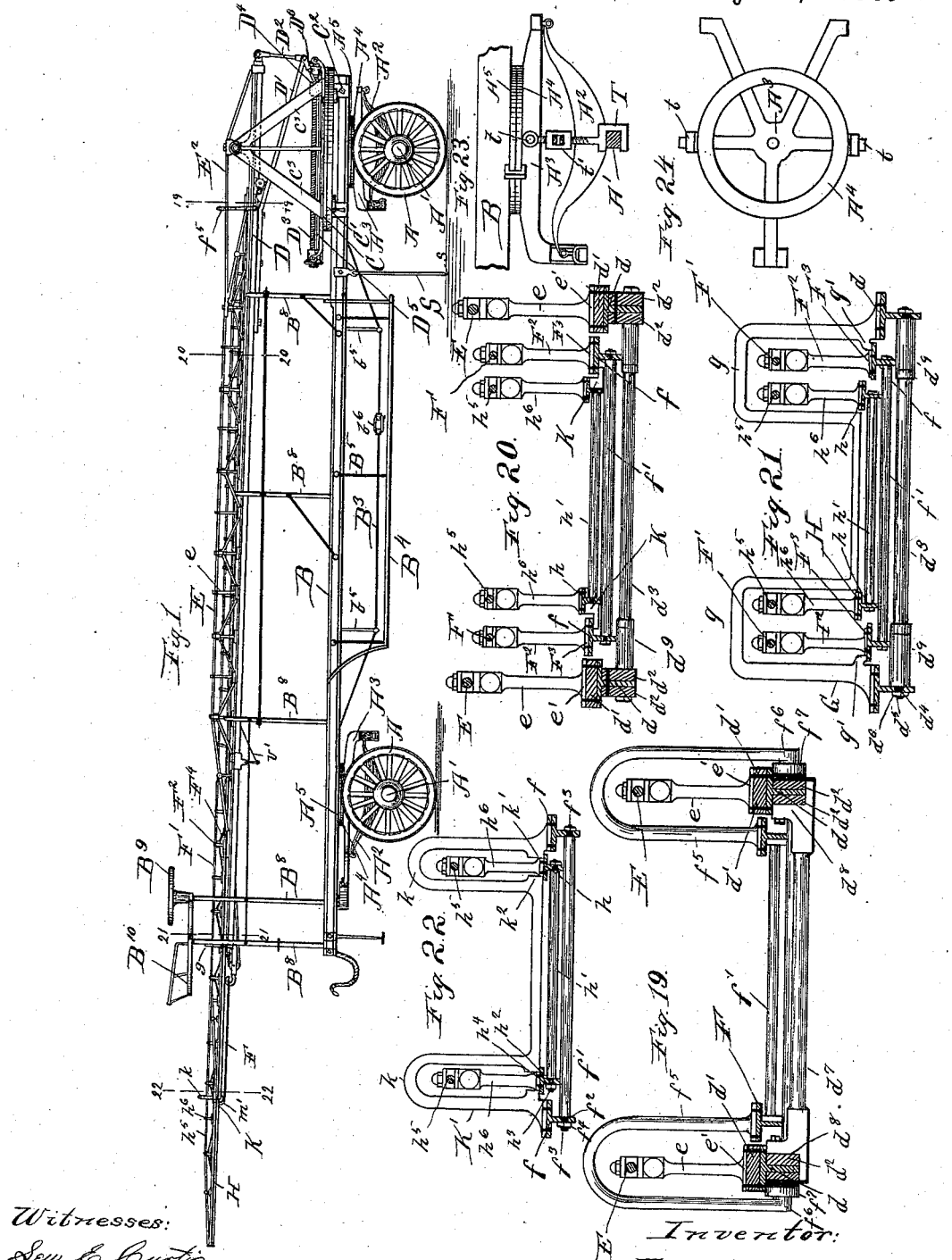
(No Model.)

5 Sheets—Sheet 1.

E. B. PRESTON.

TURN TABLE EXTENSION LADDER TRUCK.

No. 383,828. Patented May 29, 1888.



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By

(No Model.) 5 Sheets—Sheet 2.

E. B. PRESTON.

TURN TABLE EXTENSION LADDER TRUCK.

No. 383,828. Patented May 29, 1888.

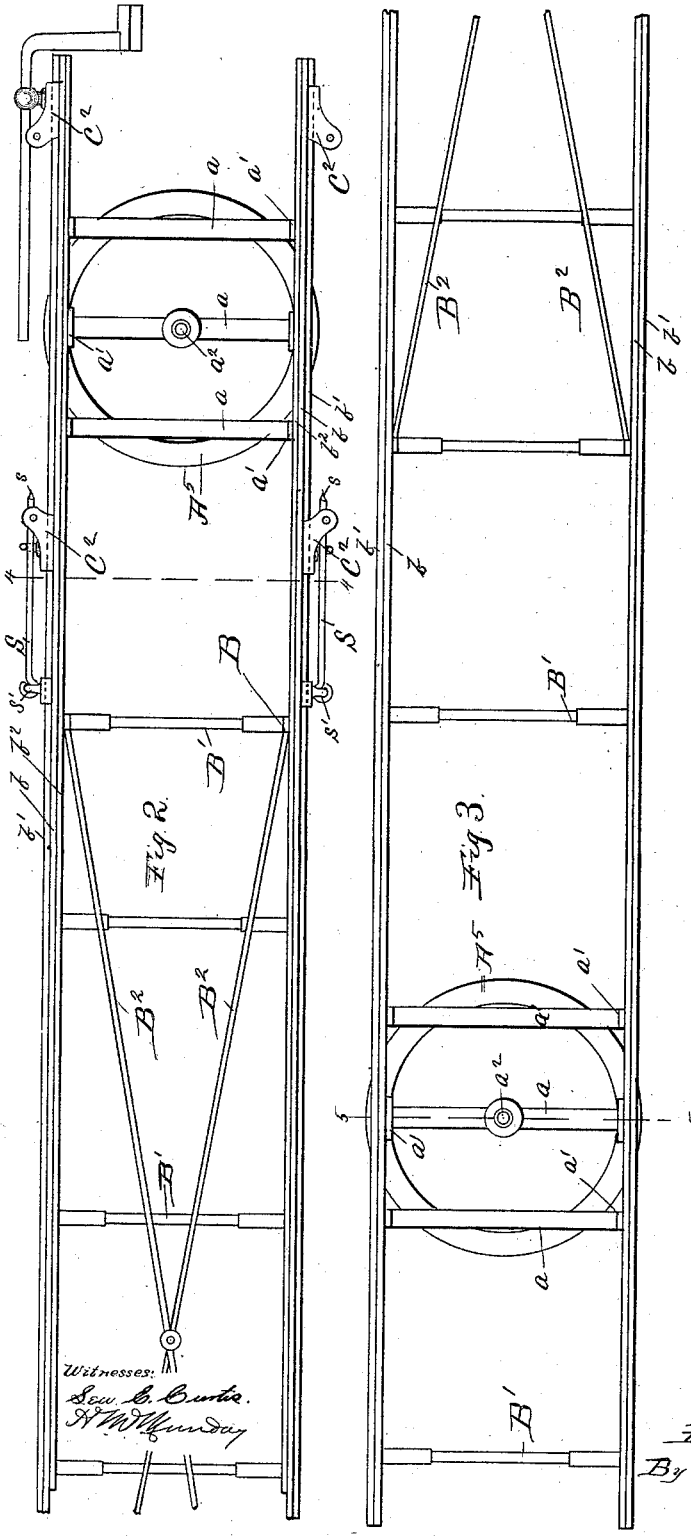

Fig. 2.

Fig. 3.

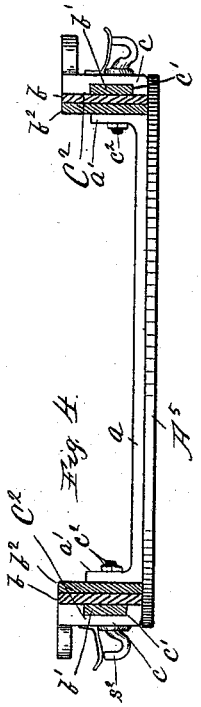

Fig. 4.

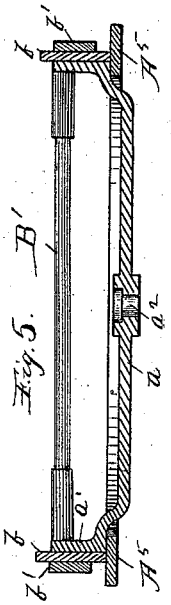

Fig. 5.

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(No Model.) 5 Sheets—Sheet 3.

E. B. PRESTON.

TURN TABLE EXTENSION LADDER TRUCK.

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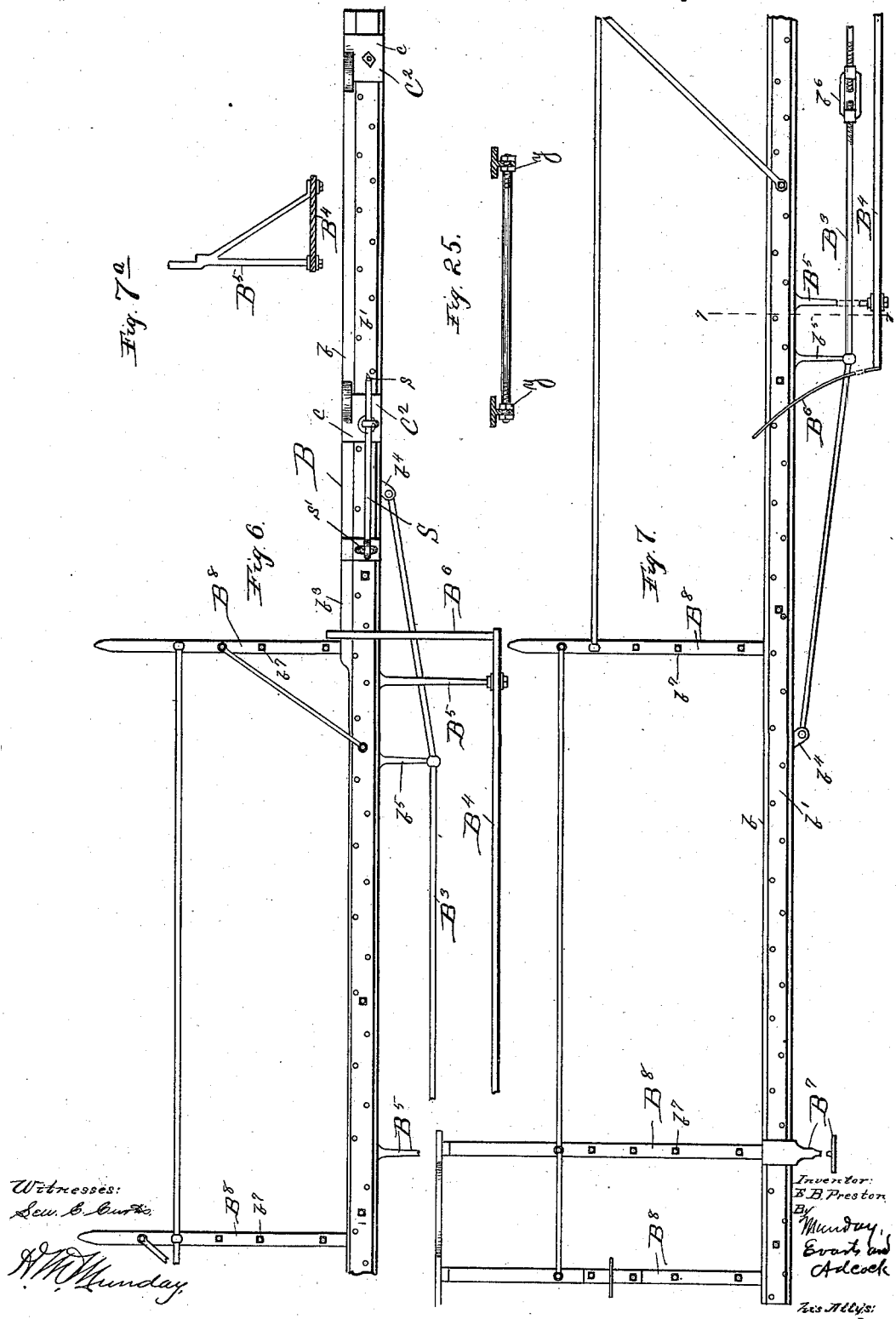

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E. B. PRESTON.

TURN TABLE EXTENSION LADDER TRUCK.

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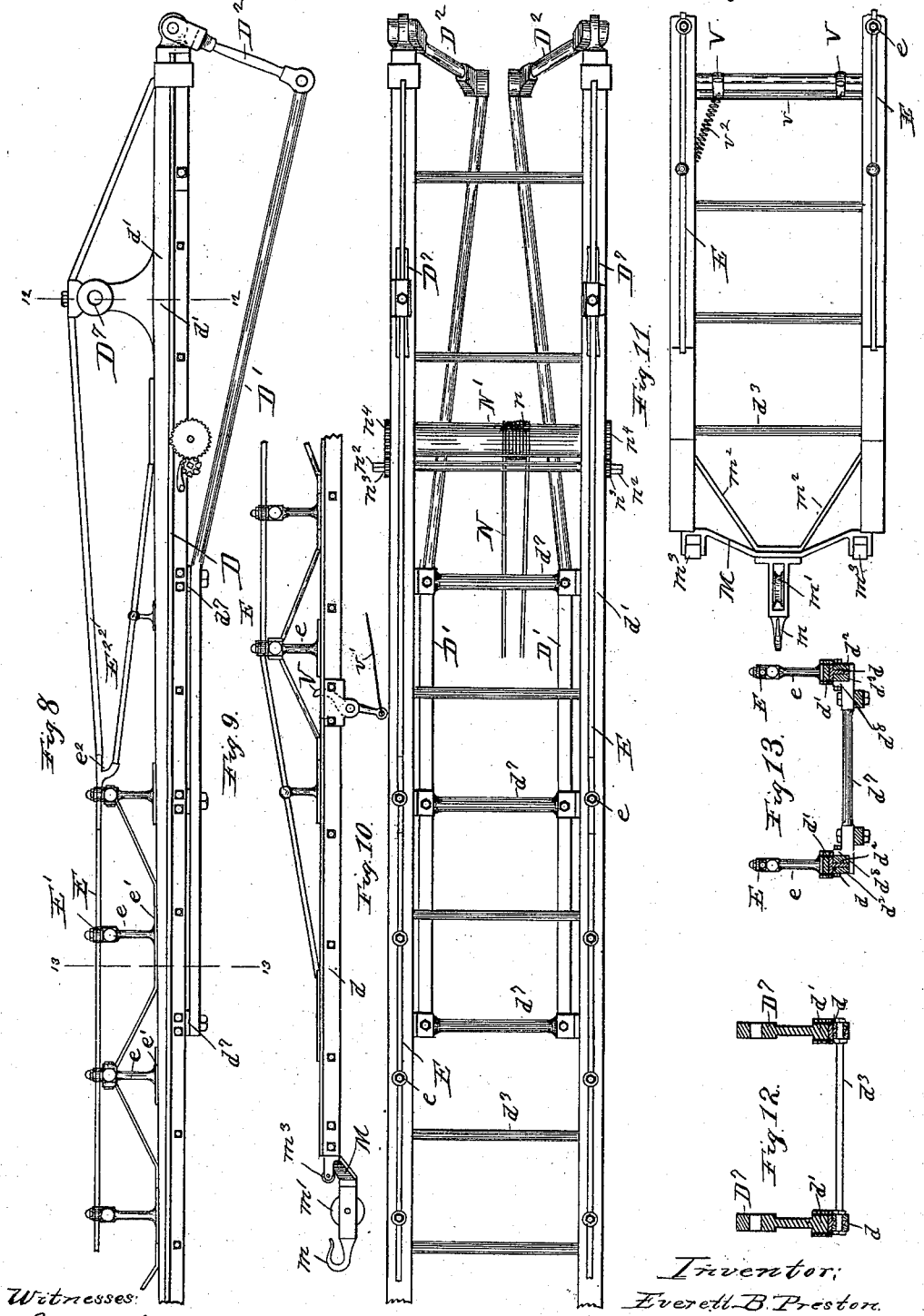

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(No Model.)

5 Sheets—Sheet 5.

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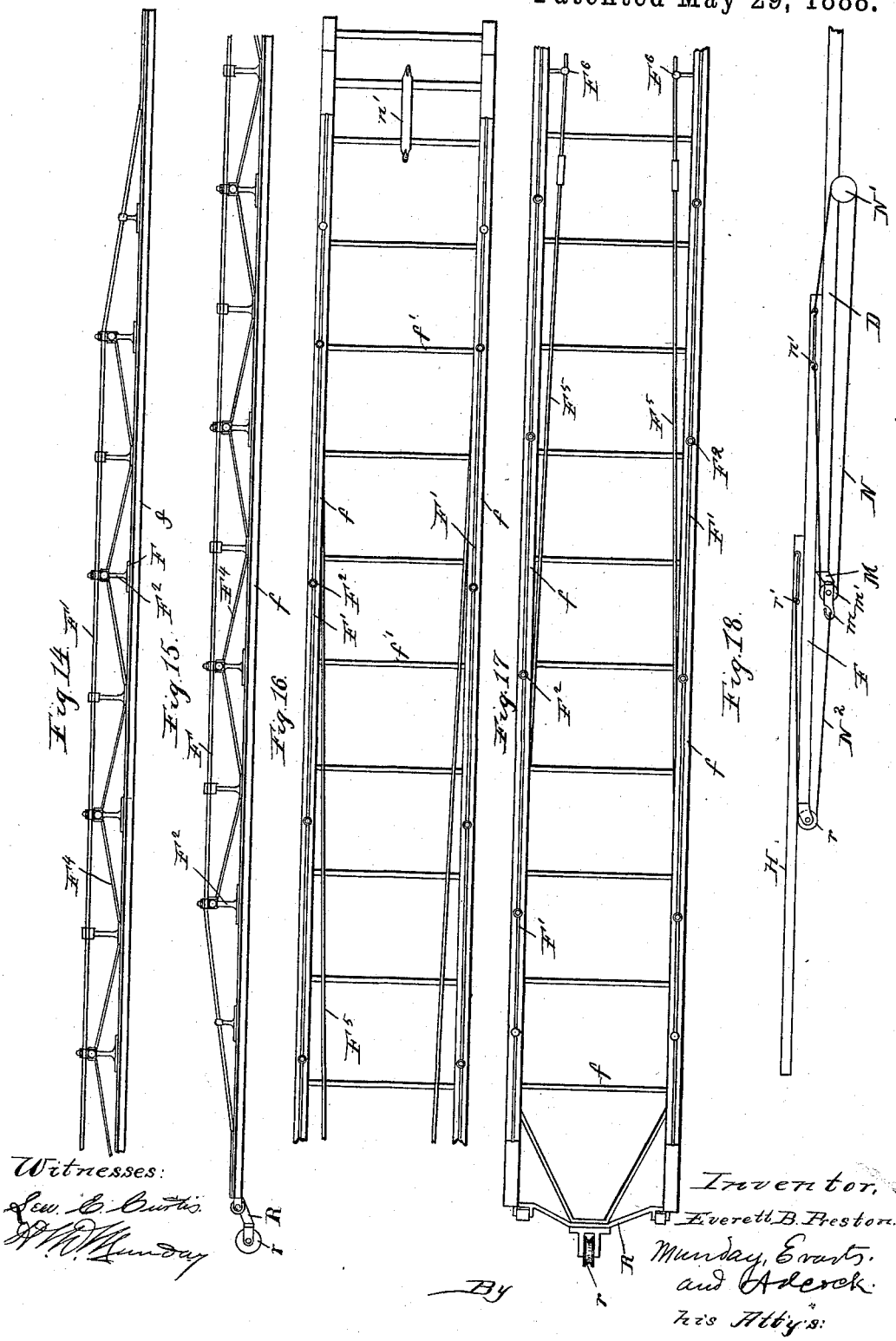
TURN TABLE EXTENSION LADDER TRUCK.

No. 383,828. Patented May 29, 1888.



Witnesses:
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UNITED STATES PATENT OFFICE.

EVERETT B. PRESTON, OF CHICAGO, ILLINOIS.

TURN-TABLE EXTENSION-LADDER TRUCK.

SPECIFICATION forming part of Letters Patent No. 383,828, dated May 29, 1888.

Application filed March 5, 1888. Serial No. 266,218. (No model.)

To all whom it may concern:

Be it known that I, EVERETT B. PRESTON, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Turn-Table Extension-Ladder Trucks, of which the following is a specification.

This invention relates to turn-table extension-ladder trucks.

The object of the invention is to produce a turn-table extension-ladder truck of a strong, rigid, simple, and durable construction, which will not be liable to sway or bend under the weight of the men thereon, and wherein the main ladder may be more easily and quickly raised than in those heretofore constructed.

The invention consists in the novel devices and novel combinations of devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of a device embodying my invention. Figs. 2 and 3 are detail plan views of the truck-frame and fifth-wheels, the former showing the front portion and the latter the rear portion of the same. Figs. 4 and 5 are cross-sections on lines 4 4 and 5 5, respectively, of Figs. 2 and 3. Figs. 6 and 7 are detail side elevations of the truck-frame, the former showing the front and the latter the rear end. Fig. 7^a is a section on line 7 7 of Fig. 7. Figs. 8 and 9 are side elevations, and Figs. 10 and 11 are plan views, of the main ladder, Figs. 8 and 10 showing the lower or pivoted end, and Figs. 9 and 11 the upper end, of the same. Figs. 12 and 13 are cross-sections on lines 12 12 and 13 13 of Fig. 8. Figs. 14 and 15 are side views, and Figs. 16 and 17 a plan view, of the second ladder, the same being the first extension-ladder, Figs. 15 and 17 showing the upper end of the ladder. Fig. 18 is a diagram view showing the three ladders and mechanism for extending the two extension-ladders simultaneously and equally. Figs. 19, 20, 21, and 22 are enlarged cross-sections on lines 19 19, 20 20, 21 21, and 22 22 of Fig. 1. Fig. 23 is a detail side view showing the mechanism for locking or holding the fifth-wheel rigidly to the axle, and Fig. 24 is a plan view of the running-gear frame. The two extension-ladders are of similar construction, excepting that the upper or fly ladder is somewhat narrower and lighter, and Figs. 14, 15, 16, and 17, of course, therefore show the construction of the uppermost as well as that of the middle ladder. Fig. 25 is a detail view showing a cross-section of one of the ladders and the preferred construction of the rungs.

In said drawings, A represents the wheels of the truck, A′ the axles, A^2 the springs, and A^3 the spider or frames to which the lower rings, A^4, of the fifth-wheels A^5 are secured. These parts may be of any ordinary construction. The upper rings, A^5, of the fifth-wheels are furnished each with three cross-bars, *a*, securely bolted thereto. These cross-bars have vertical flanges *a′*, to which the side bars of the truck-frame B are secured. The middle cross-bar, *a*, of each fifth-wheel is furnished with a central hole, a^2, for the king-bolt. Each of the two side bars of the truck-frame is composed of two vertical steel plates or bars, *b b′*, which extend the full length of the truck-frame, and a middle bar, b^2, which extends back from the front end of the truck about one-half the length of the truck. The inside frame-plate, *b*, is preferably about four and a half inches wide by one-half inch thick, except at the front end, where its width is increased to about five and one-half inches, as indicated at b^3. The outside bar, *b′*, is preferably about three inches wide by one-half inch thick. The three plates *b b′* b^2 are firmly riveted together.

B′ B′ are the cross-bars of the truck-frame, and B^2 B^2 are horizontal diagonal braces extending from one side of the bar to the other from a point back of the front fifth-wheel to a point in front of the rear fifth-wheel.

B^3 B^3 are longitudinal braces extending in a vertical plane from near the front end of the side bars to near their rear ends. They are secured at each end to ears or plates b^4, secured to the plates *b b′* b^2 of the side bars, and pass through depending truss-supports b^5, secured to the side bars. The truss-rods B^3 are furnished with turn-buckles b^6 near their middle. The long steps B^4 at the side of the truck-frame are supported at each end by depending forked supports B^5, which are secured to the side bars of the frame.

B^6 are the wheel-guards, and B^7 are the rear steps depending from the frame.

B^8 are the uprights or posts upon cross-bars b', extending between which the main ladder and also the loose ladders beneath the main ladder rest.

B^9 is the rear steering-wheel, and B^{10} the steersman's seat.

C is the turn-table, and C′ is the under or stationary ring of the turn-table, which is secured to the side bars of the truck-frame by flanged plates or brackets C^2. The brackets C^2 are four in number, and each consists of a horizontal ear-plate bolted to the turn-table ring C′ and furnished with a vertical flange, c, having a longitudinal channel or groove, c', which fits and embraces the outer narrow side-bar plate, b'. Bolts c^2 secure the flange c to the side bar of the frame.

C^3 C^3 are the inclined brace-supports secured to the movable ring C of the turn-table and to which the main ladder D is pivoted near its end.

D′ D^2 are the braces for strengthening the rear end of the ladder, and to which the raising and lowering mechanism is connected. Any suitable or well-known mechanism may be employed for operating the main ladder. That which I prefer to employ consists of a screw, D^3, sliding nut D^4, slideway D^5, and connecting-link D^6, and the same is fully shown and described in Patents No. 319,047, of June 2, 1885, and No. 336,519, of February 16, 1886.

The two side bars of the main ladder each consists of a T-shaped rolled-steel bar, d. At the lower end of this ladder, and extending, preferably, about half the length of the ladder, is a supplemental plate or bar, d', riveted securely to the top flange of the T-bar d, and also two side bars, d^2, riveted one on each side of the vertical web of said T-bar. These supplemental strengthening-bars d' and d^2 should preferably be drawn out thinner toward their upper ends. The rungs d^3 of the ladder are metal rods having shoulders d^4 and threaded ends d^5, furnished with nuts d^6, the threaded ends d^5 extending through suitable holes in the vertical web of the T-bar d and through the supplemental web-bars d^2 so far as said bars d^2 extend. The rungs and their nuts thus serve to rigidly secure the two side bars of the ladder together and to brace the ladder structure as a whole. The upper ends of the brace-bars D′ extend parallel to each other just inside the side bars of the main ladder D, and are secured to said ladder through the medium of the strong metal cross-bars d^7, the ends of which are provided with shoulders or right-angle flanges d^8 to fit the web portion of the T-bar d as re-enforced by the bars d^2. The cross-bars d^7 are bolted to the brace-bars D′ above the same, and the vertical flange d^8 is bolted to the bars d d^2. By this means a very strong and rigid construction is given to the ladder.

In order to lower the height of the main ladder on the truck, the eye or journal pieces D^7 are made to project from the upper face of the ladder, as indicated in Figs. 1 and 8. The eye or journal pieces D^7 are preferable welded to the top bars or plates, d' d', of the side bars of the ladder. Truss-rods E E, having socket-pieces E′, extend from one end to the other of the side bars of the ladder through suitable struts, e, and through the journal-pieces D^7. The struts e have base-flanges e', which are riveted to the top flange of the T-bar d. A branch truss-rod, E^2, united at e^2 with the truss-rod E, is secured to each of the side rails of the ladder at a point just back of the upwardly-projecting journal-pieces D^7. The main ladder D is thus made perfectly rigid, and is adapted to withstand without swaying any strain to which it may be subjected.

The side bars, f, of the middle ladder, F, consist of rolled steel T-shaped bars, and the rungs f' secure the same rigidly together, being furnished with shoulders f^2, threaded ends f^3, and nuts f^4; or the rungs may be riveted on instead of being secured by threaded nuts. The vertical webs of the side bars, f, ride or reciprocate upon the rungs d^3 of the main ladder, said rungs being furnished with friction rollers or sleeves d^9 to facilitate the movement. The T-bars f of the middle ladder are furnished near the lower end of this ladder with inverted-U-shaped arms f^5, which loop over the truss-rod E of the main ladder, and the outer ends of said arms f^5 are bent inward at f^6 and furnished with friction-rollers f^7, which fit under the top web of the T-bar d, thus holding and securing the two ladders stiffly and rigidly together while permitting the extension-ladder F to slide freely on the main ladder. The main ladder D is furnished at or near its upper end with a bar, G, having two loops, g, to receive the side bars of the middle ladder, F, and of the fly-ladder H. This bar G is furnished with guide-projections g', which fit over the top flange of the T-bars f of the middle ladder, so as to guide and hold the middle and fly ladders firmly as they are telescoped in or out. The middle ladder, F, is furnished with truss rods F′ F′, which extend in vertical planes over the struts F^2, which have flanges F^3 riveted to the top web of the T-bar f, and are braced by rods F^4. The middle ladder, F, is also furnished with truss-rods F^5, extending in a horizontal plane or in the plane of the ladder to stiffen the ladder sidewise and against twisting strains. These horizontally-extending truss-rods pass through horizontally-projecting struts F^6.

The fly-ladder H is of the same construction as the middle ladder, F, having T-shaped side bars, h, of rolled steel, rungs h', with shoulders h^2, screw-threads h^3, and nuts h^4. This ladder is also furnished with truss-rods h^5, extending in a vertical plane over the struts h^6, and with truss-rods extending in the plane of the ladder the same as the middle ladder, F.

The fly-ladder H is furnished with guide projections or flanged plates K, which are secured to the T-bars h of said ladder at the outer angle of the T, as is clearly shown in Fig. 20. These guides K fit under the top

flange of the T-bars *f* of the middle ladder and thus hold and guide the fly-ladder H. The middle ladder, F, is furnished near its outer or upper end with a guide-bar, K', having two loops, *k k*, to receive the vertical struts and truss-rods of the fly-ladder H, and furnished with guide-projections *k' k²*, which fit against the top flange of the T-bars *h*, as is clearly shown in Fig. 22. The vertical web of the T-bars *h* of the fly-ladder also ride against the rungs of the middle ladder, F. The T-shaped bars of the main, middle, and fly ladders thus not only give great strength and rigidity to the ladders, but also in connection with the guides said T-bars afford a strong, cheap, and efficient means of coupling the sliding ladders together, so that they may be extended or telescoped.

The main ladder D is furnished at its upper end with a cross-bar, M, having a hook or eye piece, *m*, and a pulley, *m'*, around which the rope N or chain passes that operates the extension-ladders. The cross-bar M is provided with braces *m²*, and also with friction-rollers *m³*, for the side bars of the middle ladder, F, to ride upon. The rope N is given two, three, or more wraps, *n*, around the drum N', to prevent the rope slipping on the drum, and the ends of the rope are secured to the first extension-ladder F, near its lower end by means of a hook or eye bar, *n'*. The drum N' is journaled on the main ladder D, near its lower end, and is operated from a crank-shaft, *n²*, through the spur-gears *n³ n⁴*. The first extension-ladder, F, is furnished with a cross-bar, R, near its top, having a pulley, *r*, journaled thereon, and a second wire rope or chain, N², connected at one end to the hook *m* on the main ladder and at its other end to the hook *r'* on the fly-ladder H, passes over this pulley *r*, so that when the ladder F is extended on the main ladder by operation of the cable N, the fly-ladder H will by this connecting-cable N² be simultaneously and equally extended on the middle ladder, F. By this means both extension ladders F and H are equally extended; and in cases where they are not fully extended the lap is always equally divided between the ladders, thus giving the structure as a whole very great strength and firmness. By this means, also, both extension-ladders being extended simultaneously and by the same operation of the one drum, the ladders may be fully extended ready for use very quickly, which is a matter of the utmost importance in these turn-table truck-extension ladders. By this means, also, the ladder as a whole being constructed in three sections, D, F, and H, I am enabled to very materially shorten the main ladder, the same being only about one-third the total length instead of about one-half the total length, as these turn-table extension-ladder trucks have been heretofore constructed. This shortening the main ladder renders it possible to raise it much more easily and quickly than it can be done where the main ladder is made one-half the total length of the combined ladders, as heretofore. When the raised or partially raised ladders are being swung around on the turn-table C, as is sometimes done, it is very important that the truck-frame should not rock or tip in the least transversely, and to prevent this I provide the truck-frame with two or more brace-feet, S, having sharpened ends *s*, adapted to enter the earth or pavement. These brace-feet are pivotally connected by a hinge or joint, *s'*, to the truck-frame, so that they may extend in any direction desired. When not in use, their free ends rest in spring-closed clips, *s²*, secured to the side of the truck-frame. Clips T, adapted to fit on the axle of the truck, are pivoted at *t* to the truck-frame. These clips are furnished with turn-buckles, *t'*, and they serve to rigidly connect the truck-frame with the axle, so that the truck-frame can have no rocking or tilting movement in respect to the axle when the ladders are in use. The main ladder D is provided near its top with safety pawls or catches, V, on a rock-shaft, *v*, the same being operated by a cord, *v'*, and held in position by a spring, *v²*.

As shown in Fig. 25, it will be seen that the inside shoulders on the rung consist of threaded nuts *y*. This construction enables any rung of the ladder to be taken out and replaced by another without taking the ladder apart. I prefer to provide all the rungs of all the ladders with these inside nut-shoulders *y*. For convenience of illustration, however, the nuts *y* are not shown in the other figures of the drawings.

I claim—

1. The combination, with a turn table truck, of a pivoted main ladder, D, mounted on said turn-table, having side bars, *d*, composed of T-shaped steel bars having their middle or stem webs in vertical planes, and an extension-ladder, F, having side bars *f*, consisting of T-shaped steel bars having their middle or stem webs in vertical planes to adapt the same to resist transverse breaking strains, and mechanism for raising said main ladder, substantially as specified.

2. The combination, with a turn-table truck, of a pivoted main ladder, D, mounted on said turn-table, having side bars, *d*, composed of T-shaped steel bars having their middle or stem webs in vertical planes, and a fly-ladder having side bars consisting of T-shaped steel bars having their middle or stem webs in vertical planes to adapt the same to resist transverse or breaking strains, and mechanism for raising and lowering said main ladder, substantially as specified.

3. The combination, with a turn-table truck, of a main ladder, D, pivoted to the turn-table, and consisting of T-shaped steel side bars, *d*, supplemental bars *d² d²*, top bar, *d'*, and rungs *d³*, secured to the vertical webs of said T-bars *d*, substantially as specified.

4. The combination, with a turn-table truck, of a main ladder, D, pivoted to the turn-table and consisting of T-shaped steel side bars, *d*, supplemental bars d^2 d^2, top bar, *d'*, rungs d^3, secured to the vertical webs of said T-bars *d*, brace-bars D' D^2, and cross-bars d^7, secured to said brace-bars D' and to the side bars of the ladder D, substantially as specified.

5. The combination, with a turn-table truck, of a main ladder, D, pivoted to the turn-table and consisting of T-shaped steel side bars, *d*, supplemental bars d^2 d^2, top bar, *d'*, rungs d^3, secured to the vertical webs of said T-bars *d*, brace-bars D' D^2, and cross bars d^7, secured to said brace bars D' and to the side bars of the ladder D, truss-rods E, and struts *e*, substantially as specified.

6. The combination, with the main ladder having side rails composed of T-bars having their middle or stem webs in vertical planes, of an extension-ladder having side rails composed of T-bars having their middle or stem webs in vertical planes, and guides for coupling the two ladders together bearing against the top webs of said T-shaped bars, so that they may slide on each other, substantially as specified.

7. The combination, with ladders D and F, having side bars consisting of T-shaped rails with their middle webs in vertical planes, with guides secured to one of said ladders and fitting over and under the top web or flange of the T-shaped bar of the other, substantially as specified.

8. The combination, with ladder D, having T-shaped bars *d*, of ladder F, having T-shaped bars *f*, and guide-bars f^5, secured to said ladder F and fitting against the top flanges of said T-shaped bars *d* of the ladder D, substantially as specified.

9. The combination, with ladder D, having T-shaped bars *d*, of ladder F, having T-shaped bars *f*, and guide-bars f^5, secured to said ladder F and fitting against the top flanges of said T-shaped bars *d* of the ladder D, said guide bars f^5 having friction-rollers f^7, substantially as specified.

10. The combination, with ladder D, having steel T-shaped side bars, *d*, of extension-ladder F, having steel T-shaped side bars, *f*, and a guide-bar, G, secured to said ladder D and fitting against the top flanges of said T-bars *f*, substantially as specified.

11. The combination, with ladder D, having steel T-shaped side bars, *d*, of extension-ladder F, having steel T-shaped side bars, *f*, a guide-bar, G, secured to said ladder D and fitting against the top flanges of said T-bars *f*, guide-bars f^5, secured to said ladder F and fitting against the top flange of said T-bars *d*, substantially as specified.

12. The combination, with main ladder D, having steel T-shaped side bars, *d*, rungs d^3, secured thereto and furnished with friction rollers or sleeves d^9, of extension-ladder F, having steel T-shaped side bars, *f*, riding on said friction-rollers d^9, substantially as specified.

13. The combination, with main ladder D, having steel T-shaped side bars, *d*, furnished with truss rods E and struts *e*, projecting in a vertical plane, of extension-ladder F, having steel T-shaped side bars, *f*, and U-shaped guide-bars f^5, secured to said ladder F and fitting against the top flanges of said T-bars *d*, substantially as specified.

14. The combination, with main ladder D, having steel T-shaped side bars, *d*, and extension-ladder F, having steel T-shaped side bars, *f*, and truss-rods F' and struts F^2, projecting in a vertical plane, and guide-bars G, secured to said main ladder D and provided with two loops, *g g*, substantially as specified.

15. In a turn-table extension-ladder truck, the combination of the frame B, having steel side bars, *b b'*, of different widths, with clips or brackets C^2, having vertical flange *c*, furnished with groove *c'*, to embrace the narrower bar, *b'*, turn-table ring C', bolted to said brackets C^2, and turn table C, substantially as specified.

16. In a turn-table truck, the combination of the fifth-wheel A^5, cross-bars *a*, secured thereto, having vertical flanges *a'*, and the truck-frame B, having steel side bars secured to the vertical flanges of said cross-bars *a*, substantially as specified.

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