parts 40b, 40c and 40d are extended and collapsed by a cylinder and piston device 48 to which said parts are connected through the medium of connecting rod 75 49, crank arms 50, links 51 and levers 52. It is

not considered necessary to show the fluid supply and exhaust system for the cylinder and piston device 48 since this may be of any suitable type controllable from the operator's cab 35.

When the spout 10 is to be used the parts 40b, 5 40c and 40d are extended to the position shown in Fig. 2 to form an elbow which may be pointed in any desired direction by operating the pinion 43 to turn the spout part 40a about its vertical axis. The blower housing 23 is then revolved by 10 means of the pinion 36 and rack 37 to position its discharge opening 26 directly in line with the spout part 39. With the parts in this position the snow may be delivered through spout 10 to a loading vehicle or may be thrown a considerable distance 15 to either side of the roadway.

In the present instance the levers 52 are shown as having their upper ends fixed to the spout parts 40b, 40c and 40d and their lower ends mounted 20 on a pivot shaft 53 carried by one end of a frame structure B fixed to turn with the spout part 40a. Frame B also carries a pivot shaft 54 to which the lower ends of the crank arms 50 are attached, the upper ends of said arms being connected by the links 51 to intermediate portions of the levers 25 52. The cylinder and piston device 48 is mounted on the end of frame B remote from the pivot shaft 53.

As shown in Fig. 4 the blower shaft 25 is journaled in the lower portion of a chain drive casing 30 56 by means of suitable bearings 57 and 58. The forward end 57a of the bearing 57 fits within a bearing ring 58b fastened to the blower housing 23 within the opening 23a provided for the passage of shaft 25. Within the casing 56, shaft 25 35 is provided with a sprocket wheel 59 and a bevel gear 60 (compare Figs. 4 and 5) which meshes with a similar gear 61 fixed to the shaft 19a which carries the previously mentioned cutter drive sprocket 19. The sprocket wheel 59 on shaft 25 40 is connected by chains 63 to a similar sprocket wheel 64 located in the upper portion of casing 56. The sprocket wheel 64 and a pinion 65 are secured together by a coupling sleeve 66 and are rotatably mounted on a cross shaft 67 by suitable bearings 45 68 and 69. The pinion 65 meshes with a pinion 70 fixed to a shaft 71 journaled in the casing 56 above shaft 67. Shaft 71 is journaled in suitable bearings 72 and has its rear end fastened by coupling means 73 to the forward end of a 50 main drive shaft 74. Shaft 74 (see Fig. 1) is made in sections connected together by flexible joints 75 to permit said shaft to accommodate itself to the raising and lowering of the apparatus 5 with respect to the roadway. The rearmost section of shaft 74 extends into a casing 76 where it is suitably geared to the crank shaft 77 of a Diesel engine or other suitable power plant 78 55 mounted at the rear of the truck 1.

As shown in Fig. 7, the casing 12 of the snow 60 cutting and conveying unit 8 is preferably provided with an annular flange 79 surrounding the opening 13. This flange projects rearwardly through the front opening 23a of the blower casing 23 and serves to prevent escape of the snow 65 as it passes rearwardly from casing 12 to casing 23.

Having thus described my invention, what I claim is:—

1. In mobile snow removing apparatus of the 70 character described, the combination of a blower including a rotatably mounted vertical blower casing provided with a front inlet and a peripheral outlet, a delivery spout mounted above the blower to receive snow from the outlet of the 75

blower casing when said outlet is positioned directly beneath said spout, and means for rotating the blower casing relatively to said spout to position said outlet beneath the spout or to direct said outlet toward either side of the roadway along which the apparatus is travelling.

2. Snow removing apparatus as set forth in claim 1 in which the spout is rotatably mounted so that its discharge end may be pointed in different directions.

3. Snow removing apparatus as set forth in claim 1 in which the spout comprises an elbow having its snow receiving end mounted to rotate about a vertical axis so that the discharge end of the elbow may be pointed in different directions.

4. Snow removing apparatus as set forth in claim 1 in which the spout comprises an elbow-shaped member of telescopic construction.

5. Snow removing apparatus as set forth in claim 1, in which the spout comprises a rotatably mounted telescopic member, the discharge end of which may be swung to point in different directions.

6. Snow removing apparatus as set forth in claim 1, in which the spout comprises a stationary part immediately adjacent the blower and an upper part rotatable with reference to said stationary part.

7. Snow removing apparatus as set forth in claim 1 in which the spout comprises a stationary part adjacent the blower and an upper part rotatable with reference to the stationary part, said upper part being in the form of an elbow.

8. Snow removing apparatus as set forth in claim 1 in which the spout comprises a stationary part adjacent the blower and an upper part rotatable with reference to the stationary part, said upper part comprising an elbow-shaped member of telescopic construction.

9. Snow removing apparatus of the character described including a blower into which the snow is directed as the apparatus advances along a roadway, said blower comprising an impeller mounted to revolve about a horizontal axis and a substantially cylindrical vertically disposed blower casing housing said impeller, said casing being provided with a front inlet and a peripheral outlet, and parallel roller supports on which

the casing is mounted so that it may be rotated about the axis of the impeller to direct said outlet toward either side of the road.

10. Apparatus as set forth in claim 9 including parallel rotary shafts carrying said roller supports and means for rotating the casing in response to rotation of one of said shafts.

11. Apparatus as set forth in claim 9 including a pair of shafts carrying said roller supports, a rack carried by said casing, and a pinion fixed to one of said shafts in mesh with said rack.

12. In snow removing apparatus of the character described, the combination of a casing provided with front and rear openings, means operating in said casing to feed snow through the rear opening as the apparatus advances along a roadway, a blower positioned directly behind said casing, said blower including a rotatably mounted blower casing having a front axial inlet and a peripheral outlet, the former registering with the rear opening of the first mentioned casing, and a delivery spout positioned above the blower to receive snow from the blower casing when said outlet is positioned directly beneath the receiving end of the spout, and means rotatably mounting said spout so that the discharge end thereof may be pointed in different directions.

13. The combination set forth in claim 12 in which the spout comprises an elbow-shaped member of telescopic construction.

14. Snow removing apparatus of the character described comprising a casing provided with front and rear openings, conveying means operating in said casing to feed snow through the rear opening as the apparatus advances along a snow covered roadway, a blower positioned directly behind said casing, said blower including a rotatably mounted impeller housing having a front axial inlet and a peripheral outlet, the former registering with the rear opening of said casing and a delivery spout mounted above the blower, said spout comprising a lower stationary part to which the snow is delivered by the blower when the outlet of the blower housing is positioned directly below said part and an upper part rotatable with respect to said lower part, said upper part comprising an elbow-shaped member of telescopic construction.

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