

(No Model.)

4 Sheets—Sheet 1.

J. M. TRULL.
COMBINED POWER SLEIGH AND CARRIAGE.

No. 578,667.

Patented Mar. 9, 1897.

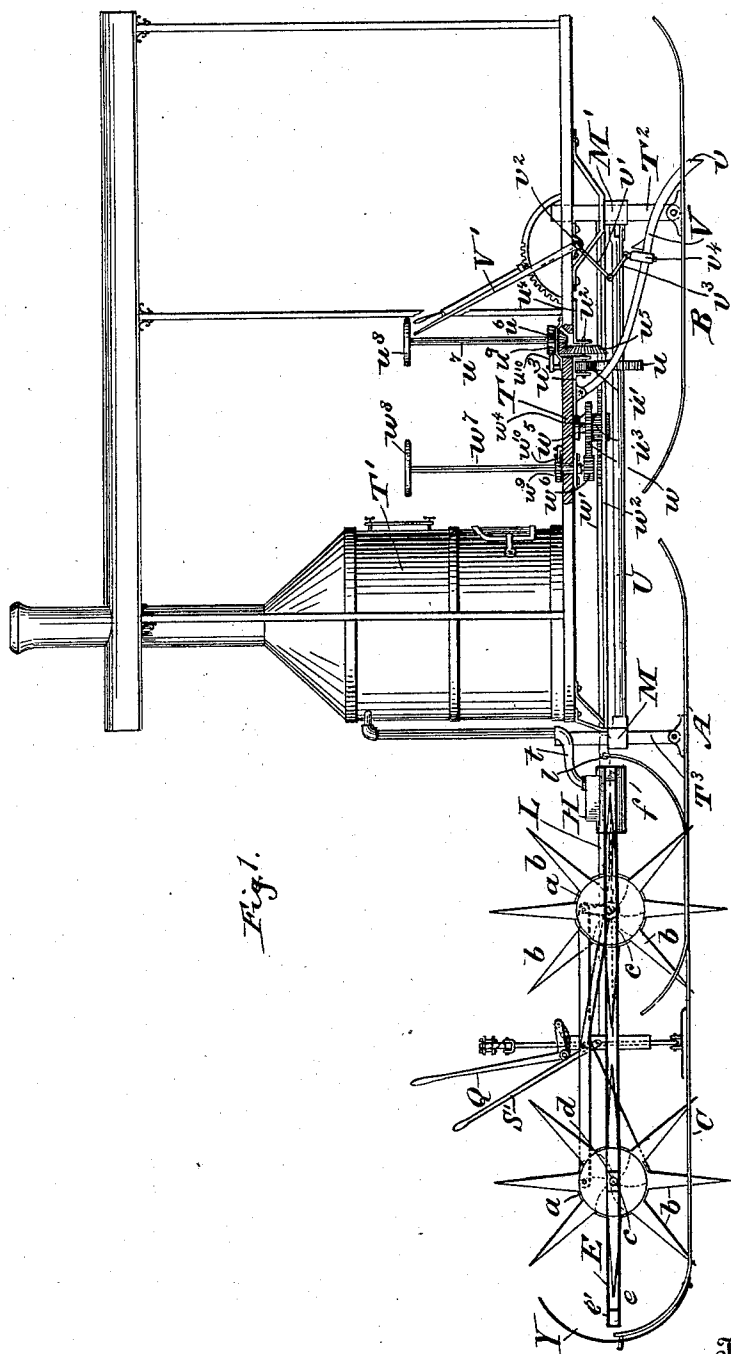


Fig. 1.

Witnesses
L. W. Legendre
Chas. C. Balston.

Inventor
John M. Trull
By his Attorney F. W. Barker

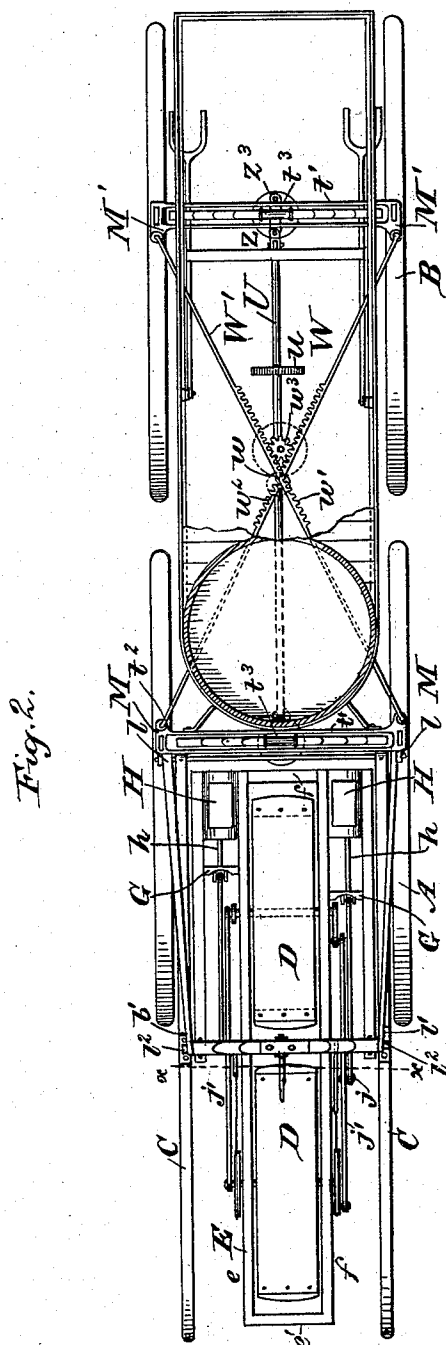
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4 Sheets—Sheet 2.

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(No Model.)

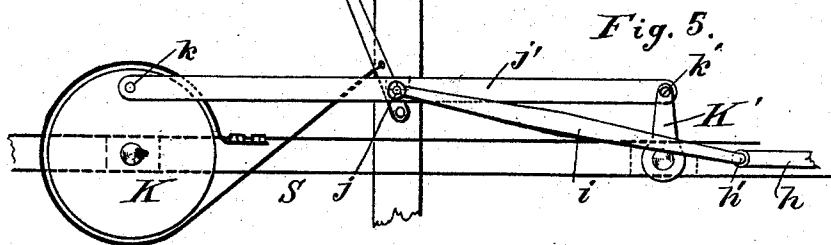
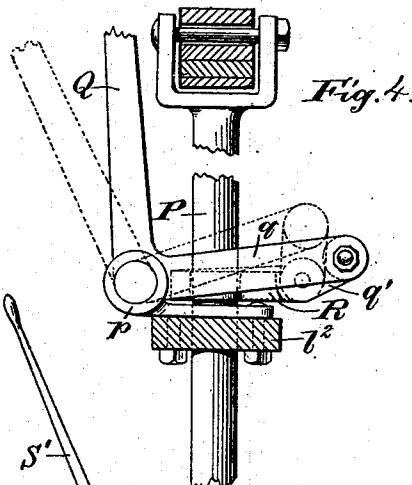
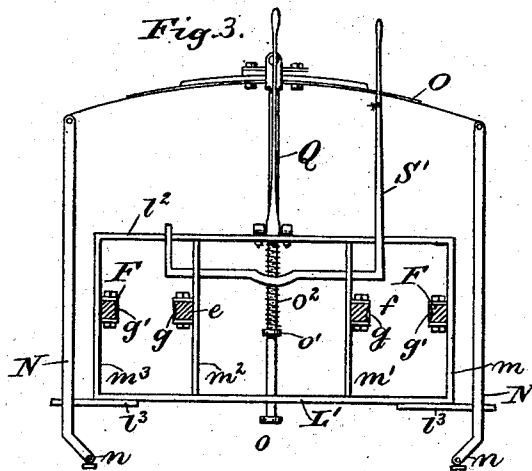
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4 Sheets—Sheet 4.

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Fig. 10.

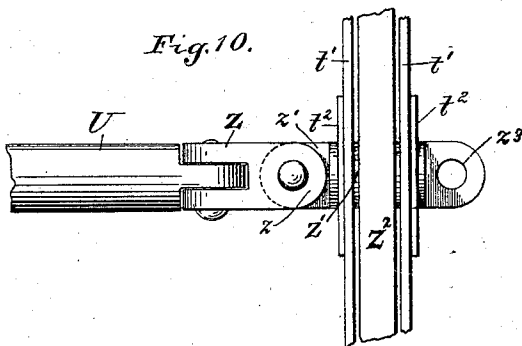


Fig. 9.

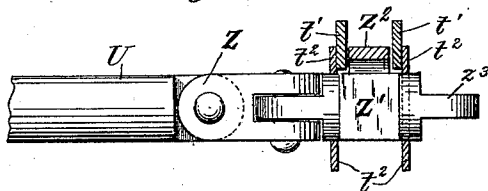


Fig. 8.

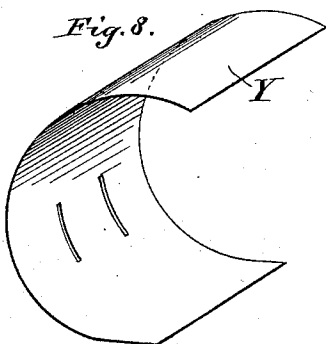


Fig. 6.

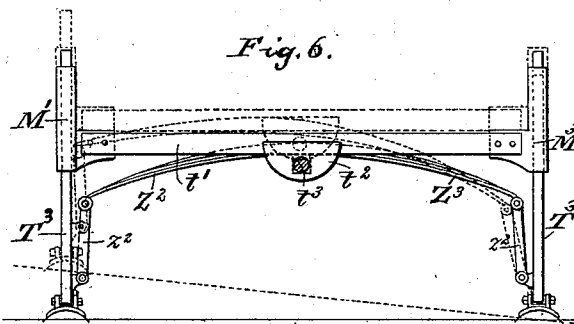
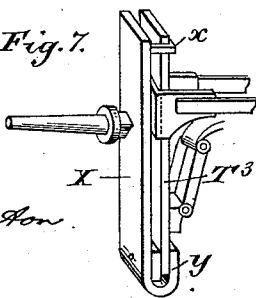


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN M. TRULL, OF TRULL, COLORADO.

COMBINED POWER SLEIGH AND CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 578,667, dated March 9, 1897.

Application filed November 30, 1894. Serial No. 530,502. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. TRULL, a citizen of the United States, residing at Trull, in the county of Routt and State of Colorado, have invented certain new and useful Improvements in a Combined Power Sleigh and Carriage, of which the following is a full, clear, and exact specification.

This invention relates to a combined sleigh and wheeled vehicle with means for propelling same by steam; and its object is to provide a carriage of this nature having a simple and durable construction and adapted for draft and other purposes.

In the drawings accompanying this specification, Figure 1 is a side elevation of the steam-sleigh. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a vertical cross-sectional view taken on the line *x x* of Fig. 2, showing the means for raising and lowering the propelling-wheels. Fig. 4 is an enlarged side elevation of the raising and lowering apparatus. Fig. 5 is a detail view of the brake mechanism. Fig. 6 is a rear end view of the sleigh. Fig. 7 is an enlarged detail view showing a portion of the sleigh with means for converting same to an axle-bearing. Fig. 8 is an enlarged detail view of a form of snow-packer which I employ. Fig. 9 is a broken plan view of a portion of a tilting shaft, knuckle, supporting-spring, and framework of the machine; and Fig. 10 is a side view of Fig. 9, with the frame part shown sectionally.

In my invention I provide a sleigh of novel construction having two sets of main runners, A A representing the forward runners and B B the rear runners. In addition to these main runners I provide auxiliary runners C C, which serve to support the propelling-wheels D D and their operating mechanism. The said propelling-wheels D D consist of the hubs *a*, having radial spurs *b*. Said hubs are journaled upon axles *c*, supported in the bearings *d*, provided in the frame E. The said frame E consists of the side-bars *e f*, which are placed parallel with each other on either side of the wheels D and are connected at their ends by cross-pieces *e' f'*. The said side-bars *e f* are provided on their outer sides with grooves *g*, which grooves, together with the corresponding grooves *g'* formed on the

inner sides of guides F F, serve as slideways for the cross-heads G. The piston-rods *h h*, bearing said cross-heads, are pivotally secured at *h'* to a pitman *i*, the said pitman being pivoted at *j*. The rod *j'* connects the propelling-wheels together, the said rod being pivotally secured at *k* to a disk K, which is mounted upon the axle *c*, and the end *k'* of said rod *j'* is pivotally connected with a crank K'. 55 60

L is a brace or support pivoted at *l l* to a slide-block M, having its forward ends *l' l'* connected together by means of a cross-piece *l²*. The said brace L is provided with downwardly-projecting pieces *m, m', m², and m³*, 65 the said pieces being connected at their lower ends with a cross-bar L'. The said pieces also serve to support the guides F F and *e f*.

Secured to the cross-bar L' are forks or guides *l³*. 70

Attached to the runners C C are uprights N N, having a spring O connecting their upper ends together. Depending pivotally from the central portion of said spring O is a bar or rod P, passing through the cross-pieces *l²* and L' and terminating in a flanged head *o*. At a point between the cross-pieces *l²* and L' is a collar *o'* on the bar P. A coiled spring *o²* surrounds the said bar P, being confined between the collar *o'* and cross-piece *l²*. A hinge-piece *p* is mounted upon the cross-piece *l²*. Within this hinge is pivoted a lever Q, having a fork *q* projecting therefrom at right angles. At the face end of said fork *q* is pivotally secured a link-piece *q'*, the said link-piece 85 *q'* being also pivoted to a friction-clutch R, which encircles the rod P. This lever Q may be arranged at the opposite side of the rod P, and a cord leading to the cab may be attached to the handle of said lever to operate the lat- 90 ter from said cab.

Friction-bands S S encircle the disk K K, being secured at *s s* to portions *s' s'* of the frame. The other ends of said friction-bands are attached to a double lever S', forming a 95 brake, the said lever S' being pivoted to the pieces *m' m²*.

T is a platform supporting a boiler T' and certain retarding mechanism, which will be described hereinafter. The said boiler is connected by a flexible pipe *t* with the cylinders H. 100

Uprights T² T³ are pivotally secured to the

runners A A and B B, respectively, the up-
 rights $T^3 T^3$ sliding within the block-pieces M
 and the uprights $T^2 T^2$ sliding within block-
 pieces M'. The said uprights $T^3 T^3$ are con-
 5 nected by a cross-bar t' and the uprights $T^2 T^2$
 are connected by a similar bar. (Not shown.)
 Secured centrally to the cross-bar t' is a bear-
 ing-plate t^2 , having a central opening t^3 , a simi-
 lar plate (not shown) being secured to the
 10 cross-bar (not shown) connecting the uprights
 $T^2 T^2$. A shaft U connects with the said plates
 t^2 and is pivotally held within the bearings t^3 .
 Upon the said shaft U is secured a cog-wheel
 u, which meshes with a pinion u' , which pin-
 15 ion is pivoted on a shaft u^2 , the said shaft be-
 ing supported in bearings $u^3 u^4$. The same
 shaft u^2 carries a beveled cog-wheel u^5 , which
 meshes with a beveled pinion u^6 . To the pin-
 ion u^6 is secured a rod u^7 , having a hand-wheel
 20 u^8 , by which it may be operated. To the rod
 u^7 is securely attached a lock device (consist-
 ing, preferably, of an ordinary ratchet-wheel
 u^9 and a pawl u^{10}) to lock the runners by means
 of the described mechanism or its equivalent
 25 in any set position until purposely released
 or shifted.

To the under side of the platform T is piv-
 otally secured one end of a curved bar V, hav-
 ing a point v, adapted to engage in the snow
 30 to retard the backward movement of the
 sleigh when going uphill and to serve the
 purpose of a drag-brake when going downhill.

A lever V, having an angular projecting
 arm v' , is pivoted at v^2 , and a link or bar v^3
 35 pivotally connects said arm v' with the bar V
 by means of a clamp or piece v^4 .

The steering means comprise the bars W
 W', secured to the cross-bars t' , which are ver-
 tically pivoted and turnable by means of a
 40 bolt or pin secured in a brace of the plat-
 form and passing through a fifth-wheel t^5 of
 the braces t' fore and aft, the said bars W W'
 crossing each other, as at w. The said bars
 have racks $w' w^2$, which racks are each in con-
 45 stant mesh with a pinion w^3 , which pinion,
 together with a cog-wheel w^4 , is loosely piv-
 oted on a vertical shaft w^5 . The cog-wheel
 w^4 meshes with a pinion w^6 , which is secured
 to and operated by a vertical rod w^7 , having
 50 a hand-wheel w^8 . To this rod w^7 may be also
 attached a lock device (such, for instance, as
 a ratchet-wheel w^9 and a pawl w^{10} to engage
 therewith) to prevent the accidental move-
 ment of the steering device. This provision,
 55 however, in connection with the steering de-
 vice is not essential.

As will be readily seen by the drawings,
 power is communicated through the cylinders
 H to rotate the wheels D D, which by means
 60 of their radial projections alternately engag-
 ing with the packed snow serve to propel the
 sleigh. By means of the lever Q and its
 mechanism operating upon the rod P the
 propelling-wheels D D may be raised or low-

ered, according to the density of the snow. 65
 The rotation of the propelling-wheels may be
 checked by operating the lever S of the fric-
 tion-brake.

In case of inequalities in the road being
 traveled I employ the herein-shown means 70
 whereby the runners on either side of the
 sleigh may be raised or lowered by turning
 the hand-wheel u^8 , which operates upon the
 shaft U, thereby causing the uprights $T^2 T^2$
 $T^3 T^3$ to have a vertical sliding motion with- 75
 in the blocks M M'.

To each end of the shaft U is hinged a
 knuckle Z, which is provided with another
 hinge z, arranged rectangularly to the first-
 mentioned hinge. Loosely engaging the said 80
 knuckle and forming a part of the latter
 hinge is preferably an extension z' , formed
 on the projecting end of the bearing-pivot Z',
 which is supported turnably within the open-
 ings t^3 of the plates t^2 . To the portion of the 85
 pivots Z' contained between the plates $t' t'$,
 which portion is preferably rectangular in
 cross-section, are firmly secured the support-
 ing-springs Z², which are also located and
 adapted to operate between the said plates 90
 $t' t'$ and engage, by means of links $z^2 z^2$, with
 the sliding standards $T^3 T^3$, the fore and aft
 runners being similarly provided. It is thus
 readily seen that since the springs, and con-
 95 sequently the runners, are connected with the
 shaft U when the latter is turned by means of
 the mechanism described the said runners, by
 means of the tilting of the said springs Z², may
 be so moved as to be adapted to any angle in
 the road-bed, while the body and framework 100
 may still retain a relatively level position. If
 desired, an extra extension or eye Z³ may be
 formed on one of the pivots Z', as shown in
 Fig. 2, as a convenience in hauling. It is ob-
 105 vious that the double-jointed knuckles Z con-
 necting the shaft U with the pivots Z' are to
 allow for the uneven movement of the run-
 ners over the road-bed and to allow them to
 turn by means of the steering device.

To steer the sleigh, it is only necessary to 110
 turn the hand-wheel w^8 , which operates the
 gearing, thus causing the cross-bars $w' w^2$ to
 move in opposite directions, thereby guiding
 the runners as desired.

To convert the sleigh into a wheeled vehi- 115
 cle, the runners are removed and hooked bars
 X are fastened to the lower parts of the up-
 rights $T^2 T^2 T^3 T^3$ at the point y by bolts or
 other suitable means. A slotted piece x is
 provided at the upper end of said bars X, 120
 through which the upper ends of the bars T^2
 T^3 project and are fastened in any suitable
 manner and in such position as to allow the
 free upward and downward movements of the
 slide-block M'. 125

The packing device Y (shown in Fig. 8)
 consists of a sheet of metal of semicircular
 shape and is adapted to be secured to the for-

ward end of the wheel-frame E of the sleigh, its function being to pack the snow previous to the runners traveling thereon.

Having now described my invention, I declare that what I claim is—

1. In a sleigh having forward and rear runners, said runners connected in pairs each by a pivoted transverse piece, said pivoted transverse piece being connected to the block-pieces M, M, and movable vertically at its ends, a connection between said transverse piece and the runners, and means for moving same a designated distance, substantially as set forth.

2. In a sleigh having forward and rear runners, said runners movably connected in pairs by a pivoted transverse piece, said pivoted transverse piece being connected to the block-pieces M, M, and movable vertically at its ends, a horizontal bar movably connected with said transverse piece, and means for turning said horizontal bar a designated distance, substantially as set forth.

3. In a sleigh having forward and rear runners, said runners connected in pairs each by a pivoted transverse piece, a horizontal bar secured movably to said transverse piece, a piece having a knuckle-joint secured to each end of said horizontal bar, and knuckle-joints formed in the opposite end of each of said pieces secured to said bar, at right angles to said first-mentioned knuckle-joint, to movably connect the said horizontal bar with the said transverse pieces, and means for turning the said horizontal bar, substantially as set forth.

4. In a sleigh having forward and rear runners, said runners movably connected in pairs each by a pivoted cross-piece, a horizontal bar movably secured to said cross-piece, a cog-wheel upon said bar, a pinion meshing with said cog-wheel, said pinion secured upon a shaft suitably journaled, said shaft also carrying a bevel-gear, another bevel-gear connected with a hand-wheel and meshing with said first-mentioned bevel-gear, substantially as set forth.

5. In a sleigh having runners, said runners movably connected in pairs each by a transverse piece pivoted to the machine-frame, the said transverse piece having a vertical movement at its ends, and means for imparting by said transverse piece a positive vertical movement to said runners, substantially as set forth.

6. In a sleigh having runners, said runners movably connected in pairs by a pivoted transverse piece, means for imparting a positive vertical movement to said runners, and a guide to direct said movement of each of said runners, substantially as set forth.

7. In a sleigh having runners, said runners movably connected in pairs by pivoted transverse pieces, means for imparting a positive

vertical movement to said runners, a vertical guide-piece connected with each of said runners, and a socket connected with the sleigh-frame for receiving said vertical guide-piece, substantially as set forth.

8. In a vehicle having runners, and a device for raising and lowering said runners on one side of said vehicle and oppositely affecting the runners on the other side thereof, a lock consisting of a piece for removably engaging a portion of said raising and lowering device, to arrest the movement thereof, substantially as set forth.

9. A convertible sleigh and wheeled vehicle comprising a frame having runners, propelling-wheels having radial arms or blades and means for driving said wheels, a friction-brake applied to said propelling-wheels, means for regulating the depth of the projecting of the propeller-blades below the runners, a steering device, and means for adjusting the relative positions of the runners to maintain the platform in an even plane on uneven roads, together with means for adjusting wheels to said vehicle in place of the runners, substantially as set forth.

10. In a power-sleigh the combination of vertically-movable and self-adjustable runners, a pair of propelling-wheels arranged tandemwise, means for driving said wheels, and means upon said wheels for engaging with the surface of the path traveled, substantially as set forth.

11. A power-sleigh having a pair of propelling-wheels pivoted thereto tandemwise, means for driving said wheels comprising a crank on one of said wheels and a disk or drum on the other of said wheels, a connecting-rod between said crank and disk, a pitman-rod pivotally connected with said connecting-rod, and a piston-rod connected with said pitman-rod, all to rotate the propelling-wheels, substantially as set forth.

12. In a power-sleigh, having a propelling-wheel whose periphery extends below the sleigh-runners, a post or upright pivotally secured to a cross-spring borne by uprights, a lever having a rectangular arm, a friction-piece encircling said post and a link pivotally connecting said arm and friction-piece, and arranged to be operated by said lever to raise the propelling-wheel, substantially as set forth.

13. In a power-sleigh, having a propelling-wheel, a friction-brake and means for applying said brake, substantially as set forth.

14. In a power-sleigh, having a propelling-wheel, a drum secured upon the shaft of said wheel, on either side thereof, a double lever and a band applied to the surface of each of said drums, said bands being connected with and operated by said lever, substantially as set forth.

15. In a sleigh having vertically-adjustable

forward and rear runners, bars connecting opposite forward and rear runners, and means for moving said bars to alter the relative and positive positions of two pairs of said runners, substantially as set forth.

16. In a sleigh having forward and rear runners, rack-bars connecting opposite forward and rear runners, a pinion at the point of intersection of said racks, a cog-wheel carried by said pinion and another pinion meshing with said cog-wheel, said second-mentioned pinion connected with and operated by a hand-wheel, substantially as set forth.

17. A snow-packer for sleighs comprising a semicircular sheet of metal and means for

connecting the same, substantially as set forth.

18. In a combined sleigh and wheeled vehicle, hooked bars adapted to support the frame and slidable vertically in guides arranged between said frame and said bars, the said hooked bars having axle-journals, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of March, 1894.

JOHN M. TRULL.

Witnesses:

CHARLES RENFRO,
ANNIE C. BURGESS.