

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

1,065,011.

Patented June 17, 1913

6 SHEETS—SHEET 1.

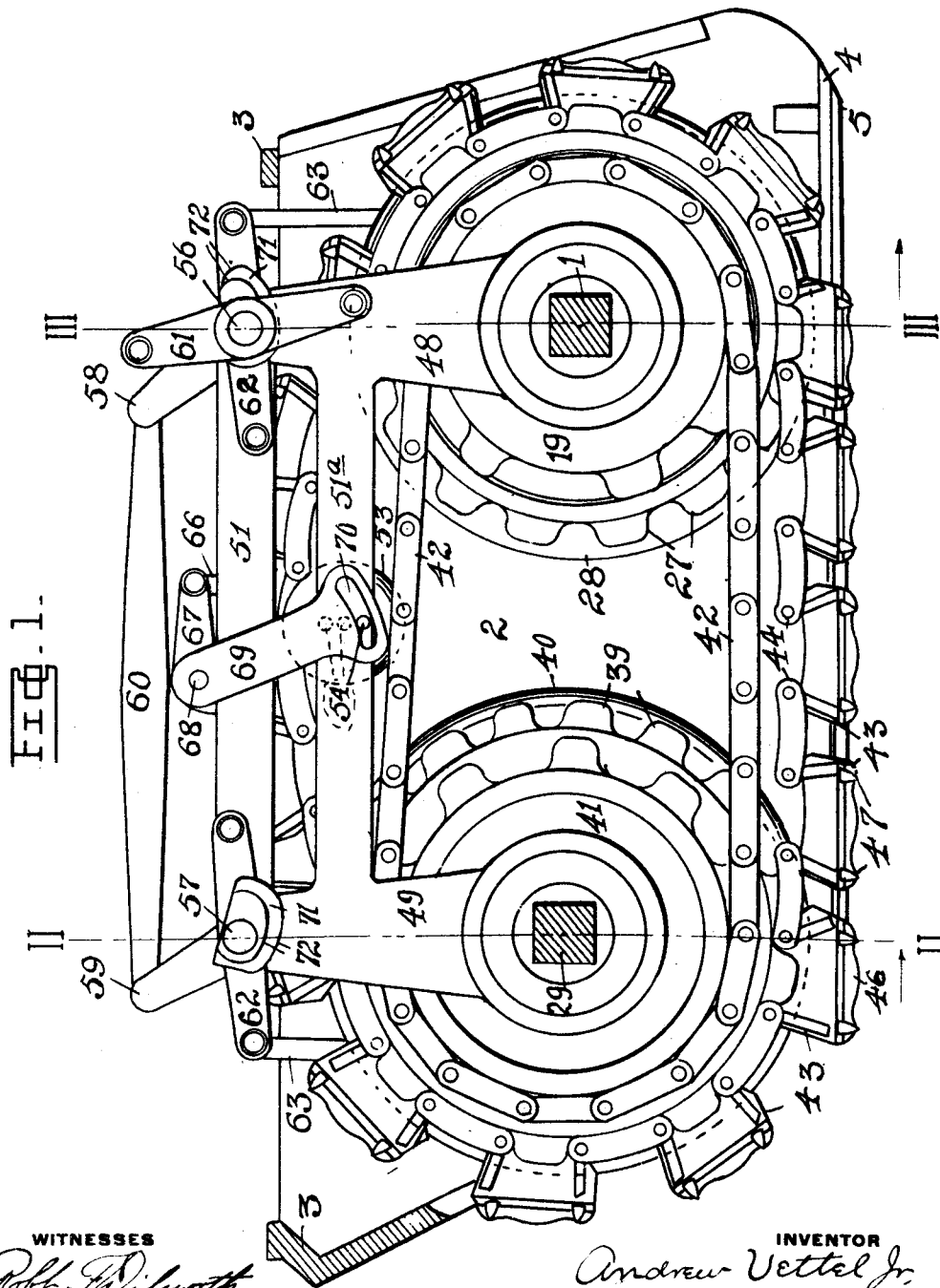


FIG. 1.

WITNESSES

Robt. Milworth
Geo. A. Hanion

INVENTOR

Andrew Vettel Jr.
by Edward A. Lawrence,
his attorney.

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

1,065,011.

Patented June 17, 1913.

6 SHEETS—SHEET 2.

FIG. 2.

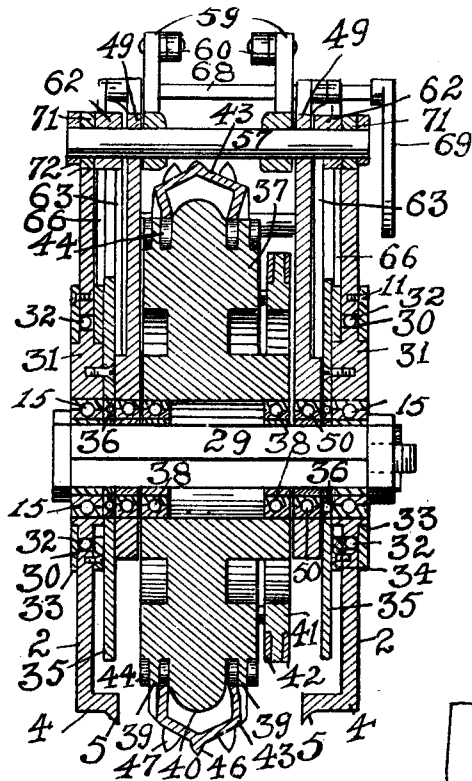


FIG. 4.

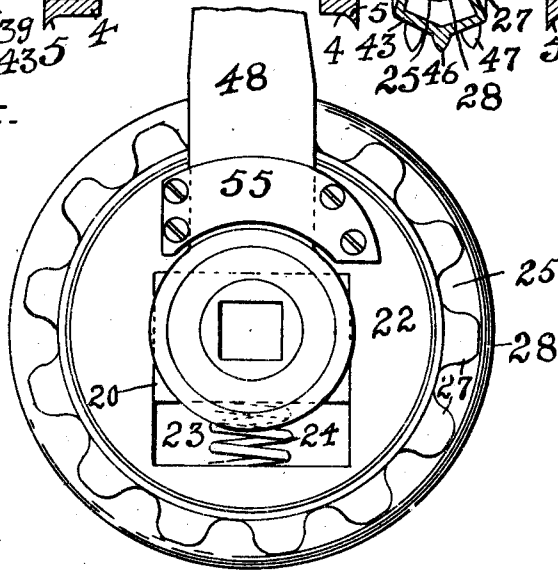
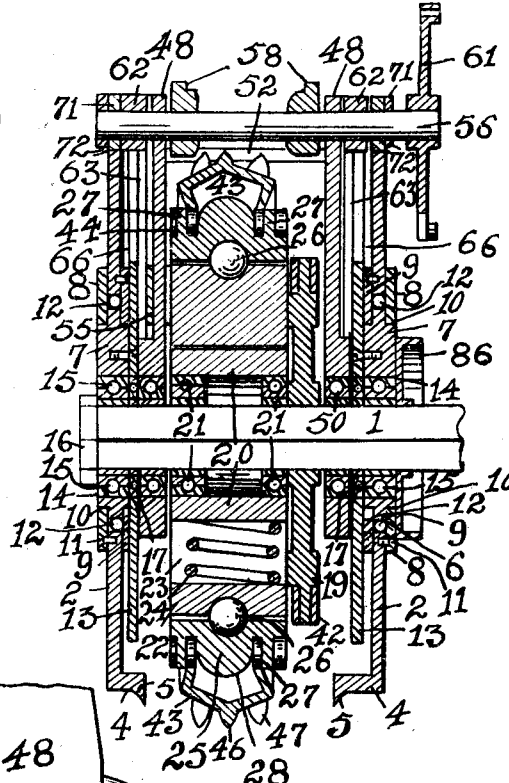


FIG. 3.



WITNESSES

Roll. F. Dilworth
Geo. A. Harrison

INVENTOR

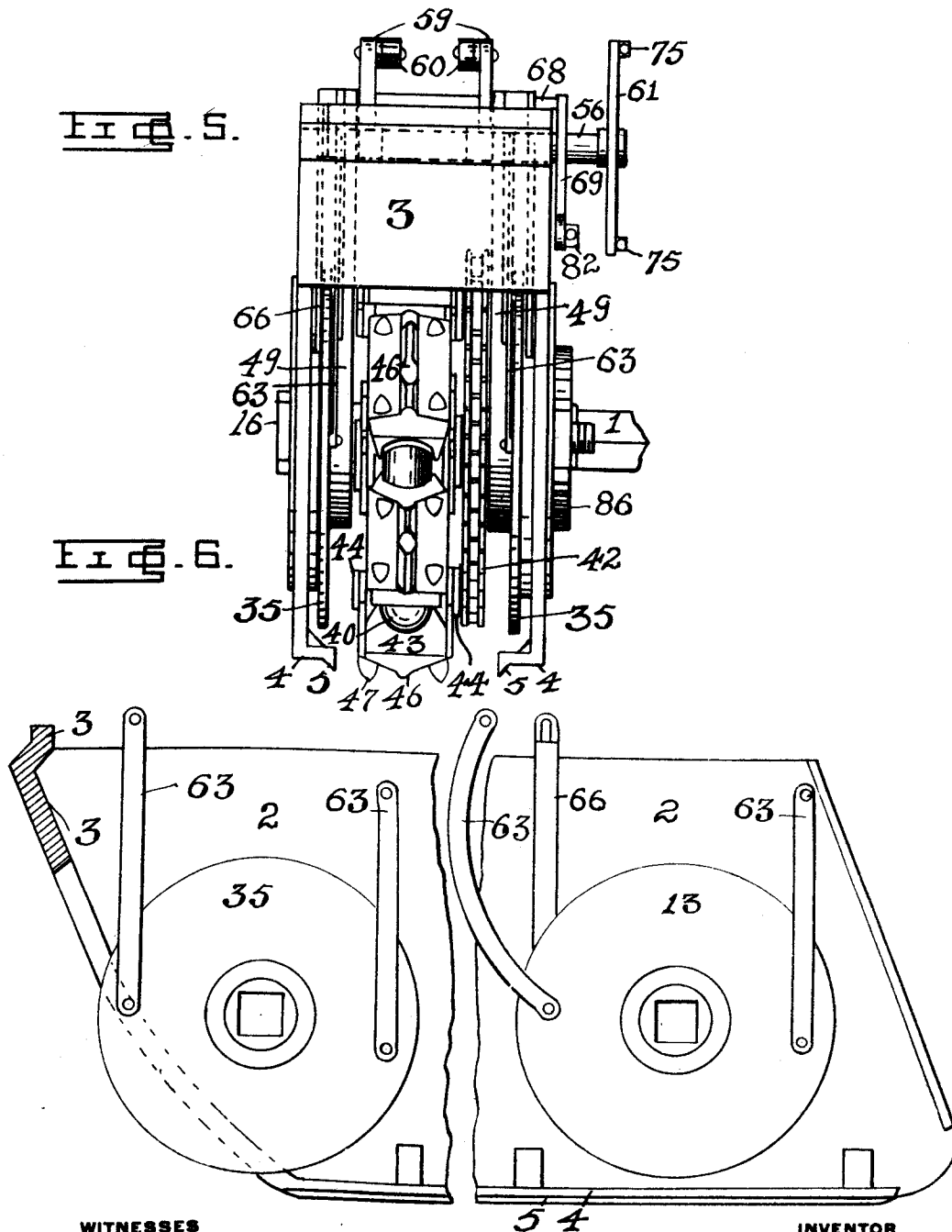
Andrew Vettel Jr.
by Edward A. Lawrence,
his Attorney

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

1,065,011.

Patented June 17, 1913.

6 SHEETS—SHEET 3.



WITNESSES
Robt. F. Whitworth
Geo. A. Hanson

INVENTOR
Andrew Vettel Jr.
by Edward A. Lawrence,
his Attorney.

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

1,065,011.

Patented June 17, 1913.

6 SHEETS-SHEET 4.

Fig. 7.

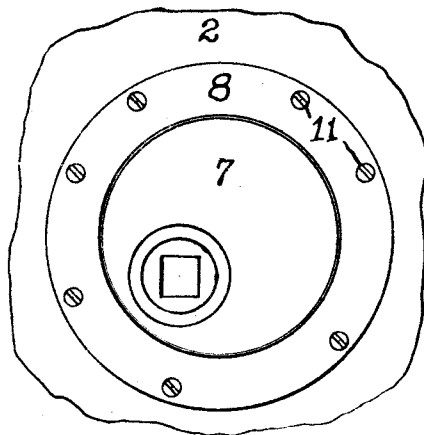


Fig. 9.

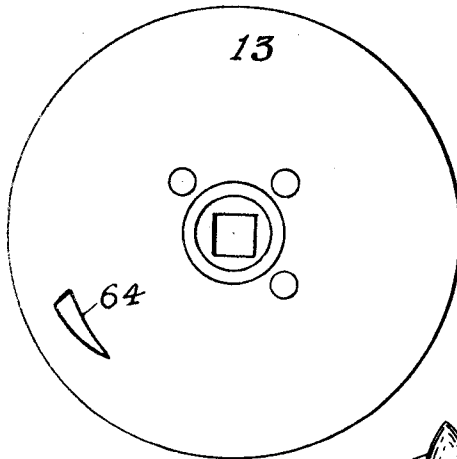


Fig. 8.

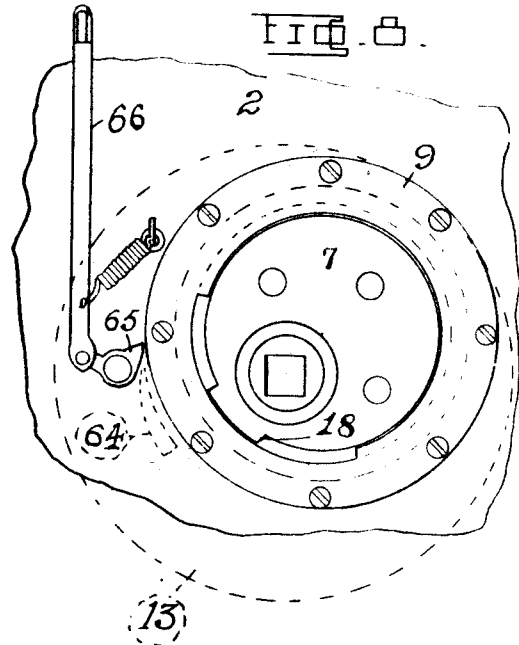
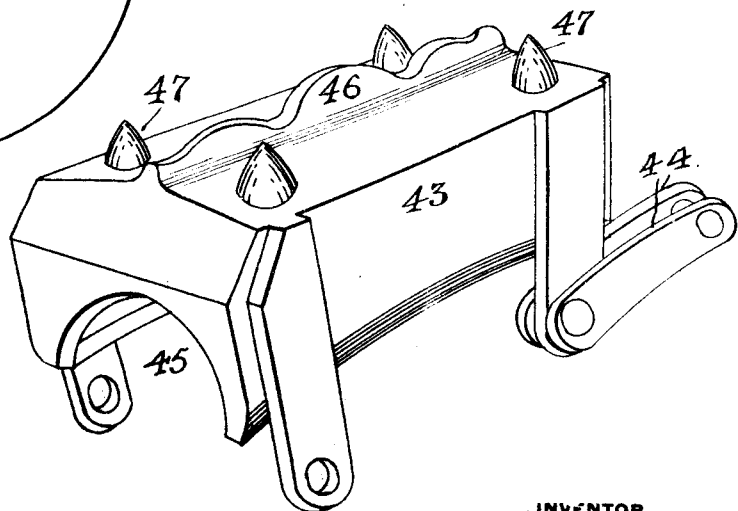


Fig. 10.



WITNESSES

Robt. F. Wilcox
Geo. A. Hanson

INVENTOR

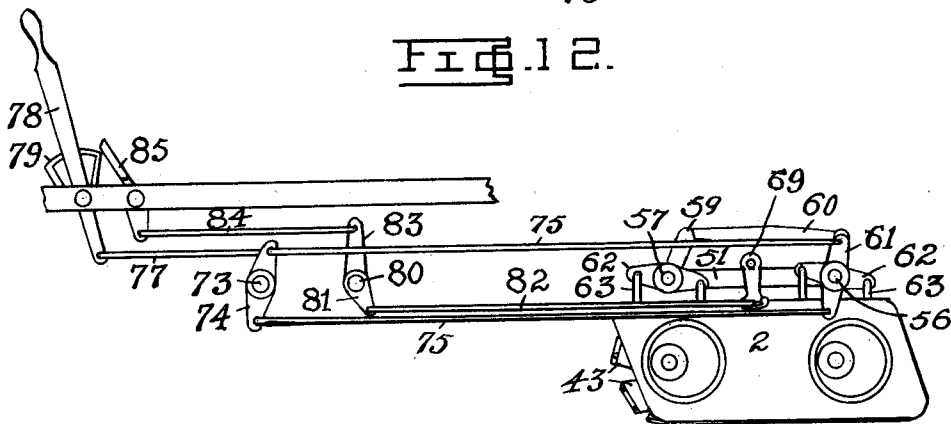
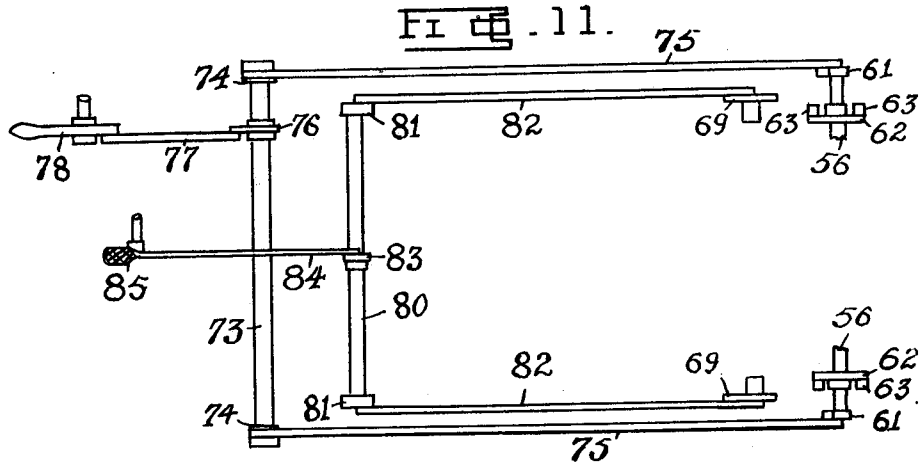
Andrew Vettel Jr.
by Edward A. Lawrence
his attorney.

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

Patented June 17, 1913.

6 SHEETS-SHEET 5.

1,065,011.



WITNESSES

Robt. F. Whitworth
Geo. A. Harrison

INVENTOR

Andrew Vettel Jr.
by Edward A. Lawrence,
his attorney.

A. VETTEL, JR.
SLEIGH ATTACHMENT FOR POWER DRIVEN VEHICLES.
APPLICATION FILED MAY 10, 1912.

1,065,011.

Patented June 17, 1913.

6 SHEETS—SHEET 6.

FIG. 13.

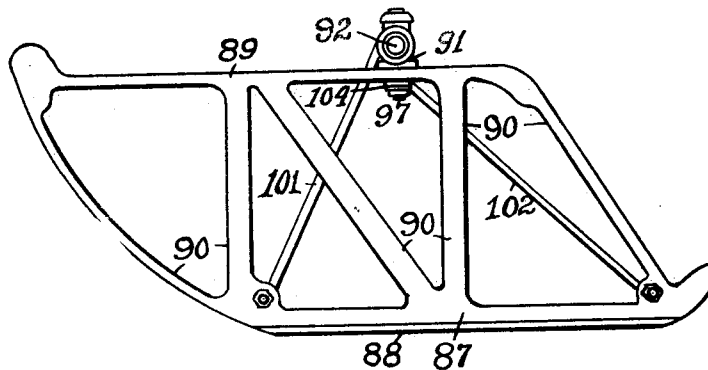


FIG. 14.

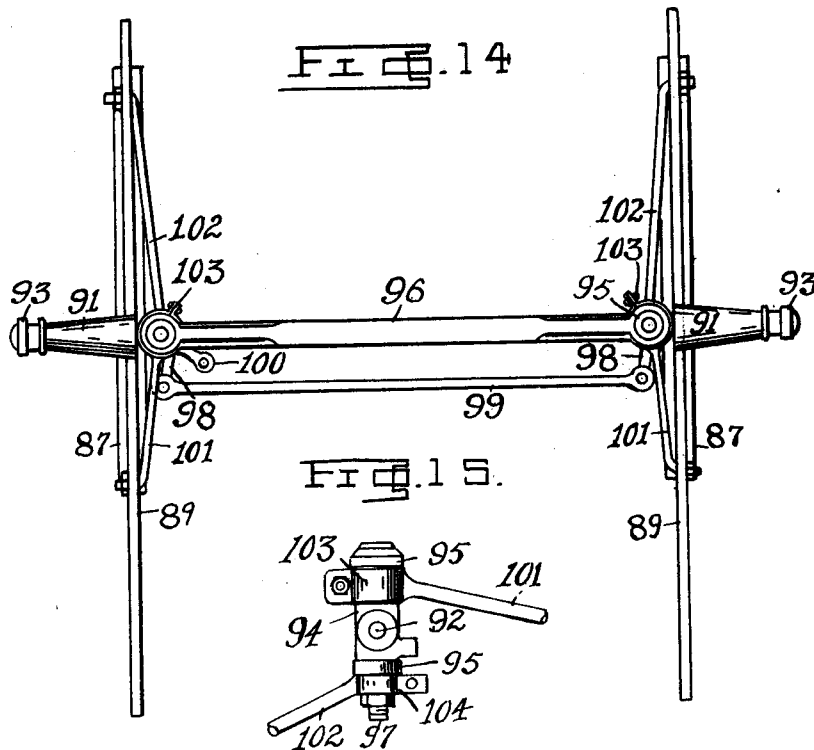
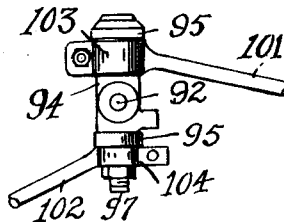


FIG. 15.



WITNESSES

Robt. F. Philworth
Geo. A. Hanson

INVENTOR

Andrew Vettel Jr.
by Edward A. Lawrence,
his Attorney

UNITED STATES PATENT OFFICE.

ANDREW VETTEL, JR., OF SANDUSKY, OHIO.

SLEIGH ATTACHMENT FOR POWER-DRIVEN VEHICLES.

1,065,011.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed May 10, 1912. Serial No. 696,483.

To all whom it may concern:

Be it known that I, ANDREW VETTEL, Jr., a citizen of the United States, and residing in the city of Sandusky, in the county of Erie and State of Ohio, have invented or discovered new and useful Improvements in Sleigh Attachments for Power-Driven Vehicles, of which the following is a specification.

10 My invention consists of new and useful improvements in sleigh-attachments for power-driven vehicles, such, for instance, as automobiles and automobile-trucks.

My object is to provide means whereby 15 sleigh-runners may be expeditiously and inexpensively substituted for the wheels of a power-driven vehicle, adapting the latter without further alteration for travel on snow or ice, or both. To accomplish this 20 purpose, I substitute for the rear or driving wheels a pair of power-runners which are mountable on the spindles or ends of the driving-axle of the vehicle without change in the latter, and which are provided with 25 tractor-chains actuated by said driving-axle and adapted to engage the ground to propel the vehicle either forwardly or backwardly as may be desired. Means are provided for raising said tractor-chains out of contact 30 with the ground and for locking the same in their raised position so that the vehicle may coast, as for instance in descending a hill. For the front or steering wheels of the vehicle I substitute non-power-driven or 35 steering runners which are connected with the usual steering mechanism for controlling the direction of travel.

Many novel features of structure and arrangement of parts will appear from the 40 following description.

In the accompanying drawings, Figure 1 is a side elevation of one of my power-runners, the inside side-plate and the adjacent eccentric mechanism being removed for the 45 sake of clearness and the tractor-chain being shown in its depressed or operative position; Fig. 2 is a vertical section of the runner along the line II—II in Fig. 1, looking in the direction of the arrow; Fig. 3 is a similar view along the line III—III in Fig. 1, looking in the direction of the arrow; Fig. 4 is a side elevation showing the rear tractor-chain-sprocket and the method of 50 mounting the same; Fig. 5 is a front elevation of one of the power-runners; Fig. 6 is an elevation showing the inner face of

one of the side plates of said runner and the eccentric-controlling disks adjacent thereto; Fig. 7 is a broken elevation showing a portion of the outer face of one of said 60 side plates with one of the eccentrics mounted therein; Fig. 8 is an inside elevation of the same, the controlling disk being indicated in dotted lines; Fig. 9 is an elevation showing the inside face of said disk; 65 Fig. 10 is an enlarged perspective of one of the tractor-shoes, a plurality of which are linked together to form the tractor-chain of the runner; Fig. 11 is a diagrammatic plan view showing the controlling mechanism 70 for the power runners; Fig. 12 is a side elevation of the same; Fig. 13 is a side elevation of one of the front or steering-runners; Fig. 14 is a plan view showing said runners mounted on either end of the front or non- 75 driving-axle and connected with the usual steering-gear, and Fig. 15 is an enlarged detail in elevation showing the method of laterally bracing one of said steering runners.

The following is a detailed description of 80 the drawings, which, however, are merely intended to illustrate a practical embodiment of the principles of my invention and not to limit the scope of the same to the structures shown.

Referring first to Figs. 1-12, inclusive, which relate to the power-runners to be substituted for the driving-wheels of the vehicle, the runner illustrated in Figs. 1-9, inclusive, is that substituted for the right 90 hand driving-wheel, the left hand runner being identical in structure except for the necessary reversal of a portion of the parts. In said figures 1 represents one end or spindle of the driving-axle from which the 95 wheel is removed. 2-2 are the vertical side plates of the runner connected together by webs or cross-braces 3-3 to stiffen the structure. The lower, longitudinal edges of plates 2-2 are provided with shoes 4-4 100 which contact with and slide along the snow or ice. Said shoes are preferably provided with longitudinal angular projections or ribs 5-5 to prevent skidding or side-slipping. The side plates 2-2 are provided adjacent to the rear ends with a pair of aligned 10 circular openings 6-6 in which are mounted the eccentrics 7-7 held in place by means of outside annular plates 8-8 and inside annular plates 9-9 engaging the counter- 110 sunk edges 10-10 of the eccentrics 7-7 and secured to the side plates 2-2 by screws

11—11. Anti-friction members or balls 12—12 are interposed between the edges of eccentrics 7—7 and the edges of openings 6—6.

13—13 are controlling-disks fixed to the inner faces of eccentrics 7—7.

The eccentrics 7—7 are provided with eccentrically placed apertures 14—14 which are fitted with ball-bearings 15—15 through which is inserted the axle 1 in a manner identical to that in which the spindle or end of said axle is inserted in the wheel. The usual cap or nut 16 is secured to the end of the axle 1 to prevent the escape of the axle from the runner. The cap or nut used to secure the wheel in place is also used for the similar purpose of securing the power-runner in place on the axle.

It is evident that the rotation of the disks 13—13 in the proper direction, carrying with them the eccentrics 7—7, will act to raise or lower the axle 1 in relation to the side plates 2—2. Suitable bearings 17—17 are interposed between the axle 1 and the central bores of the disks 13—13.

To limit the arc of rotation of the eccentrics 7—7 I provide the same with radial fingers 18 which move in arc-shaped recesses in the plates 9—9, the contact of the tooth with either end of said recess preventing further rotation of the eccentric in that direction.

Rigidly mounted on axle 1 within the side plates 2—2 is the driving-chain sprocket 19. Mounted on said axle adjacent to said sprocket 19 is a block 20, ball-bearings 21 being interposed between the axle and said block to prevent interference with the rotary movement of said axle.

22 is a non-rotating wheel provided with a vertical recess or opening 23 in the upper portion of which is seated the block 20, a coiled spring 24 being interposed between said block and the bottom of said recess to normally keep said block in its elevated position but permitting it to be depressed in said recess against the action of said springs in case of a sudden jar or jolt. Thus means are provided for the assumption of such jolts or jars as might otherwise be transferred between the axle and the runner to the injury of either.

25 is an annular tractor-chain sprocket mounted to rotate on the perimeter of wheel 22, ball-bearings 26 being interposed between the same to avoid friction. The sprocket 25 is provided with two annular series of teeth, 27—27, on the edges thereof, and an elevated, rounded edge 28 between said two series of teeth.

29 is a transverse shaft or spindle mounted in advance of axle 1 and in a similar manner.

The side plates 2—2 are provided with a pair of alined circular openings 30—30 in

each of which is mounted an eccentric 31, ball-bearings 32—32 being interposed between said eccentrics and the side plates. The eccentrics are held in place by means of outside annular plates 33—33 and inside annular plates 34—34 secured to said side plates.

35—35 are controlling disks, similar to disks 13—13, secured to the inner faces of eccentrics 31—31 and mounted on shaft 29 by means of ball-bearings 36—36. It is evident that the rotation of disks 35—35 will elevate or depress the shaft 29. The arc of rotation of eccentrics 31—31 is limited in a manner similar to that shown in Fig. 8 in connection with eccentrics 7—7.

37 is a second tractor-chain sprocket mounted to rotate freely on shaft 29 by means of ball-bearings 38—38, and provided with two annular edge series of sprocket teeth 39—39 and an intermediate elevated, rounded edge 40.

41 is a driving-chain sprocket secured to the face of sprocket 37 and rotating therewith.

42 is a power-chain connecting sprocket 19 with sprocket 41, thus transferring rotary power from the axle 1 to the tractor-chain sprocket 37.

The sprocket 41 is preferably of somewhat larger diameter than sprocket 19 to reduce the rate of rotation.

43—43 represent a series of tractor-shoes which are linked together at their adjacent ends by means of pairs of links 44—44 to form an endless tractor-chain which is mounted on the tractor-chain sprockets 25 and 37, the teeth 27—27 and 39—39 meshing between the pairs of links 44—44, as shown. It is thus evident that rotation in either direction may be applied to the tractor-chain from the axle 1. The end walls of the shoes 43—43 are cut away to form the rounded apertures 45—45 which are engaged by the rounded edges 28 and 40 of the sprockets 25 and 37, respectively. The shoes 43—43 are preferably provided with laterally convexed outer faces having a central, longitudinal interrupted fin or series of teeth 46—46 and conical projections 47—47 to enable the shoes to bite into the snow or ice.

48—48 and 49—49 represent pairs of standards mounted by means of ball-bearings 50—50 on axle 1 and shaft 29, respectively, between the disks 13—13 and 35—35. Said standards are connected longitudinally by top-braces 51 and side-braces 51^a at either side, and transversely by cross-braces 52, thus forming a rigid frame mounted on said axle and said shaft but not interfering with the rotation of the axle.

53 is an idler-wheel journaled between the parallel braces 51^a by means of its shaft engaging holes 54 in said braces. Said wheel

is provided with a rounded edge to engage the apertures 45—45 in the end walls of the shoes 43—43 and is intended to take up slack in the tractor-chain. I provide a plurality of pairs of alined holes 54—54 at different elevations to allow of adjusting the height of the wheel 53.

A guide-plate 55 is secured at its ends to the left hand face of wheel 22 as shown in Fig. 3, embracing the adjacent standard 48, as shown in Fig. 4, and slides vertically on said standard, thus permitting vertical and preventing rotary movement of said wheel 22.

In the upper ends of standard 48—48 is journaled a transverse rock-shaft 56 and a similar rock-shaft 57 is journaled in the upper ends of standards 49—49.

58—58 are a pair of upwardly extending arms rigidly mounted on shaft 56 and 59—59 are a similar pair of arms on shaft 57. Each arm 58 is connected to the opposing arm 59 by pivotally attached links 60. Outside of the inside side plate 2 a double ended rocking-arm 61 is rigidly mounted at its center on rock-shaft 56, the purpose of which arm will be explained later.

62—62 represent pairs of double ended rocking-arms rigidly mounted at their centers on the shafts 56 and 57. The arms 62—62 on the shaft 56 are connected by pivotally attached links 63—63 to the inner faces of disks 13—13 at either side of the centers of the latter, and similar links 63—63 connect the arms 62—62 of the shaft 57 with the disks 35—35. It is evident that by rocking the shaft 56 in the proper direction, the disks 13—13 and 35—35 may be turned, within the limits of their arc of rotation, to either raise or lower the axle 1 and shaft 29 in relation to side plates 2—2, and thus either raise or lower the tractor-chain out of or into its operative position.

To enable me to lock the tractor-chain in its raised or inoperative position, I provide the outer face—that is the face adjacent to the side plate 2—of the inner disk 13 with an angular tooth 64 which, when said disk is turned to the position which it assumes when the tractor-chain is raised out of its operative position, is engaged by a spring-pawl 65 mounted on the inner face of side plate 2 and controlled by a rod 66 pivoted at its upper end by means of a slot to an arm 67 rigidly mounted on a transverse rock-shaft 68 journaled on longitudinal braces 51—51. 69 is an arm rigidly mounted on the inner end of said shaft 68 and extending downwardly outside of the runner. Said arm is provided with a transverse curved slot 70, and the purpose of the same will be later explained.

To steady and assist the raising and lowering action of the eccentrics, I rigidly mount on the rock-shafts 56 and 57 cams

71—71 which bear upon the top edges of the side plates 2—2 and are provided with edge-flanges 72—72 which bear against the inside faces of said side plates to prevent the cams slipping from engagement with the top edges thereof.

Referring particularly to Figs. 11 and 12, 73 is a rock-shaft journaled transversely in advance of the power-runners in the frame of the vehicle, not shown, and provided at its ends with rigidly mounted double ended arms 74—74 which are connected by pivotally connected rods 75—75 with the ends of the double ended arms 61 of the two power-runners. 76 is an upwardly extending rigid arm mounted on shaft 73 and connected by link 77 with a hand-lever 78 placed conveniently to the hand of the chauffeur. The lever 78 is preferably provided with a locking-quadrant 79. It is thus evident that the chauffeur, by means of hand-lever 78, may throw the tractor-chain into or out of its operative position at will. 80 is a second transversely mounted shaft also journaled in the vehicle frame and provided at its ends with downwardly extending rigidly mounted arms 81—81 which are connected by pivotally attached rods 82—82 to the slotted ends of arms 69 of the locking-mechanisms of the two power-runners. Shaft 80 is also provided with a third rigidly mounted arm 83 which is connected by link 84 with the foot-treadle 85 whereby the chauffeur may at will unlock the tractor-chains preliminary to depressing the same into their operative positions.

86 represents the brake-band drum which is mounted as usual on the axle 1, the usual service and emergency brakes on the driving-axle being retained when the wheels are removed.

It is thus evident that the substitution of my power-runners for the driving-wheels of a vehicle involves no alteration in the essential parts of the vehicle other than the removal of the wheels and the mounting of the power-runners on the axle, the only change required being the boring of a few holes in the frame for mounting the rocking-shafts 73 and 80 and their actuating mechanisms.

Referring now to Figs. 13, 14 and 15, the front or non-power runners are substituted for the front or non-driving wheels without change of parts other than said substitution. The steering runners may be of any suitable type and construction, but I prefer the structure illustrated wherein the same are composed of a shoe 87, preferably provided with a longitudinal bottom rib 88 to grip the ground and prevent skidding or side-slipping, a top-plate 89, the shoe being brought upwardly at the front to meet said top-plate, and vertical braces 90—90. The top-plate is provided with a rigidly attached

hub 91 into which the spindle 92 of the axle is inserted and secured by the nut 93 or whatever type of locking-device with which the vehicle is provided. 94 is the usual vertical spindle-collar, rigid with the spindle 92 and pivoted in the yoke 95 on the end of the axle 96 by the pin 97. 98—98 are the steering-arms rigid with the collar 94 and connected with the steering-rod 99. 100 is the arm by which the steering-shaft is attached. 101 and 102 are bracing-rods, secured at their bottom ends by means of nuts to the shoe 87, and provided respectively at their upper ends with split-collars, 103 and 104, which encircle and are bolted tightly around the spindle-collar 94. The runner is thus firmly braced against lateral strain.

It is evident that the steering-mechanism of the vehicle controls the non-power runners to direct the course of the vehicle, and that no alterations are required for the substitution of the runners for the wheels.

It is thus evident that my invention provides efficient and inexpensive means for expeditiously changing a power-driven wheeled vehicle into a power-driven sleigh, no alteration of the power plant, transmission or body of the vehicle being required. The mechanism for controlling the power runners from the chauffeur's seat being quickly attached to the frame without marring the same, a few holes being only required. When the runners are replaced again by the wheels, the controlling mechanism is removed and the vehicle again presents its original appearance.

What I desire to claim is:—

1. In combination with the driving axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, and an eccentric interposed between said axle and said runner.

2. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, an eccentric interposed between said axle and said runner, and means for limiting the rotary movement of said eccentric.

3. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, an eccentric interposed between said axle and said runner, and means for locking said eccentric against rotation.

4. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, an eccentric interposed between said axle and said runner, means for limiting the rotary movement of said eccentric, and means for locking said eccentric against rotation.

5. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, a tractor mounted on said axle and receiving power therefrom, and means for shifting said runner in relation to said axle.

6. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, a tractor mounted on said axle and receiving power therefrom, means for shifting said runner in relation to said axle, and means for locking said runner against shifting.

7. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, means for shifting said axle vertically in relation to said runner, a shaft journaled in said runner parallel with said axle, sprockets mounted on said axle and said shaft, and a tractor-chain mounted on said sprockets receiving power from said axle.

8. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, a shaft journaled in said runner parallel with said axle, sprockets mounted on said axle and said shaft, means for shifting said axle and said shaft vertically in relation to said runner, and a tractor-chain mounted on said sprockets receiving power from said axle.

9. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, a shaft journaled in said runner parallel with said axle, sprockets mounted on said axle and said shaft, means for shifting said axle and said shaft vertically in relation to said runner, common controlling means for said axle and said shaft, and a tractor-chain mounted on said sprockets receiving power from said axle.

10. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving-wheel, a shaft journaled in said runner parallel with said axle, sprockets mounted on said axle and said shaft, means for shifting said axle and said shaft vertically in relation to said runner, means for locking said axle and said shaft against vertical movement, and a tractor-chain mounted on said sprockets receiving power from said axle.

11. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving wheel, a shaft journaled in said runner parallel with said axle, a sprocket mounted on said shaft and rotating therewith, a second sprocket loosely

mounted on said axle, a cushion-device interposed between said second sprocket and said axle, a tractor-chain mounted on said two sprockets, and means whereby said shaft is rotated by power from said axle.

12. In combination with the driving-axle of a power-driven vehicle, a runner adapted to be mounted on said axle as a substitute for the driving wheel, a shaft journaled in said runner parallel with said axle, a sprocket mounted on said shaft and rotating therewith, a second sprocket loosely mounted on said axle, a cushion-device interposed be-

tween said second sprocket and said axle, a tractor-chain mounted on said two sprockets, means whereby said shaft is rotated by power from said axle, and means for shifting said runner in relation to said tractor-chain.

Signed at Sandusky, O., this 4th day of May, 1912.

ANDREW VETTEL, JR.

Witnesses:

JOHN J. HEALY,
CHARLES E. LARGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."