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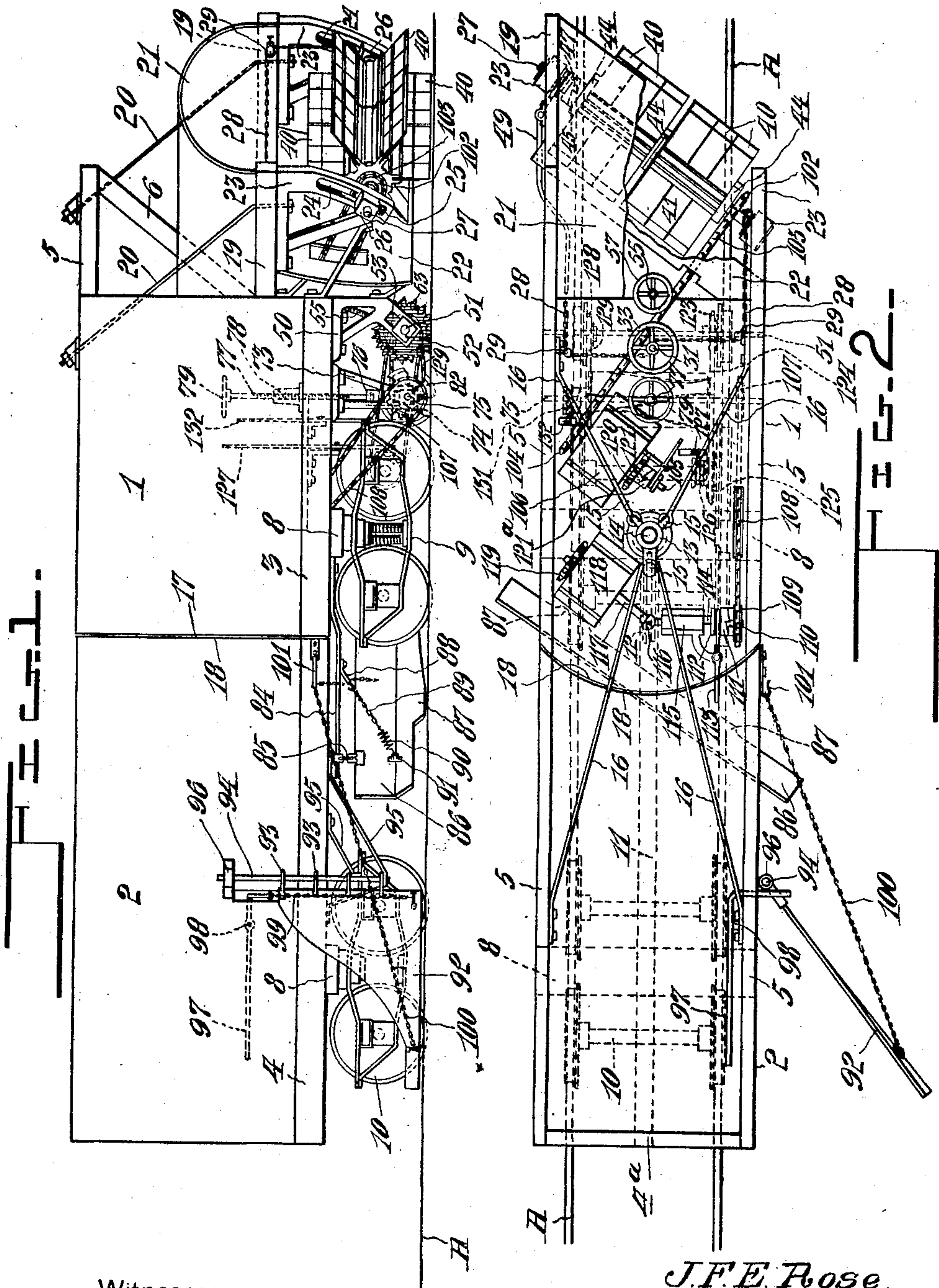
J. F. E. ROSE.

PATENTED AUG. 14, 1906.

SNOW AND ICE REMOVING APPARATUS.

APPLICATION FILED OCT. 9, 1905.

3 SHEETS—SHEET 1.



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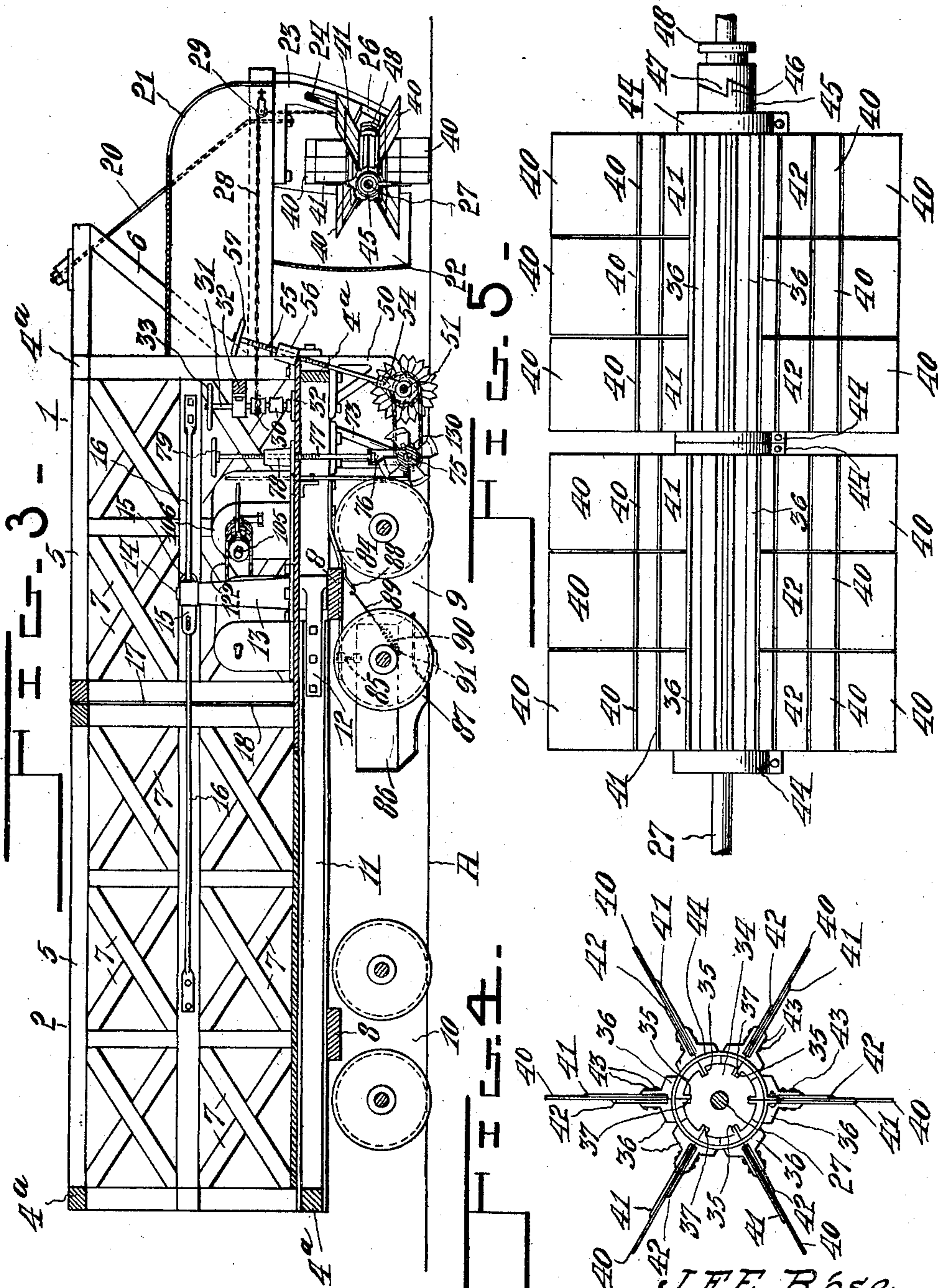
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3 SHEETS—SHEET 2



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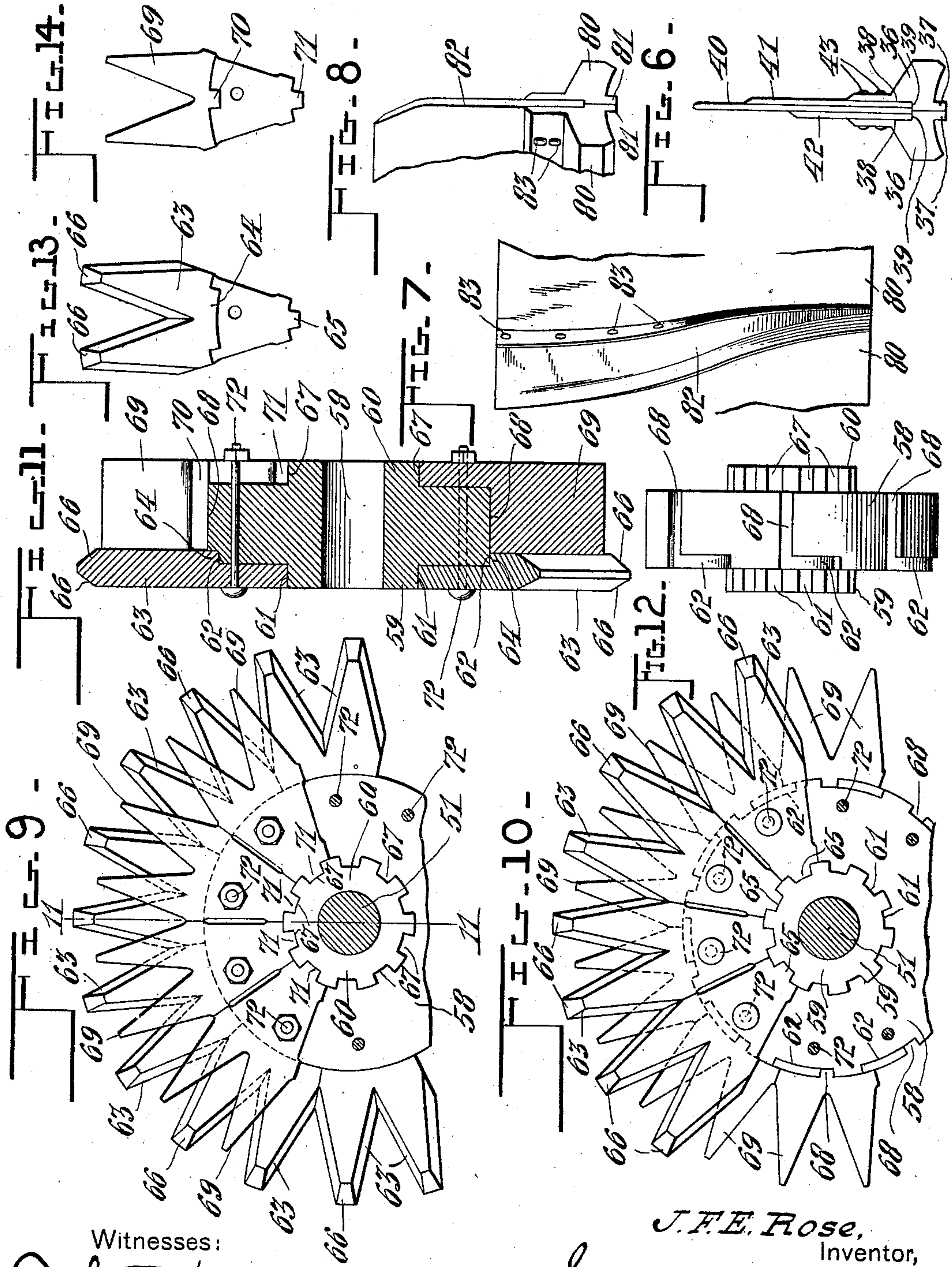
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3 SHEETS—SHEET 3



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UNITED STATES PATENT OFFICE.

JOSEPH F. E. ROSE, OF MONTREAL, CANADA.

SNOW AND ICE REMOVING APPARATUS.

No. 828,572.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed October 9, 1905. Serial No. 281,925.

To all whom it may concern:

Be it known that I, JOSEPH F. E. ROSE, a subject of the King of Great Britain, residing in the city and district of Montreal, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Snow and Ice Removing Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to snow and ice removing apparatus particularly adapted for street-railways.

The object of my invention is to provide an efficient apparatus for completely removing snow and ice from the tracks of street-railways and for removing snow and ice from a distance to one side of the tracks; and my invention consists of the construction, combination, and arrangement of parts, as herein illustrated, described, and claimed.

In the accompanying drawings, forming part of this application, I have illustrated one form of embodiment of my invention, in which drawings similar reference characters designate corresponding parts, and in which—

Figure 1 is a side elevation of my invention. Fig. 2 is a plan view. Fig. 3 is a central vertical section taken longitudinally of my invention. Fig. 4 is an end elevation of the snow-plow of my invention detached and showing its shaft in section. Fig. 5 is a plan view of the snow-plow detached. Fig. 6 is an enlarged detail in end elevation, one of the blades of the snow-plow showing its connecting members. Fig. 7 is a fragmentary detail of a portion of an ice-removing member. Fig. 8 is a fragmentary detail, in end elevation, of one blade of an ice-removing member, showing its connected parts. Fig. 9 is a fragmentary detail, partly in side elevation and partly broken away, showing a portion of a member adapted to remove ice from the rails. Fig. 10 is a fragmentary detail in side elevation, partly in section and partly broken away, of the opposite side of the device shown in Fig. 9. Fig. 11 is a vertical section on line 11-11 of Fig. 9. Fig. 12 is a plan view of the hub of the ice-removing device used to clean the rails. Fig. 13 is an enlarged detail, in side elevation, of the teeth used on the ice-removing device; and Fig. 14 is an enlarged detail, in side elevation, of a tooth used on the ice-removing device.

Referring to the drawings, 1 designates the front section, and 2 the rear section, of my apparatus. The front section is supported on beams 3 and the rear section on beams 4, said beams being connected to the end sills 4^a. The top beams 5 are provided on each section and extend forward of the front section 1 and are braced by the members 6. The body portion of each section is provided with a plurality of braces 7.

Disposed under each section are body-bolsters 8, to which the front truck 9 and the rear truck 10 are rigidly secured. Secured to the rear truck is a center beam 11, extending longitudinally forward and having secured to its extreme forward end a yoke 12, provided with a vertical opening. Disposed on the floor of the front section 1 is a standard 13, through which is projected a vertical pin 14, extending through the opening in the yoke 12, thereby pivotally connecting the front section 1 and the rear section 2.

The standard 13 is provided with eyes 15, which are engaged by the braces 16, said braces extending radially therefrom and having their opposite ends secured to the sides of the front and the rear section. The rear end of the front section 1 is convexed, as shown at 17, and the forward end of the rear section 2 is concaved, as shown at 18. By the construction described each section 1 and 2 is permitted to traverse a curve independently of the other section, said sections being pivotally connected by the longitudinal center beam 11. The forward section 1 has secured thereto beams 19, which are braced by the members 20, extending to the top beams 5.

Carried by the beams 19 is a hood 21, and extending below said hood and secured to said beams is a shield 22, set at an angle to the tracks A. The object of the hood and shield is to prevent the snow and ice being thrown back into the car or against the mechanism hereinafter described.

Secured to the under sides of the beams 19 are bearing-supporting members 23, provided with slots 24. These bearing-supports are disposed at different distances from the forward end of the front section 1, so that a shaft carried thereby will be at an angle to the tracks A. Disposed in the bottom of the slots 24 are springs 25, adapted to support the axle-boxes 26, slidably disposed in said slots. Carried by the boxes 26 is a shaft 27. Connected to the axle-boxes 26 are chains 28, which are passed over the pulleys 29 and

extend to drums 30 on the rod 31, which rod is rotatably supported in bearings 32 on the forward section 1 and is provided with a hand-wheel 33.

5 The hub 34, one-half of the length of the shaft 27, is secured on said shaft and is provided with slots 35 in its periphery. Arranged around said hub is a plurality of clamping members 36, arranged in pairs and
10 formed with lugs 37 on one end. These lugs 37 are disposed in the slots 35 in the periphery of the hub 34. The inner faces of the outer ends of the clamping members are cut away, as shown at 38, leaving shoulders 39.
15 Disposed between the cut-away faces 38 of each pair of clamping members 36 is a central blade 40, and on opposite sides of the blade 40 are blades 41 42, formed from resilient metal and secured together by rivets 43.
20 Disposed at each end of the hub 34 and locked on the shaft 27 in any suitable way are collars 44, adapted to permit movement of the clamping members 36 longitudinally of the shaft 27. Disposed on the other half
25 of the shaft 27 is a loosely-mounted hub 45, similar in construction to the hub 34 and carrying similar blades 40, 41, and 42. The hub 45 is provided at its outer end with a clutch member 46, adapted to engage a corresponding clutch member 47, formed integral with a
30 slidable collar 48, which collar is adapted to rotate with the shaft 27 and is slidable longitudinally thereof by means of the lever 49, which extends back to the front section 1 of
35 the apparatus.

The shaft 27 being rotated, as hereinafter described, the snow is swept from between the tracks A by the movement of the blades secured on said shaft. If it is desired to
40 clean the snow from only one side of the tracks, the clutch 47 is actuated out of engagement with the clutch 46, whereby only one-half of the sweeper will be actuated.

Secured to the under side of the beams 3 of
45 the front section 1 are hangers 50, adapted to support a shaft 51, carried by the axle-boxes 52, which boxes are slidably disposed in the slots 53, formed in the hangers 50. Secured on the shaft 51 is a yoke 54, connected to a
50 rod 55, which rod is provided with screw-threads on its exterior surface and is disposed in an interiorly-screw-threaded sleeve 56, carried on the floor of the car-section 1. A suitable hand-wheel 57 is secured on the up-
55 per end of the rod 55. Adjustment of the shaft and its connecting members may be had by means of the screw-threaded rod and sleeve.

Secured on the shaft 51, at each end there-
60 of, over the rails A are hubs 58. Each of these hubs is provided with an annular flange 59 on one side and a similar flange 60 on the opposite side. The flange 59 is provided with a plurality of slots 61, and the hub is
65 provided with a plurality of peripheral slots

62. Disposed on that side of the hub 58 are a plurality of double teeth 63. Formed on each tooth is a shoulder 64, which is disposed in the peripheral slot 62, and on the end of each of said teeth is formed a lug 65, which is
70 disposed in the slot 61 in the flange 59. These teeth 63 are provided with ends having inclined faces 66.

The flange 60 is provided with a plurality of slots 67, and the adjacent periphery of the
75 hub 58 is provided with a plurality of slots 68. Carried by this side of the hub 58 is a plurality of teeth 69, each formed with a shoulder 70, which is disposed in the slots 68 in the periphery of the hub, and each of said
80 teeth is provided with a lug 71, which is disposed in the adjacent slot 67 in the flange 60. Disposed transversely through each of said teeth and through the hub 58 is a plurality of
85 bolts 72, adapted to hold the teeth 63 and 69 firmly on the hub.

The object of the teeth 69 is to free the upper face of the rails A from ice, and the object of the teeth 63 is to remove the ice from one
90 side of the rails A, so as to afford a clean surface for the rim of the ordinary form of flanged wheel used on street-railway cars.

Disposed on the under side of the beams 3 of the section 1 are a plurality of slotted
95 hangers 73, similar to the hangers 50 already described. Carried by the slotted hangers 73 are adjustable boxes 74, which support a shaft 75. Secured to the shaft 75 is a yoke 76, connecting with a screw-threaded rod 77,
100 which rod is disposed in the interiorly-screw-threaded sleeve 78 and is provided with a hand-wheel 79 at its upper end. By means of this construction the shaft 75 and its connecting parts may be adjusted vertically.
105 Disposed around the shaft 75 is a plurality of sectional members 80, each provided with lugs 81, adapted to fit into a hub similar to 34, which hub is disposed on a shaft 75 and held in place by collars 44, as hereinbefore
110 described. Disposed between each pair of the sectional members 80 is a helical blade 82, secured in position by means of the rivets 83. The shaft 75 being rotated, as hereinafter described, the blades 82 will scrape the
115 ice from between the rails A.

Secured to the under side of the beams 3 are rods 84, which rods extend under the rear
section 2. Disposed on the rods 84 are links 85, which pivotally support an angular
120 scraper 86, so that it lies at an angle to the tracks A. The lower edge of the angular scraper is provided with lips 87, adapted to bear on the upper surface of the rails A. Secured to the rods 84 are hooks 88, to which
125 are connected chains 89, the opposite end of the chains connecting with springs 90, which springs in turn are connected to the eyes 91, by means of which the angular scraper is maintained in place when the apparatus is
130 in motion.

Disposed to one side of the section 2 of the apparatus is a wing 92, provided with eyes 93 on its vertical inner end, through which eyes is disposed a vertical rod 94, supported by brackets 95 on the under side of the beam 4, and also supported by the upper bracket 96, secured on the side of the rear section 2.

The lever 97 is pivoted at 98 and has one end connected, by means of the chain 99, to the lower end of the wing, whereby the same may be adjusted vertically. A chain 100 is secured to the outer end of the wing 92 and its opposite end disposed on a hook 101, which hook is secured on the beam 4. By means of the chain 100 the wing 92 is maintained at any desired angle with relation to the side of the car.

Secured on the shaft 27, carrying the snow-plow, is a sprocket-wheel 102, over which is disposed a chain 103, connecting with a sprocket-wheel 104, which latter sprocket-wheel is secured on the shaft 105 of a motor 106, suitably supported on the front section 1 of the apparatus. By means of this construction the snow-plow may be rotated.

Secured on the shaft 75 is a sprocket-wheel 107, over which is run a chain 108, connecting with a sprocket-wheel 109, which carries one side 110 of a clutch, which is loosely carried on a shaft 114. A corresponding clutch 111 is slidably secured on the shaft 114 and adapted to rotate therewith and is provided with a collar 112. The clutch member 111 may be actuated into engagement with the clutch member 110 by means of the lever 113, whereby when the shaft 114 is rotated the shaft 75 will be rotated and the helical blades 82 caused to rotate, and thereby remove ice remaining between the rails A after the sweeper has passed thereover.

The shaft 114 is carried in a bearing 115 and has on its end opposite the clutch 110 a knuckle 116. Connected to the knuckle 116 is one end of a motor-shaft 117 of the motor 118, the opposite end of said shaft carrying a sprocket-wheel 119 in alinement with a sprocket-wheel 120, loosely mounted on the end of the shaft 105 of the motor 106. The sprocket-wheel 120 carries a clutch member 121, and said sprocket-wheels 119 and 120 are connected by a chain 122. A suitable clutch 121^a is slidably disposed on the end of the shaft 105 adjacent the clutch member 121, whereby movement of the sprocket-wheel 120 will be communicated to the shaft 105 and from thence to the snow-plow.

It will be noted that the motors 106 and 118 are disposed at an angle to the line of movement of the car-section 1 and that their shafts are parallel to each other and parallel to the snow-plow shaft 27, so that if the motor 106 becomes disabled the snow-plow may be driven by the motor 118 by means of the chains and sprocket-wheels described.

Secured on the shaft 51 is a sprocket-wheel 123, over which is run a chain 124, connecting with a sprocket-wheel 125, loosely mounted on one of the axles of the truck which supports the front section 1. Secured on said axle is a clutch 126, adapted to slide into engagement with the corresponding clutch on the sprocket-wheel and adapted to be actuated by the lever 127, whereby the shaft 51 may be rotated from said front axle.

Secured on the shaft 51 is a sprocket-wheel 128, over which is run a chain 129, connecting with a sprocket-wheel 130, loosely mounted on the shaft 75, which carries the ice-cutting blades 82. A clutch 131 is slidably disposed on the shaft 75 and adapted to rotate therewith and may be caused to engage the sprocket-wheel 130 by means of the lever 132, whereby the shaft 51 may be rotated from the shaft 75, which is rotated by the motor 118.

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

1. In a device of the character described, a wheeled supporting-car comprising two sections, means connecting said sections, a snow-plow, and a plurality of ice-cutting members carried by one section, and means for actuating the snow-plow and ice-cutting members.

2. In a device of the character described, a wheeled supporting-body comprising a plurality of sections pivotally connected, a rotary snow-plow, and a plurality of rotary ice-cutting members carried by one section, and means for actuating the snow-plow and the ice-cutting members.

3. In a device of the character described, a wheeled supporting-body comprising a front section having a rounded rear end and a rear section having a curved front end, means pivotally connecting said sections together, a rotary snow-plow, and a plurality of rotary ice-cutting members carried by the front section, and means for actuating the snow-plow and the ice-cutting members.

4. In a device of the character described, a wheeled supporting-body comprising a front section, a standard on the front section provided with an opening therethrough and provided with eyes thereon, a rear section, a longitudinal beam secured to the rear section, a yoke on said beam provided with an opening therein registering with the opening in said standard, a pin disposed through said openings and pivotally connecting said sections, braces having one of their ends disposed in said eyes and having their opposite ends secured to said sections, a rotary plow carried by the front section, a plurality of ice-cutting members carried by the front section, and means carried by the front section for actuating the plow and the ice-cutting members.

5. In a device of the character described, a supporting-body comprising a plurality of

pivotal-ly-connected sections, a rotary snow-plow carried by one of said sections, a plurality of ice-cutting members carried by one of said sections, means carried by one of said sections for rotating the snow-plow and ice-cutting members, and a scraper carried by one of said sections.

6. In a device of the character described, a wheeled supporting-body comprising a front and rear section, a rotary snow-plow carried by the front section, means connecting said sections, means for adjusting the plow vertically, a plurality of ice-cutting members carried by the front section, means for adjusting said ice-cutting members vertically, and means for actuating the snow-plow and the ice-cutting members.

7. In a device of the character described, a wheeled supporting-body comprising a front and rear section, a rotary snow-plow carried by the front section, a plurality of flexible members connected to the snow-plow, a rod carried by the front member, a hand-wheel on the rod, a plurality of drums on the rod adapted to receive the flexible members, a plurality of ice-cutting members carried by the front sections, means for adjusting said ice-cutting members vertically, and means for actuating the snow-plow and the ice-cutting members.

8. In a device of the character described, a wheeled supporting-body comprising a front and rear section, a rotary snow-plow carried by the front section, means for adjusting the plow vertically, a plurality of ice-cutting members carried by the front sections, rods connected with the ice-cutting members and provided with screw-threads thereon, interiorly-screw-threaded sleeves adapted to receive said rods, a hand-wheel on each of said rods, and means for actuating the snow-plow and the ice-cutting members.

9. In a device of the character described, a wheeled supporting-body provided with beams extending forwardly thereof, a hood carried by said beams, a shield carried by said beams below the hood, a rotary snow-plow carried by the forward end of said beams and comprising a plurality of sections, a plurality of ice-cutting members carried by said body, and means carried by said body and adapted to actuate the snow-plow and the ice-cutting members.

10. In a device of the character described, a wheeled supporting-body provided with beams extending forwardly thereof, hangers carried by said beams and provided with slots therein, springs disposed in said slots, boxes disposed in said slots on said springs, a shaft carried by said boxes, a plurality of blades secured on the shaft, a plurality of ice-cutting members carried by said body, and means adapted to actuate the snow-plow and said ice-cutting members.

11. In a device of the character described, a

wheeled supporting-body, a shaft carried by the forward part of said body, a hub disposed on said shaft and provided with longitudinal slots therein, a plurality of members connected in pairs and provided with lugs disposed in said slots in said hub, collars on said shaft adapted to maintain said hub in position, a plurality of ice-cutting members carried by said body, and means for rotating said shaft and said ice-cutting members.

12. In a device of the character described, a wheeled body, a shaft carried by the forward end of said body, a plurality of hubs on said shaft, one of which is loosely mounted, a plurality of blades, of different lengths, carried by said hubs, collars disposed on said shafts adjacent said hubs, a clutch member on said shaft, means for disengaging said clutch member, a plurality of ice-cutting members carried by said body, and means for actuating the shaft and said ice-cutting members.

13. In a device of the character described, a wheeled supporting-body, a shaft carried by the forward end of said body, means for adjusting the shaft vertically, a plurality of sections of blades secured on said shaft, each section comprising a plurality of blades, a plurality of ice-cutting members carried by said body, means for actuating said shaft and said ice-cutting members, and means for rendering inoperative one section of said blades.

14. In a device of the character described, a wheeled supporting-body comprising a plurality of sections, a shaft carried by one section, a plurality of blades secured on said shaft, a sprocket-wheel on said shaft, a chain on said sprocket-wheel, a second sprocket-wheel adapted to receive said chain, and a motor adapted to rotate said second sprocket-wheel.

15. In a device of the character described, a wheeled body, a snow-plow carried by said body and comprising a plurality of sections, hangers secured to said body, a shaft carried by said hangers, a plurality of ice-cutting members secured adjacent opposite ends of said shaft, a second ice-cutting member carried by said body, and means for actuating the snow-plow and said ice-cutting members.

16. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried by said body, a pair of ice-cutting members carried by said body each comprising a central hub, a plurality of blades secured on opposite sides of said hub, a second ice-cutting member carried by said body adjacent said ice-cutting members, and means for actuating the snow-plow and said ice-cutting members.

17. In a device of the character described, a wheeled supporting-body, a snow-plow carried by the forward end of said body, a plurality of ice-cutting members carried adjacent each side of said body, each comprising a hub provided with peripheral slots and provided

with a slotted flange on each side thereof, a plurality of double teeth, each provided with a plurality of lugs adapted to engage the slots in said flanges and said peripheral slots, and connecting members disposed through said teeth and said hub, a second ice-cutting member extending transversely of and supported by said body, and means for actuating the snow-plow and said ice-cutting members.

18. In a device of the character described, a wheeled supporting-body, a snow-plow carried by the forward end thereof, a shaft supported by said body, a plurality of circular ice-cutters carried by said shaft, a second shaft supported by said body, a plurality of helical blades secured on said shaft, and means carried by said body adapted to actuate said snow-plow and said shafts.

19. In a device of the character described, a wheeled supporting-body, a snow-plow carried by the forward end of said body, a shaft supported by said body, ice-cutting members carried adjacent each end of said shaft, a second shaft supported by said body, a hub on said second shaft provided with slots therein, a plurality of connecting members disposed in pairs and provided with lugs adapted to engage the said slots, a helical blade secured between each pair of said connecting members, and means carried by said body adapted to actuate the snow-plow and said shafts.

20. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried by said body, means for actuating said snow-plow, a shaft carried by said body, a plurality of ice-cutting members disposed on said shaft, a sprocket-wheel on said shaft, and means driven by the wheels of said supporting-body adapted to drive said sprocket-wheel, an ice-cutting member disposed transversely of and supported by said body, and means carried by the body for actuating said transverse ice-cutting member and said snow-plow.

21. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried by the forward end of said body, a plurality of ice-cutting members carried adjacent the front end of said body, and a transverse ice-cutting member carried by said body, a motor adapted to actuate the snow-plow, a second motor in alinement with the first motor adapted to actuate said transverse ice-cutting member, and means for connecting the shafts of said motors.

22. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried thereby, a motor adapted to drive the snow-plow and provided with a shaft, a sprocket-wheel loosely mounted on said shaft, a clutch on said shaft adapted to engage said sprocket-wheel, an ice-cutting member carried by said body, a motor adapted to drive said ice-cutting member and provided with a shaft, a sprocket-wheel on said

latter shaft adapted to be connected with the sprocket-wheel on the first motor, and a plurality of ice-cutting members disposed adjacent each side of said body and adapted to be driven by the wheels of said body.

23. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried thereby, a motor carried by said body and adapted to actuate said snow-plow, an ice-cutting member disposed transversely of and supported by said body, a sprocket-wheel connected with said ice-cutting member, a chain disposed over said sprocket-wheel, a second sprocket-wheel adapted to receive said chain, a shaft carried by said body on which said second sprocket-wheel is loosely mounted, a collar on said shaft adapted to engage said second sprocket-wheel, a knuckle-joint on the end of said shaft, a second shaft connected to said knuckle-joint, and a second motor carried by said body and adapted to actuate said second shaft.

24. In a device of the character described, a wheeled supporting-body, a rotary snow-plow carried by the forward end of said body, means for actuating said snow-plow, a shaft carried by said body, a plurality of ice-cutting members on said shaft, a sprocket-wheel on said shaft, a second shaft carried by said body adjacent said first shaft, an ice-cutting member disposed on said second shaft, means for driving said second shaft, a sprocket-wheel loosely mounted on said second shaft, a chain connecting said sprocket-wheel and the sprocket-wheel on the first-mentioned shaft, and a clutch on said second shaft adapted to engage said sprocket-wheel on said second shaft.

25. In a device of the character described, a wheeled supporting-body, a snow-plow carried by the forward end of said body and comprising a plurality of sections, a plurality of ice-cutting members carried by said body, means carried by said body adapted to actuate said snow-plow and said ice-cutting members, a plurality of rods carried by said body, and a scraping member carried by said rods.

26. In a device of the character described, a wheeled supporting member, a snow-plow carried thereby, a plurality of ice-cutting members carried by the body, means for actuating said snow-plow and said ice-cutting members, a plurality of rods carried by said supporting-body, links disposed on said rods, an angular scraping member carried by said links and provided with a plurality of lips thereon, eyes secured on said scraping member, resilient members secured to said eyes, and chains connecting said resilient members and said rods.

27. In a device of the character described, a wheeled supporting-body, a snow-plow carried by said body, a plurality of ice-cutting members carried by said body, means adapt-

ed to rotate said snow-plow and ice-cutting members, a scraping member carried by said body, a wing carried by said body and extending to one side thereof, and means for adjusting the angle of the wing with relation to said body.

28. In a device of the character described, a wheeled supporting-body comprising a plurality of pivotally-connected sections, a snow-plow and a plurality of ice-cutting members carried by one section of said body, means carried by said section adapted to rotate said snow-plow and said ice-cutting members, a wing disposed on one side of the other section of said body and provided with a plurality of eyes, a rod carried by said other section of said body and disposed through said eyes, a chain connected to said wing, a lever

pivoted to said other section of said body and adapted to adjust the wing vertically, a chain connected to the outer end of said wing, and a hook on said body adapted to receive said chain.

29. In a device of the character described, a wheeled body, a shaft carried by said body, means for driving the shaft, a section of resilient blades secured on said shaft, a section of resilient blades loosely mounted on said shaft, and means for locking said loosely-mounted section of blades to said shaft.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOSEPH F. E. ROSE.

Witnesses:

JOHN F. DEUFFERWIEL,
CH. FACOMPRES.