

No. 686,640.

Patented Nov. 12, 1901.

H. FISHER-SPENSER & H. BRUNLEES.
SINGLE LINE RAILWAY.

(Application filed Dec. 6, 1900.)

(No Model.)

3 Sheets—Sheet 1.

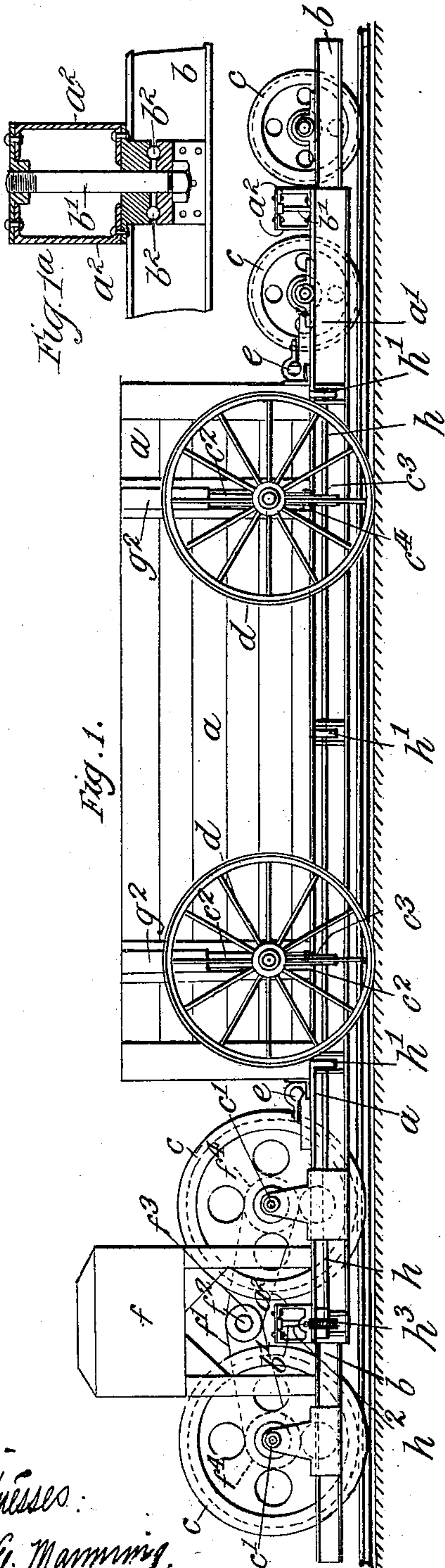


Fig. 1.

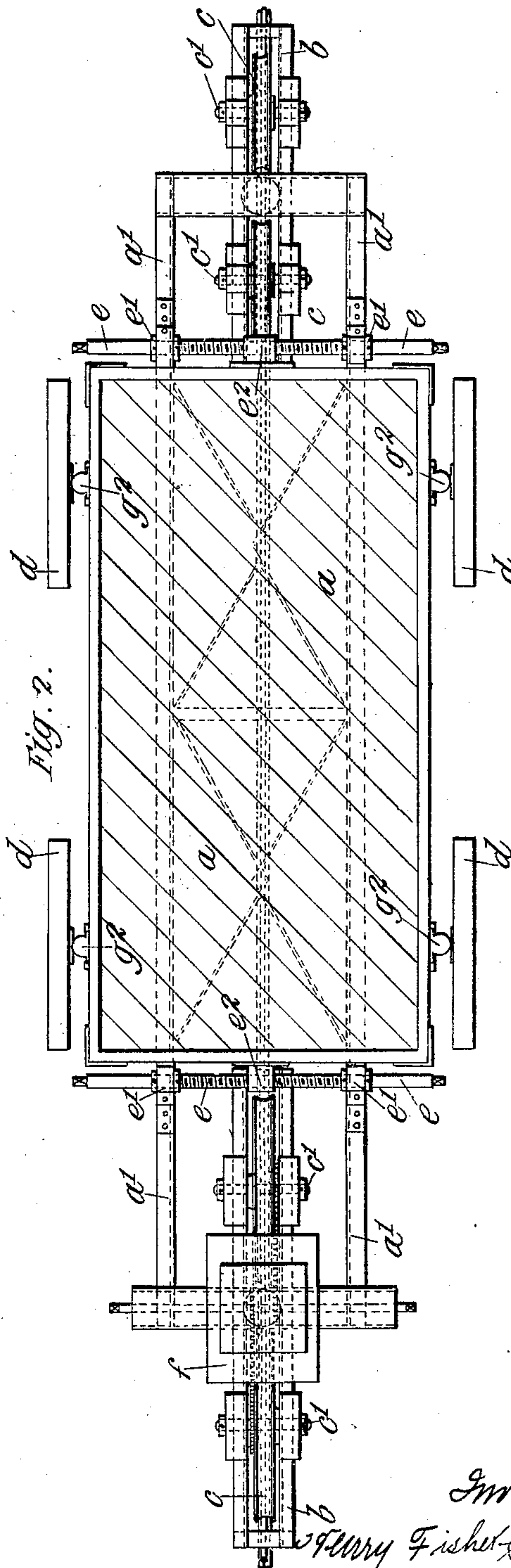


Fig. 2.

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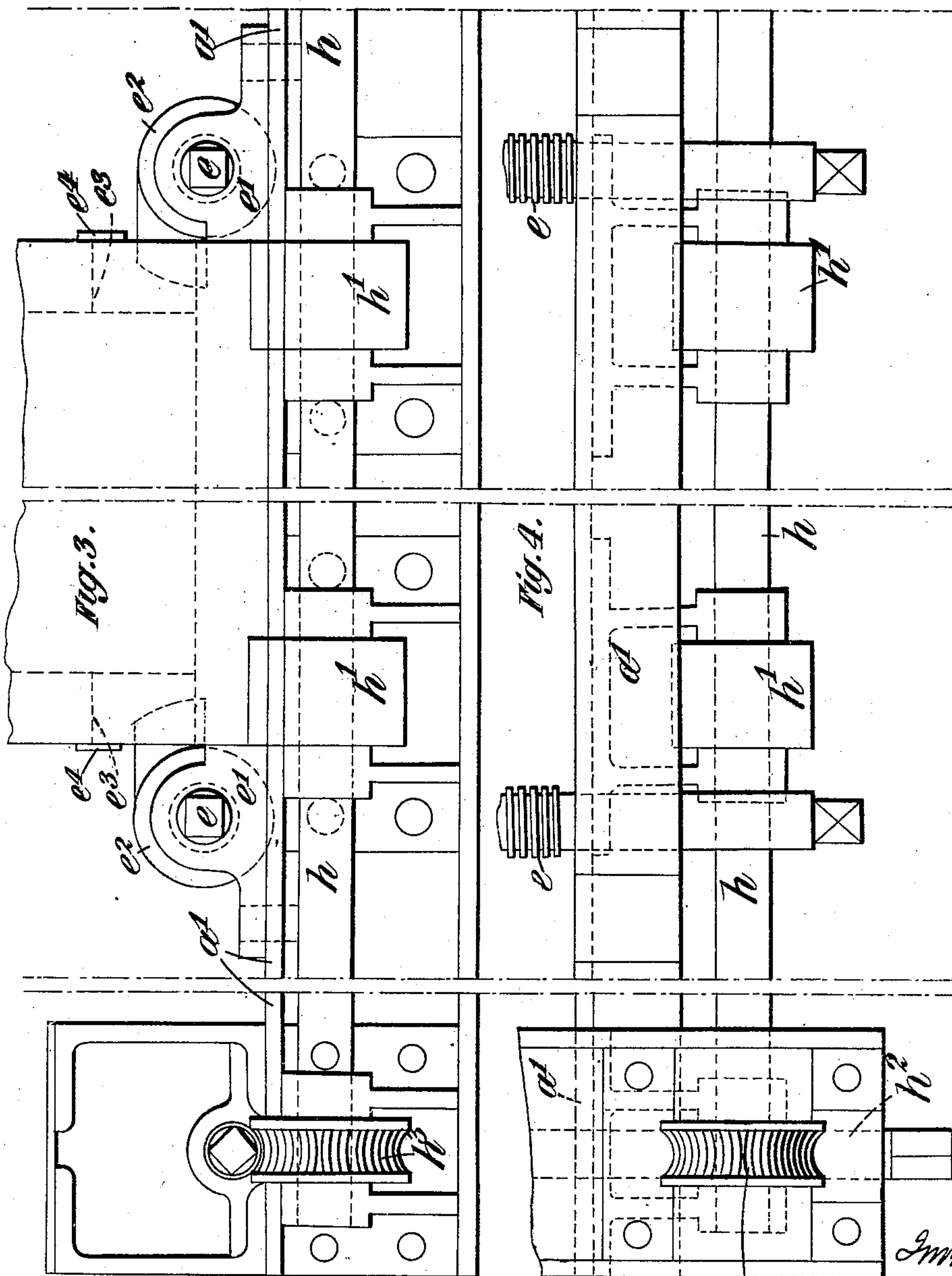
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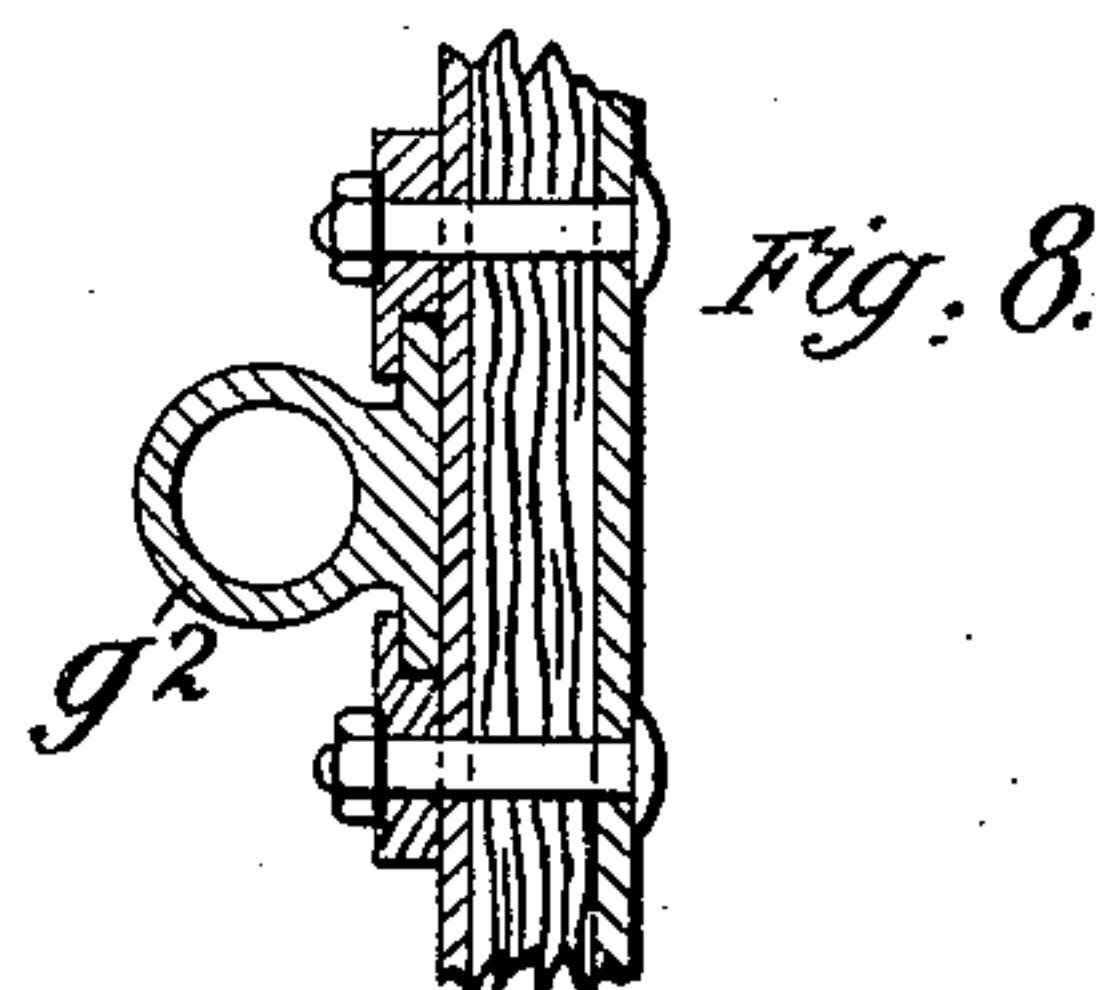
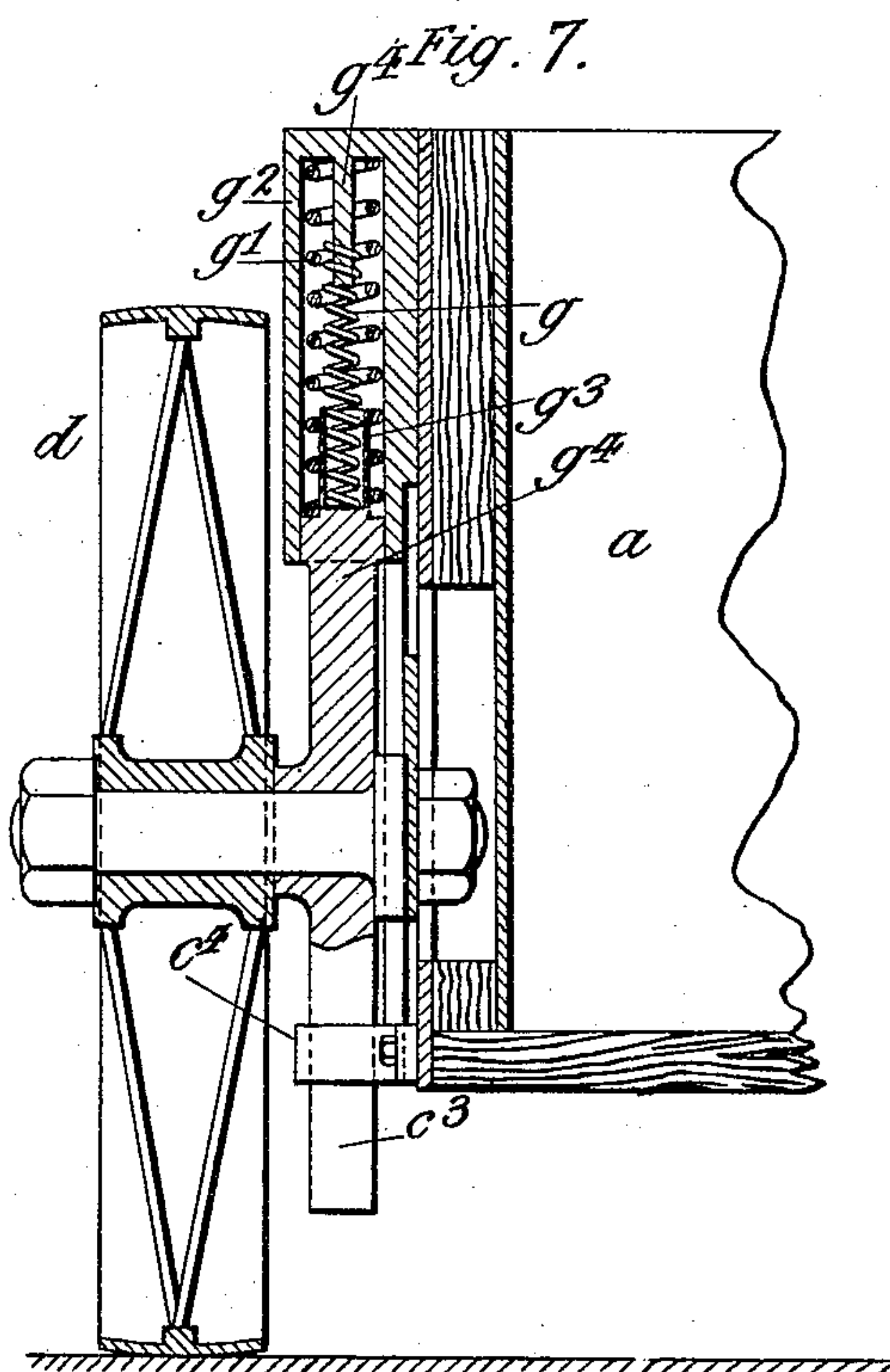
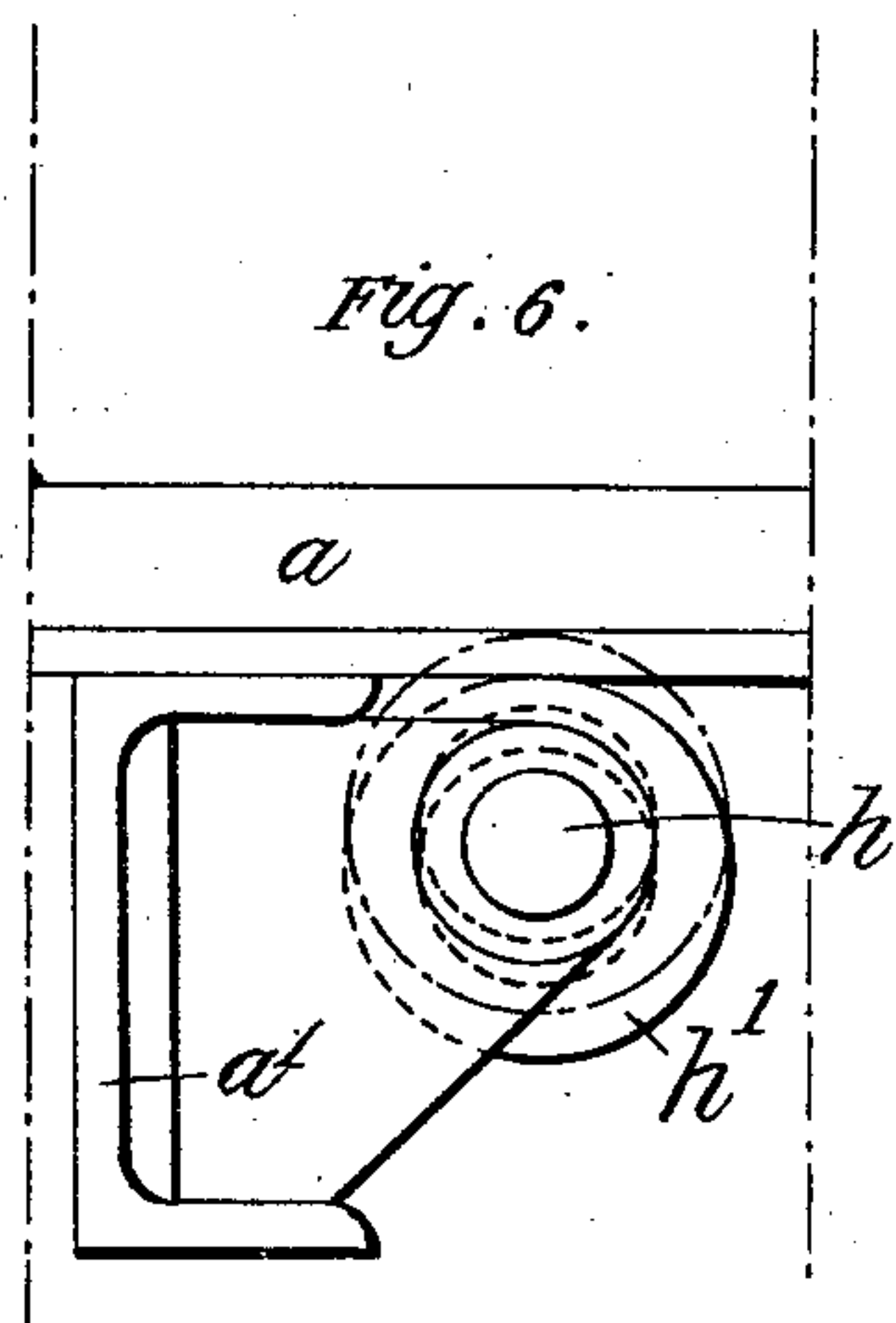
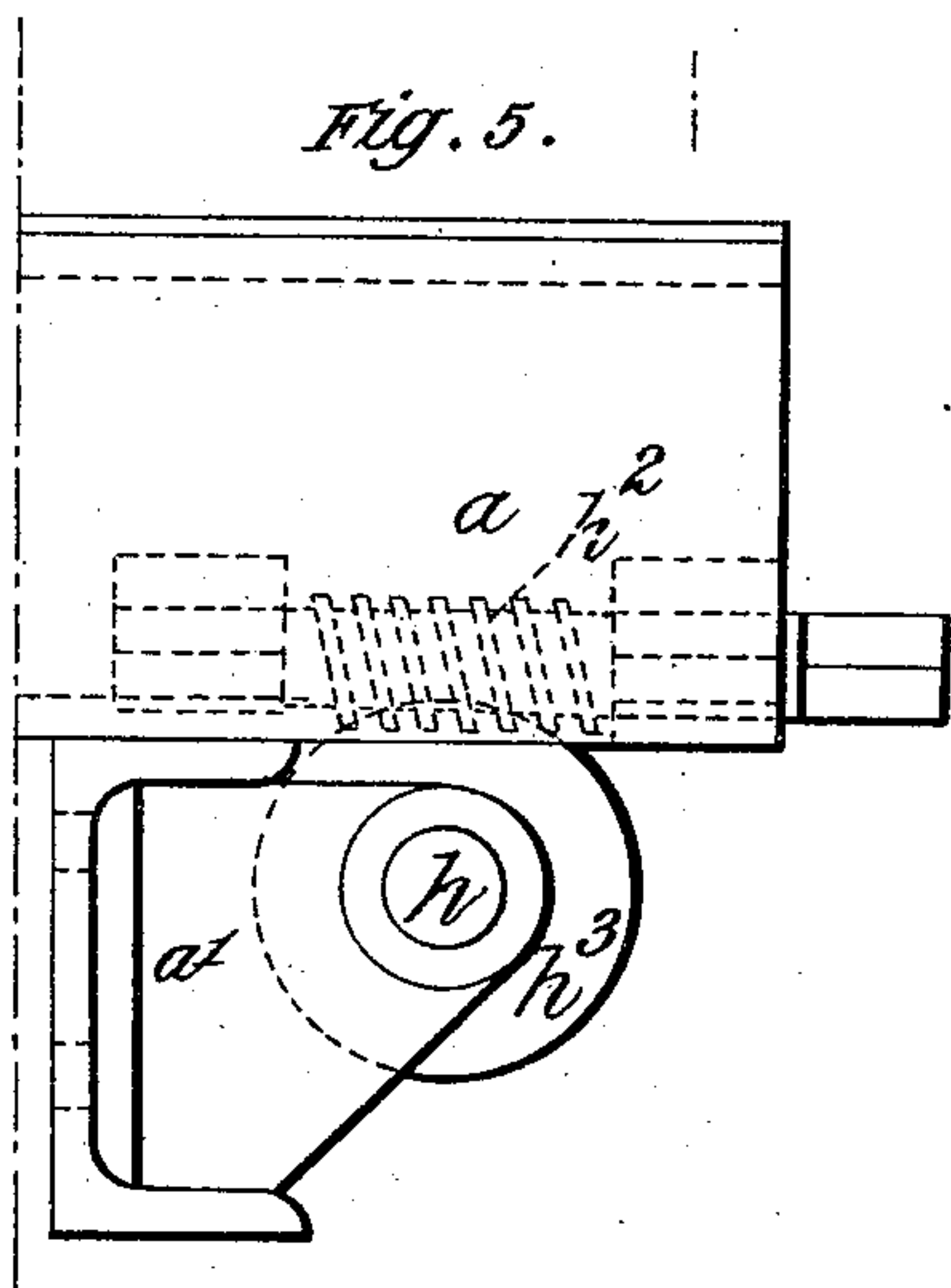
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

HENRY FISHER-SPENSER, OF LONDON, AND HOWARD BRUNLEES, OF
LINDFIELD, ENGLAND.

SINGLE-LINE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 686,640, dated November 12, 1901.

Application filed December 6, 1900. Serial No. 38,905. (No model.)

To all whom it may concern:

Be it known that we, HENRY FISHER-SPENSER, civil engineer, residing at 24 Trafalgar Buildings, London, and HOWARD BRUNLEES, civil engineer, residing at Norrington, Lindfield, in the county of Sussex, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements Relating to Single-Line Railways, of which the following is a specification.

This invention has reference to single-line railways in which the vehicles are provided with a central wheel or wheels engaging with a single rail and also with a lateral wheel or wheels adapted to touch or run on the ground at the side of the single rail in order to prevent the vehicle from becoming displaced from the said rail. Our invention has special reference to the kind of single-line railways in which the said rail is laid on the ground.

According to our invention the body or weight-carrying part of the vehicle, which may be a car, truck, tipping wagon, or passenger-carriage, is mounted at each end on bogies supported on appropriate central wheels adapted to engage with the aforesaid central rail, and the said vehicle is also provided with lateral balance-wheels, between the axles of which and the vehicle are interposed yielding bodies, such as springs. We also provide that the propelling power, which may be derived from an electric, hydraulic, or other motor carried by the vehicle or otherwise, is applied in such a manner as to avoid all lateral thrust, and consequently stress, on the vehicle.

In order to enable the load carried by the vehicle to be shifted so that the weight on the central rail may be equally distributed or balanced in such a manner as to insure that the greater part of the load may be borne by the central wheels, we provide means whereby the body of the vehicle can be shifted transversely with respect to the central rail by means of a revolving screw or screws carried by the under frame of the vehicle and engaging with nuts on the body of the vehicle, the said screw or screws being actuated by suitable wheel-and-worm gearing.

In order that our said invention may be clearly understood and readily carried into effect, we will proceed to describe the same

more fully with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal elevation, and Fig. 1^a is a detail sectional view, showing the pivotal connection between the bogie and the weight-carrying portion; Fig. 2, a plan of a vehicle constructed according to our invention. Fig. 3 is a transverse section, Fig. 4 a reverse plan, and Figs. 5 and 6 are opposite end views, showing the means for supporting the body portion while it is being shifted transversely. Fig. 7 is a sectional elevation showing the means for connecting the lateral wheels to the vehicle, and Fig. 8 is a plan of one of the bearings for said wheels.

a is the body or weight-carrying part of the vehicle.

b b are the bogies, which, as shown in Fig. 1^a, are pivotally connected to the weight-carrying portion, said pivotal connection consisting of a large bolt *b'* and a nut mounted with framework *b''*, provided in the ball-bearings; *c c*, the central wheels, which engage with the single rail on the road or track; *d d*, the lateral wheels; *e e*, the screws for transversely adjusting the position of the load on the wheels, and *f* is the driving-motor.

The bogies *b b*, on which the body or weight-carrying portion of the vehicle is mounted, are constructed so that the weight or load lies between the wheels and in the longitudinal central plane of the vehicle, the bottom of the vehicle being at a lower level than the axles *c' c'* of the wheels *c c*.

g g' are springs interposed between the axles *c' c'* of the lateral wheels and the weight-carrying portion of the vehicle. (See Fig. 7.) These springs are placed in boxes *g'' g''* on the body of the vehicle and are so arranged that they will offer a graduated resistance to the weight coming upon them. The inner spring *g* is held in position at its lower end by the socket *g''*, formed in the upwardly-extending arm *c''* on the axle *c'* and at its upper end by the projection *g''*, while the outer spring *g'* bears on the upper end of the box and on the wheel-axle. Should the wheels meet with an obstruction, they will in moving vertically cause the outer spring to be compressed, and if the obstruction be continued to a further degree the upper end of the spring *g* will also

come into contact with the said upper end of the box and will consequently be compressed, whereby the shock which would otherwise be given to the vehicle will be absorbed by the springs and the wheels will override the obstruction without tipping or overbalancing the vehicle.

$c^3 c^3$ are downwardly-extending arms on the axles of the wheels $c c$, which slide in brackets $c^4 c^4$ in the body of the vehicle and prevent the said wheels moving laterally. The body of the vehicle is by these means secured in the most stable position and is adapted to move on steep inclines or around sharp curves without danger of upsetting.

The motor f is mounted on one of the bogies b and imparts motion to the wheels $c c$ by means of chains $f' f'$, gearing with wheels $f^3 f^3$ on the motor-shaft f^2 and with gear-wheels $f^4 f^4$ on the axles of central wheels $c c$.

The screws $e e$ are mounted in an underframe a' , on which the body of the vehicle is supported in such a manner that it can be shifted transversely relatively to said underframe. The said screws revolve in the sleeves $e' e'$, mounted at each side of the said underframe at both ends of the vehicle, and engage with nuts $e^2 e^2$ on the body portion, so as to shift the latter transversely when the said screws are rotated. In order to facilitate the said transverse movement, we provide, at each side of the vehicle, rods $h h$, near each end, and at the center of which are eccentrically mounted antifriction-rollers $h' h'$. The said rods are each rotated when required by means of a worm h^2 , mounted on the said underframe at one end of the vehicle and gearing with a wheel h^3 on each of said rods h . The said worms are operated by crank-handles, so as to cause the said rollers to bear against the under side of the body to lift it clear of the underframe and support it during its transverse movement by the aforesaid screws.

To permit the body of the vehicle to rise vertically from the underframe, the nuts $e^2 e^2$ are adapted to loosely engage with slots $e^3 e^3$ in the end of the body portion and are prevented from coming out of said slots by hinged stops $e^4 e^4$, which can be turned out of the way to allow the said nuts to be removed in order that the body can be lifted from the underframe when desired.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. The combination with a vehicle adapted to run on a single rail, of bogies, of central wheels engaging with said rail and mounted in said bogies, of a weight-carrying portion supported by and situated between said bogies and having its bottom at a lower level than the axles of said central wheels, of lateral wheels carried by independent axles on the vehicle and adapted to run in constant engagement with the ground at each side of said rail, and of springs interposed between the said lateral wheels and the vehicle and

adapted to offer resistance to pressure exerted vertically upon them for the purpose specified.

2. The combination with a vehicle adapted to run on a single rail, of central wheels mounted in suitable bearings at each end of the vehicle to engage with said rail, of lateral wheels adapted to run in constant engagement with the ground at each side of the said rail, and independent axles each provided with springs interposed between said lateral wheels and the vehicle for the purpose specified.

3. The combination with a vehicle adapted to run on a single rail, of central wheels mounted at each end of said vehicle and adapted to engage with said rail, of bearings on said vehicle for said wheels, of lateral wheels adapted to run in constant engagement with the ground at each side of the said rail, of independent axles each provided with springs interposed between the said lateral wheels and said vehicle and of means for retaining said springs in position.

4. The combination with a vehicle adapted to run on a single rail, of central wheels mounted at each end of the vehicle and adapted to engage with said rail, of lateral wheels carried by independent axles on said vehicle and adapted to run in constant engagement with the ground at each side of said rail, of springs interposed between the said axles and the vehicle, and of means for retaining the said springs in position.

5. The combination with a vehicle adapted to run on a single rail, of bogies, of a weight-carrying portion supported by said bogies, of central wheels mounted in said bogies and engaging with said rail, of lateral wheels adapted to run in constant engagement with the ground at each side of the said rail and of independent axles each provided with springs interposed between the said lateral wheels and the said vehicle.

6. The combination with a vehicle adapted to run on a single rail, of bogies, of central wheels engaging with said rail and mounted in projections extending upward from said bogies, of a weight-carrying portion supported by and situated between said bogies and having its bottom at a lower level than the axles of said central wheels, of lateral wheels carried by independent axles on the vehicle and adapted to run in constant engagement with the ground at each side of said rail, and of springs interposed between the said lateral wheels and the vehicle and adapted to offer a graduated resistance to pressure exerted vertically upon them for the purpose specified.

7. The combination with a vehicle adapted to run on a single rail, of bogies, of a weight-carrying portion, of central wheels mounted in said bogies at each end of said vehicle to engage with said rail, of lateral wheels carried by independent axles mounted in said weight-carrying portion, of springs interposed between the said independent axles and said

weight-carrying portion, of boxes on said weight-carrying portion for retaining the said springs, of upwardly-extending projections and of downwardly-extending projections on said axles, for the purpose specified.

8. The combination with a vehicle adapted to run on a single rail, of bogies, of a weight-carrying portion supported on said bogies and capable of independent transverse movement relatively thereto, of central wheels mounted in said bogies at each end of the said vehicle, of lateral wheels carried by independent axles mounted in said weight-carrying portion, and of springs interposed between said axles and said weight-carrying portion for the purpose specified.

9. The combination with a vehicle adapted to run on a single rail, of bogies of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of means for shifting said weight-carrying portion transversely, of central wheels mounted in said bogies at each end of the vehicle to engage with said rail, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engagement with the ground at each side of said rail, and of springs interposed between said axles and the said weight-carrying portion for the purpose specified.

10. The combination with a vehicle adapted to run on a single rail, of bogies, of a weight-carrying portion supported on said bogies and capable of independent transverse movement relatively thereto, of screws and nuts for enabling the said weight-carrying portion to be shifted transversely, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted in said weight-carrying portion and adapted to run in constant engagement with the ground on each side of the said rail, and of springs interposed between the axles of said lateral wheels and the said weight-carrying portion for the purpose specified.

11. The combination with a vehicle adapted to run on a single rail, of bogies, of a weight-carrying portion supported on said bogies and capable of independent transverse movement relatively thereto, of screws carried by the underframe of the weight-carrying portion, of nuts carried by said weight-carrying portion engaging with said screws for enabling the said weight-carrying portion to be shifted transversely, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted in said weight-carrying portion and adapted to run in constant engagement with the ground on each side of the said rail, and of springs interposed between the axles of said lateral wheels and the said weight-carrying portion for the purpose specified.

12. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-

carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in sleeves carried by the underframe of said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engagement with the ground at each side of said rail and of springs interposed between the said independent axles and the said weight-carrying portion.

13. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in sleeves carried by the underframe of said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of means for supporting said weight-carrying portion during its transverse movement, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engagement with the ground at each side of said rail and of springs interposed between the said independent axles and the said weight-carrying portion.

14. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in sleeves on the underframe of said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of means carried by said underframe and acting on said weight-carrying portion to support it during its transverse movement, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engagement with the ground at each side of said rail and of springs interposed between the said independent axles and the said weight-carrying portion.

15. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in sleeves carried by the underframe of said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of rollers carried by said underframe and adapted to support said weight-carrying portion during its transverse movement, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in con-

stant engagement with the ground at each side of said rail, and of springs interposed between the said independent axles and the said weight-carrying portion.

5 16. In a vehicle adapted to run on a single rail the combination of bogies of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in
10 sleeves on the underframe of the said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of eccentric rollers carried by said underframe and adapted to support the said weight-car-
15 rying portion during its transverse movement, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted
20 to run in constant engagement with the ground at each side of said rail and of springs interposed between the said independent axles and the said weight-carrying part.

25 17. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in
30 sleeves carried by the underframe of said weight-carrying portion of nuts on said weight-carrying portion engaging with said screws, of rods mounted in said underframe, of eccentric rollers carried by said rods and adapted to support the said weight-carrying
35 part during its transverse movement, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engagement with the ground at each
40 side of said rail and of springs interposed between the said independent axles and the said weight-carrying part.

45 18. In a vehicle adapted to run on a single rail, the combination of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in
50 sleeves carried by the underframe of said weight-carrying portion, of nuts on said weight-carrying portion engaging with said screws, of rods mounted in said underframe, of eccentric rollers carried by said rods and adapted to support said weight-carrying por-
55 tion during its transverse movement, of means for rotating said rods, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run in constant engage-
60 ment with the ground at each side of said rail and of springs interposed between the said independent axles and the said weight-carrying portion.

65 19. In a vehicle and adapted to run on a single rail, the combination of bogies, of a

weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of screws revolving in sleeves carried by the underframe, 70 of nuts on said weight-carrying portion engaging with said screws, of rods mounted in suitable bearings on said underframe, of eccentric rollers carried by said rods, of gear-wheels on said rods, of worms carried by the
75 said weight-carrying portion for rotating said rods, of central wheels mounted in said bogies at each end of the vehicle, of lateral wheels carried by independent axles mounted on said weight-carrying portion and adapted to run
80 in constant engagement with the ground at each side of said rail, and of springs interposed between the said independent axles and the said weight-carrying part.

20. The combination with a vehicle adapted 85 to run on a single rail, of central wheels mounted at each end of said vehicle to engage with said rail, of lateral wheels adapted to run in a constant engagement with the ground at each side of said rail, and independent axles 90 for each wheel having a vertical sliding and yielding connection with said vehicle; and of a motor mounted on said vehicle for the purpose specified.

21. In a vehicle adapted to run on a single 95 rail, the combination with said vehicle of a driving-bogie at one end, of a trailing bogie at the other end, of central wheels supporting said bogies and engaging with said rail, of a weight-carrying portion situated between 100 said central wheels but having no central wheel itself, of an underframe carrying the body of said bogies and said weight-carrying portion and suspended from the axles of the central wheels, of lateral wheels adapted to 105 run in constant engagement with the ground but not normally sustaining the weight of the vehicle, and of independent axles carrying said lateral wheels and yieldingly connected to the vehicle, for the purpose specified. 110

22. In a vehicle adapted to run on a single rail the combination with said vehicle, of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of 115 central wheels mounted in said bogies at each end of said vehicle, of lateral wheels carried by independent axles mounted in said weight-carrying portion, of springs interposed between said axles and the vehicle and of a mo- 120 tor mounted on one of said bogies and transmitting motion by suitable means to said central wheels for the purpose specified.

23. In a vehicle adapted to run on a single rail the combination with said vehicle, of bogies, of a weight-carrying portion mounted on said bogies and capable of independent transverse movement relatively thereto, of means for shifting the said weight-carrying portion transversely, of central wheels mount- 125 ed in said bogies at each end of the vehicle, of lateral wheels carried by independent axles 130

on said weight-carrying portion and adapted
to run in constant engagement with the
ground on each side of said rail, of springs
interposed between said axles and the vehi-
5 cle and of a motor mounted on one of said
bogies and transmitting motion through suit-
able gearing to said central wheels.

In testimony whereof we have hereunto set

our hands, in presence of two subscribing
witnesses, this 23d day of November, 1900. 10

HENRY FISHER-SPENSER.
HOWARD BRUNLEES.

Witnesses:

WM. J. DOW,
THOMAS SELBY WARDLE.