(No Model.) 3 Sheets—Sheet 1.

J., W. H. & M. C. RUNNOE.

POWER SLED.

No. 557,085. Patented Mar. 24, 1896.

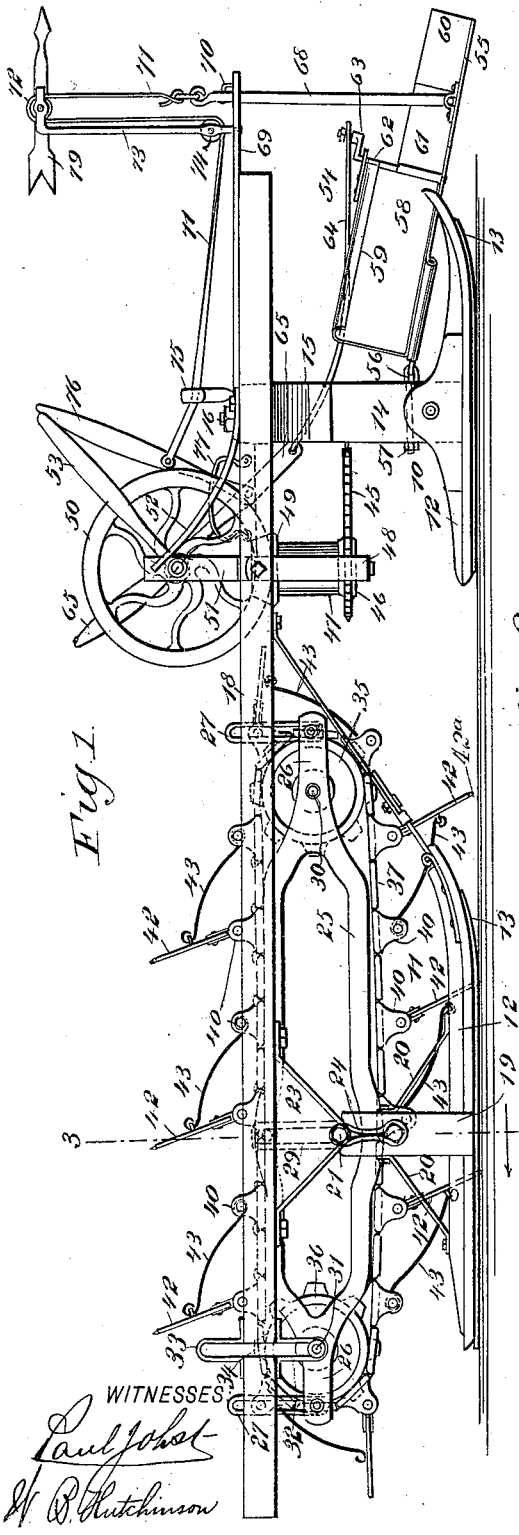

Fig. 1.

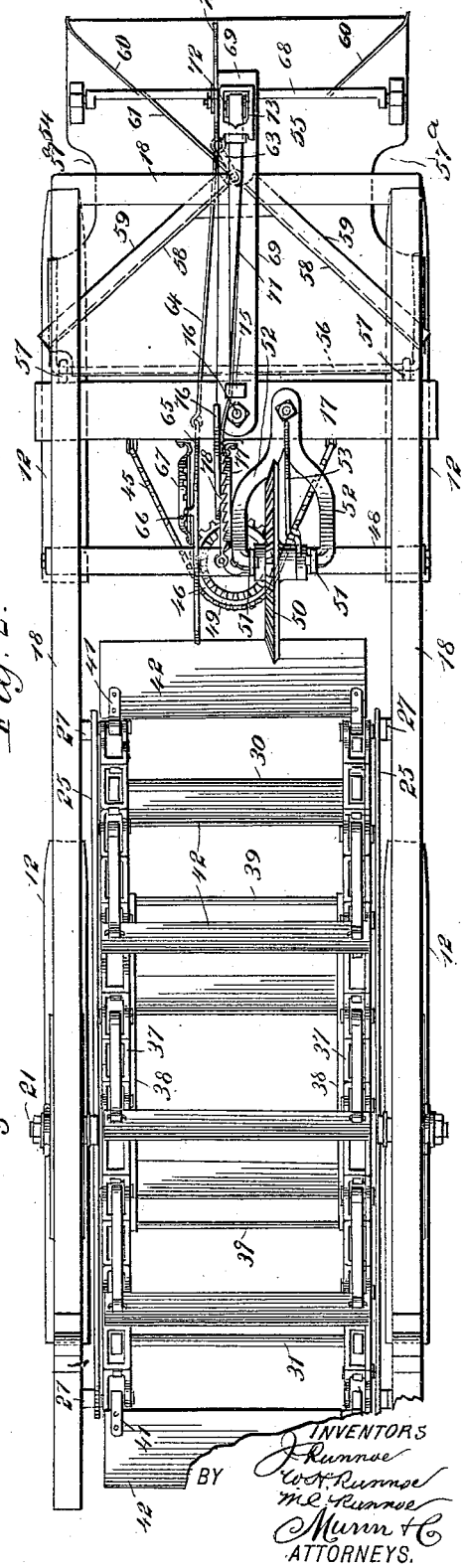

Fig. 2.

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Fig 3.

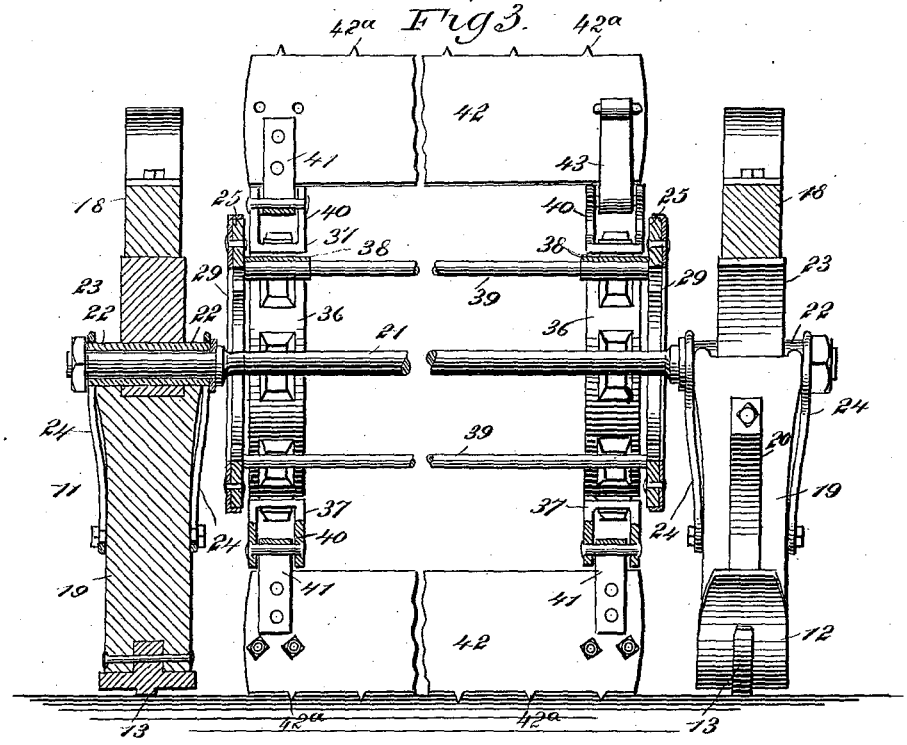

Fig 4

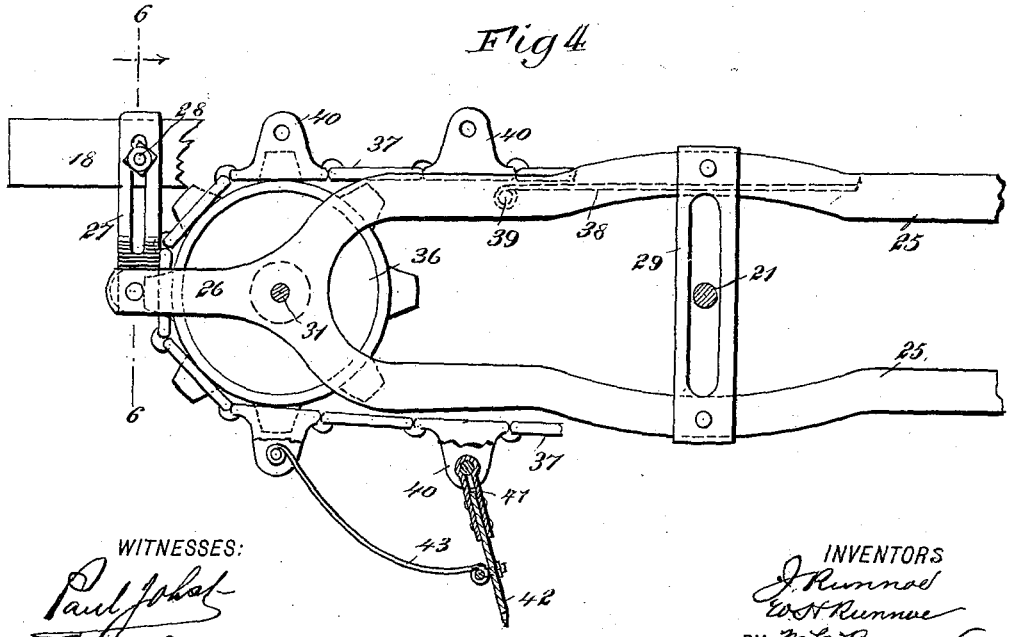

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Fig. 5.

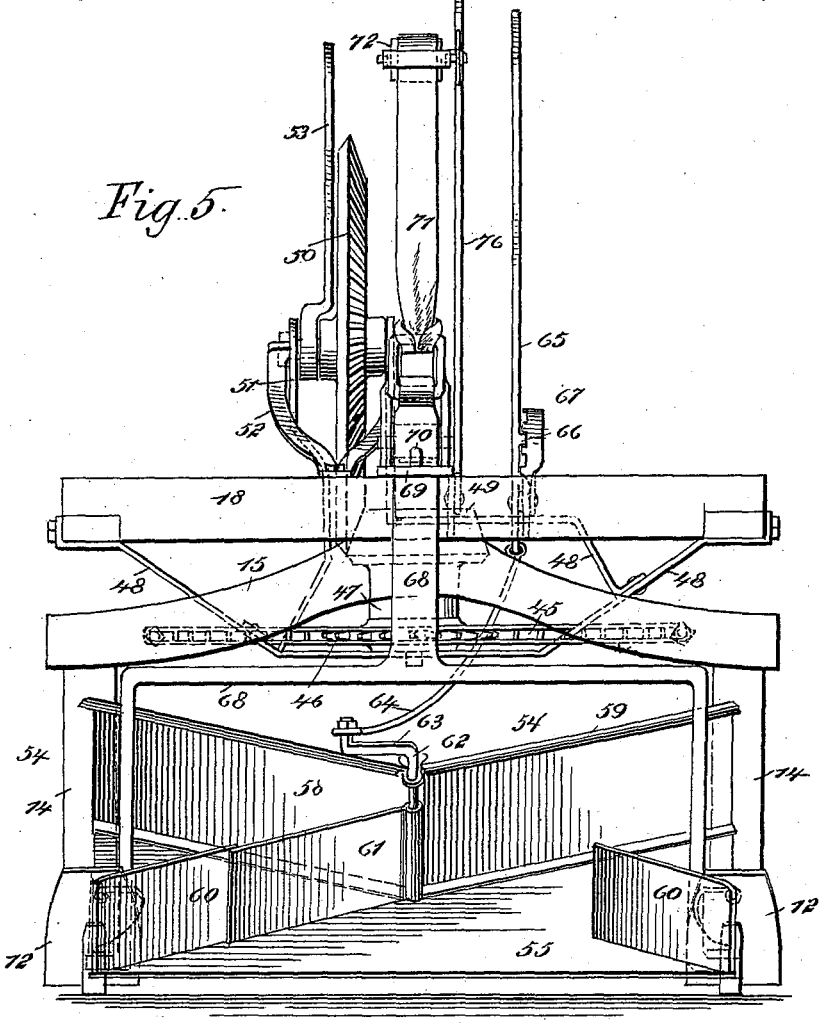
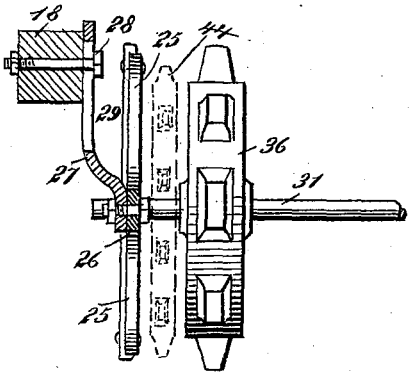


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH RUNNOE, WILLIAM H. RUNNOE, AND MOSES C. RUNNOE, OF CRESTED BUTTE, COLORADO.

POWER-SLED.

SPECIFICATION forming part of Letters Patent No. 557,085, dated March 24, 1896.

Application filed January 29, 1895. Serial No. 536,600. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH RUNNOE, WILLIAM H. RUNNOE, and MOSES C. RUNNOE, of Crested Butte, in the county of Gunnison and State of Colorado, have invented a new and Improved Power-Sled, of which the following is a full, clear, and exact description.

Our invention relates to improvements in that variety of sleds which are self-propelling—that is, which carry a motor of some kind to drive the sled; and the object of our invention is to produce a sled of this kind which may be driven over the snow or ice with sufficient power to haul a load after it or upon it, which has easy means of steering it, which is constructed in such a way that it is not likely to slew, which has its driving mechanism adjustable to suit varying depths and conditions of snow, and which is provided with an improved snow-plow adapted to discharge the snow to either or both sides, as necessity may require, and adjustable also vertically to enable it to scoop the snow to any desired depth.

To these ends our invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

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

Figure 1 is a side elevation of our improved sled. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged cross-section on the line 3 3 of Fig. 1. Fig. 4 is an enlarged detail sectional elevation of the frame which supports the driving-gear, its connection with the main frame, and a portion of the driving mechanism. Fig. 5 is a front elevation of the sled, and Fig. 6 is a detail cross-section on the line 6 6 of Fig. 4.

The sled is provided with front and rear bobs, 10 and 11, which are in a general way like the ordinary bobs, but which have certain special features adapting them for use in connection with the mechanism which they carry. The bobs are each provided with runners 12 which have longitudinal keel-pieces 13 which prevent the runners from slewing, and the forward runners are pivoted to the standards 14, which have a limited movement in relation to the runners, so that the latter may pass readily over uneven surfaces, and the standards are at the top secured to a bolster 15 which connects by means of a king-bolt 16 with a cross-bar 17 of the main frame 18, which may be of any suitable construction and is adapted to support a steam-engine or other motor which is used for driving the sled.

The rear bob, 11, has rigid standards 19 which are stiffened by suitable braces 20, and the tops of these standards are connected by a cross-shaft 21, (see Fig. 3,) on which are journaled the sleeves 22 which carry the bolster-blocks 23, and these support the rear end of the frame 18. The shaft 21 is prevented from slipping endwise by the straps 24 which encircle the sleeves 22 and are secured to the outer and inner sides of the standards 19.

The driving mechanism proper is carried by elongated frames 25, which are supported on opposite sides of the main frame and depend therefrom, the frames 25 having prolonged ends 26, which serve as bearings for the driving-shafts to be presently described. The frames 25 are supported at their ends by longitudinally-slotted links 27, which are fastened to the frame 18 by bolts 28, and which may be adjusted up and down so as to bring the frames and the driving mechanism which they carry to the desired height. The frames 25 carry guide-bars 29, which are slotted and extend from the upper to the lower members of the frames, these bars straddling the cross-shaft 21.

Journaled in opposite ends of the frames 25 are shafts 30 and 31, and to facilitate the vertical adjustment of these shafts the rear shaft is adapted to move vertically through the guide-loops 32 and 33, which are secured to the upper and lower sides of the frame 18, so as to align with slots 34 in the frame. The shafts 30 and 31 carry sprocket-wheels 35 and 36, which are connected by the endless chains 37, these being of any approved construction, and to prevent the upper members of the chains from sagging excessively they are made to run over guide-plates 38, which are sup-

ported on cross-rods 39 fastened to the frames 25, and similar rods connect the lower members of the frames so as to brace them.

The chains 37 have a portion of their links provided with outwardly-projecting lugs 40, and between some of these lugs are pivoted the ears 41 of the cross-blades 42, which are adapted to project downward into contact with the snow or ice over which the sled moves, and the blades are braced by the straps 43, which connect the blades with adjacent lugs 40 on the chains. These straps are preferably spring-straps and have a loose connection with the blades, so that the latter may yield when necessary and not come into too sudden and violent contact with any serious obstruction on the road. The blades 42 have spurs 42^a on their outer edges, so that they may get a good grip on the ice.

The rear shaft, 31, is adapted to be driven from an engine or other motor on the frame 18, and to this end it may be provided with sprocket-wheels 44 (shown by dotted lines in Fig. 6) or with other suitable gearing.

The sled is steered by a chain 45, which has its ends secured to the beam 15 on opposite sides of the king-bolt, and the chain extends around a sprocket-wheel 46, which is arranged behind the forward bob, 10, and is secured to a hub 47 journaled in a framework 48 attached to the main frame 18, and the hub 47 is formed integral with or rigidly attached to a pinion 49, which gears with a large vertically-rotating gear-wheel 50, which is journaled on posts 51 projecting from the framework 48, these posts being stiffened by the spring-brace 52 which connects the posts with the cross-bar 17 of the frame 18. The gear-wheel 50 is turned by a lever 53, which is attached to the shaft of the gear-wheel, although any other suitable means may be employed for turning the gear-wheel. When the gear-wheel 50 is turned it turns the sprocket-wheel 46 and moves the chain 45, thereby turning the forward bob, 10, to the right or left, as the case may be, and guiding the sled.

The sled has at its front end a snow-plow 54, which is adapted to prepare the road for the sled, and this plow has an inclined bottom plate 55, which is adjustable up and down, as presently described, and this has a rear bail 56, which is hinged to the bolts 57 in the standard 14 of the front bob, 10; but the plow may be connected with the bob in any other convenient manner. The bottom plate 55 is cut away on the sides, as shown at 57^a, to provide clearance for the runners 12. The plate 55 carries a V-shaped guard 58, which is placed near the rear end of the plate 55, point forward, and is placed perpendicular to the plate. The guard 58 has a turned-over flange 59 at the top to prevent the snow from being thrown up over it, and as the guard extends the full width of the plate 55 it throws the snow to one side of the plate and clears the road for the sled.

The plate 55 has at its front corners guide-plates 60, which are perpendicular to the plate 55 and align with opposite sides of the guard 58. These guide-plates 60 extend inward but a short distance, and they serve as abutments for the free end of a swinging guide-plate 61, which is journaled at the point of the guard 58 and may be swung against either of the plates 60. This arrangement is to provide for throwing the snow to one side where it is necessary—as, for instance, on a side hill—where it is desirable to throw the snow to the downhill side. When the guide-plate 61 is in contact with one of the plates 60, the snow will pass along the guide-plate 60 to the opposite side of the plate 55 and be discharged. If the snow is to be discharged on both sides of the snow-plow, the guide-plate 61 is turned straight forward.

The swinging guide-plate 61 is carried by a shaft 62, which is journaled at the point of the guard 58 and has a crank 63 at the top which connects by a rod 64 with a tilting lever 65, which is fulcrumed on a suitable support on the frame 18, and thus by moving the lever 65 the guide-plate 61 may be regulated. The lever 65 has a tooth 66 on one side adapted to engage the notches of the quadrant 67, which is supported on the frame 18 and opposite which the lever 65 swings. The front end of the snow-plow is supported by a forked hanger 68, which is pivoted to the plate 55 and extends upward through a guide-arm 69, which is pivoted on the king-bolt 16 and extends forward from the frame 18. The shank of the hanger 68 moves freely in the arm 69 and is prevented from dropping too low by a stop 70, which strikes the top of the arm. The hanger is moved by a belt or cable 71, which extends upward over a guide-pulley 72 in the top of a post 73 on the arm 69, and thence beneath a guide-pulley 74 at the foot of the post, through a guide 75 on the frame 18, and connects with a lever 76, which is fulcrumed on a suitable support and moves opposite a quadrant 77 carried by the frame 18, the lever having a tooth 78 to engage the notches of the quadrant and fix the position of the lever.

If desired, ratchet-wheels and pawls may be substituted for the quadrants 67 and 77 as a means of holding the levers 65 and 76.

The shaft of the pulley 72 is preferably provided with an indicator 79, which by its deflection shows the relative position of the snow-plow.

It will be seen from the above description that by an engine on the frame 18 the shafts 31 and 30 may be revolved, and when these revolve their sprocket-wheels 35 and 36 carry along the chains 37, thus bringing the blades 42 into contact with the snow and pushing the sled ahead. The sled may be guided by the lever 53 and the gear mechanism connecting the said lever with the forward bob, and the track is kept clear by the snow-plow 54, which is adapted to throw the snow to either side of the road, as specified, and may be regulated

as to height by the lever 76 and the connections between the lever and plow.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, with the sled, of the endless chains mounted thereon, the blades pivoted to the chains to propel the sled, and braces connecting the blades to the chains and adapted to hold said blades in an extended position, substantially as described.

2. The combination with the sled, of the vertically-adjustable frames supported thereon, the sprocket-wheels mounted in the frames, the endless chains carried by the sprocket-wheels, and the propelling-blades secured to the chains and provided with means for holding them elastically extended, substantially as described.

3. The combination, with the sled and the main frame thereon, of the vertically-adjustable frames supported on the main frame, the cross-shafts on the adjustable frames, the sprocket-wheels carried by the cross-shafts, the endless chains on the sprocket-wheels, the blades on the chains, and the spring brace-straps connecting the blades and chains, substantially as described.

4. In a sled of the kind described, the combination with the chains, of the projecting lugs thereon, the cross-blades pivoted between a portion of the lugs, and the brace-straps pivoted between the other lugs and connected to the blades, substantially as described.

5. The combination with the sled and the snow-plow having the fixed guard and guide-plates, of the swinging guide-plate connecting the guard and fixed guide-plates, the crank-shaft for moving the swinging guard-plate, and a lever mechanism for turning the crank-shaft, substantially as described.

6. The combination, with the sled and the snow-plow hinged to the front end thereof, of the arm on the sled, the hanger pivoted to the plow and projecting upward through the arm, a lever on the sled, and a lifting-bail connected with the hanger and extending over suitable guides to the lever, substantially as described.

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