

(No Model.)

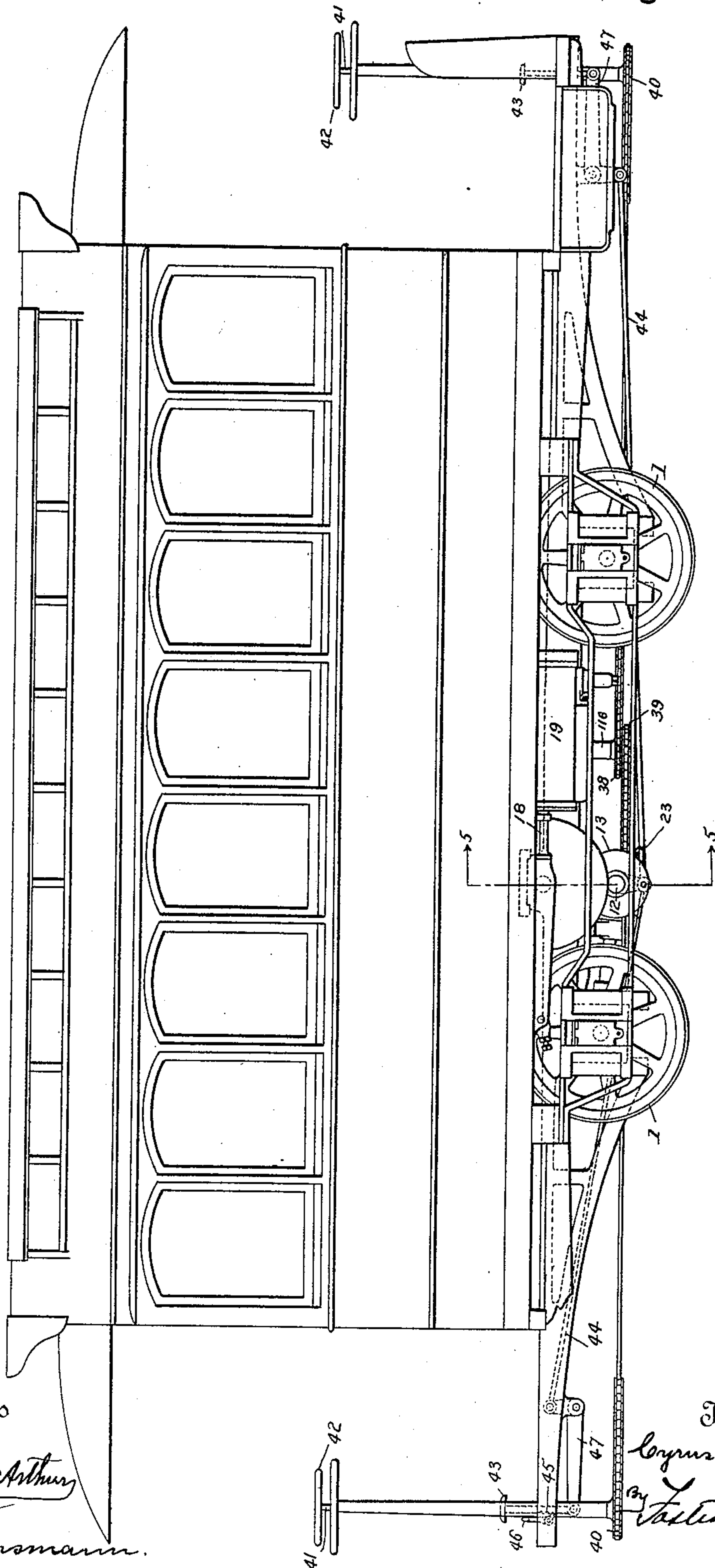
5 Sheets—Sheet 1.

C. W. BALDWIN.  
TRAM CAR.

No. 434,172.

Patented Aug. 12, 1890.

Fig. 1.



Witnesses

*W. S. McArthur*

*A. E. G. Lamsman*

Inventor

*Cyrus W. Baldwin*

*John Freeman*

*attys.*

(No Model.)

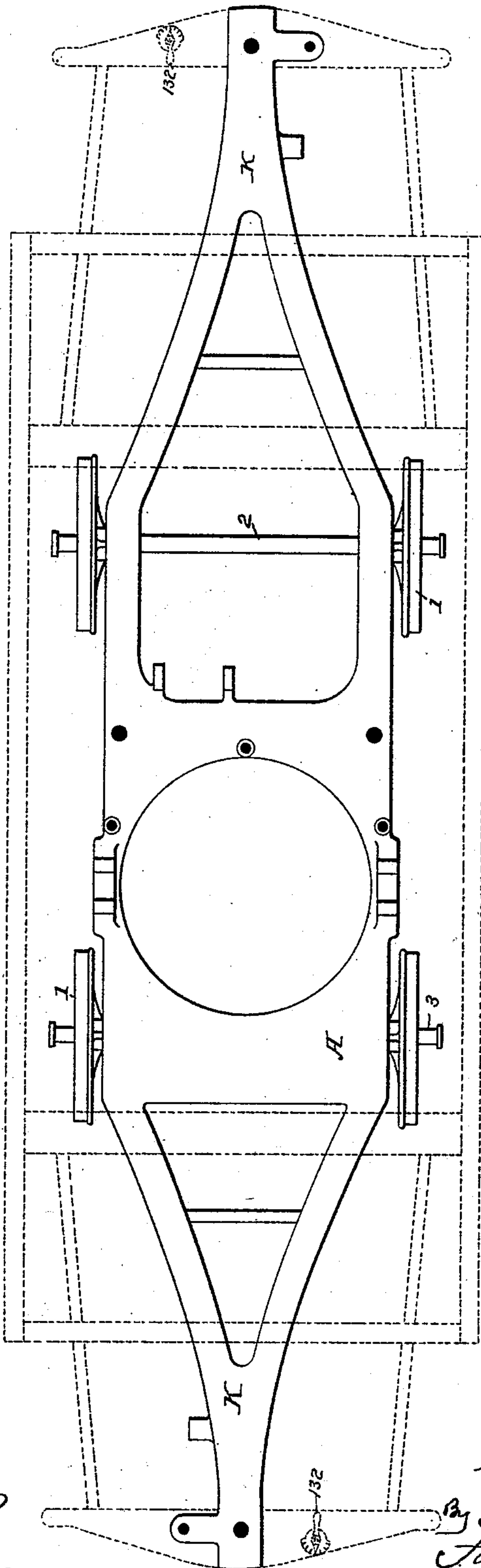
5 Sheets—Sheet 2.

C. W. BALDWIN.  
TRAM CAR.

No. 434,172.

Patented Aug. 12, 1890.

Fig. 2.



Witnesses

*Chas. S. McArthur*

*A. E. Farnsman*

Inventor

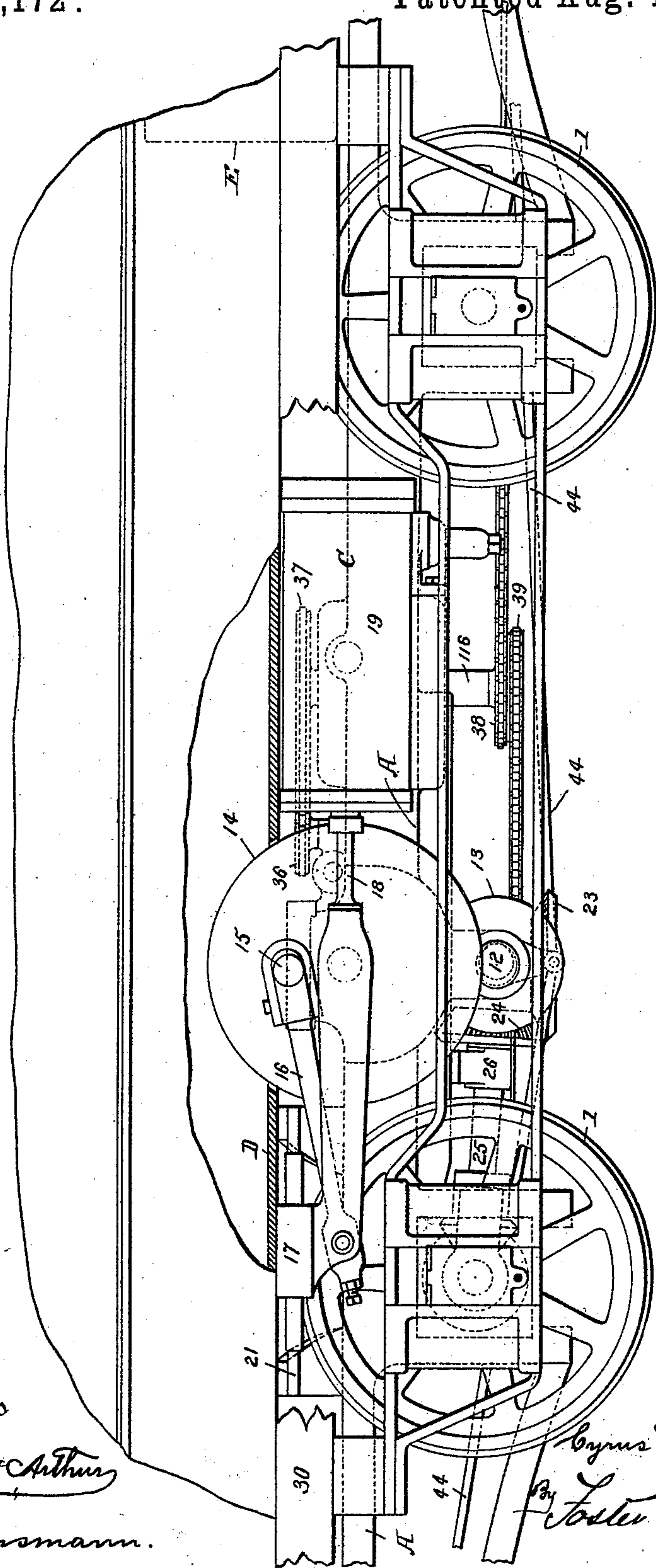
*Cyrus W. Baldwin*

*John Farnsman*  
attys.

5 Sheets—Sheet 3.

No. 434,172.

Patented Aug. 12, 1890.



Ch. S. M. Arthur  
A. E. J. Farnsman.

Cyrus W. Baldwin,

*Foster Freeman*  
*Atty.*



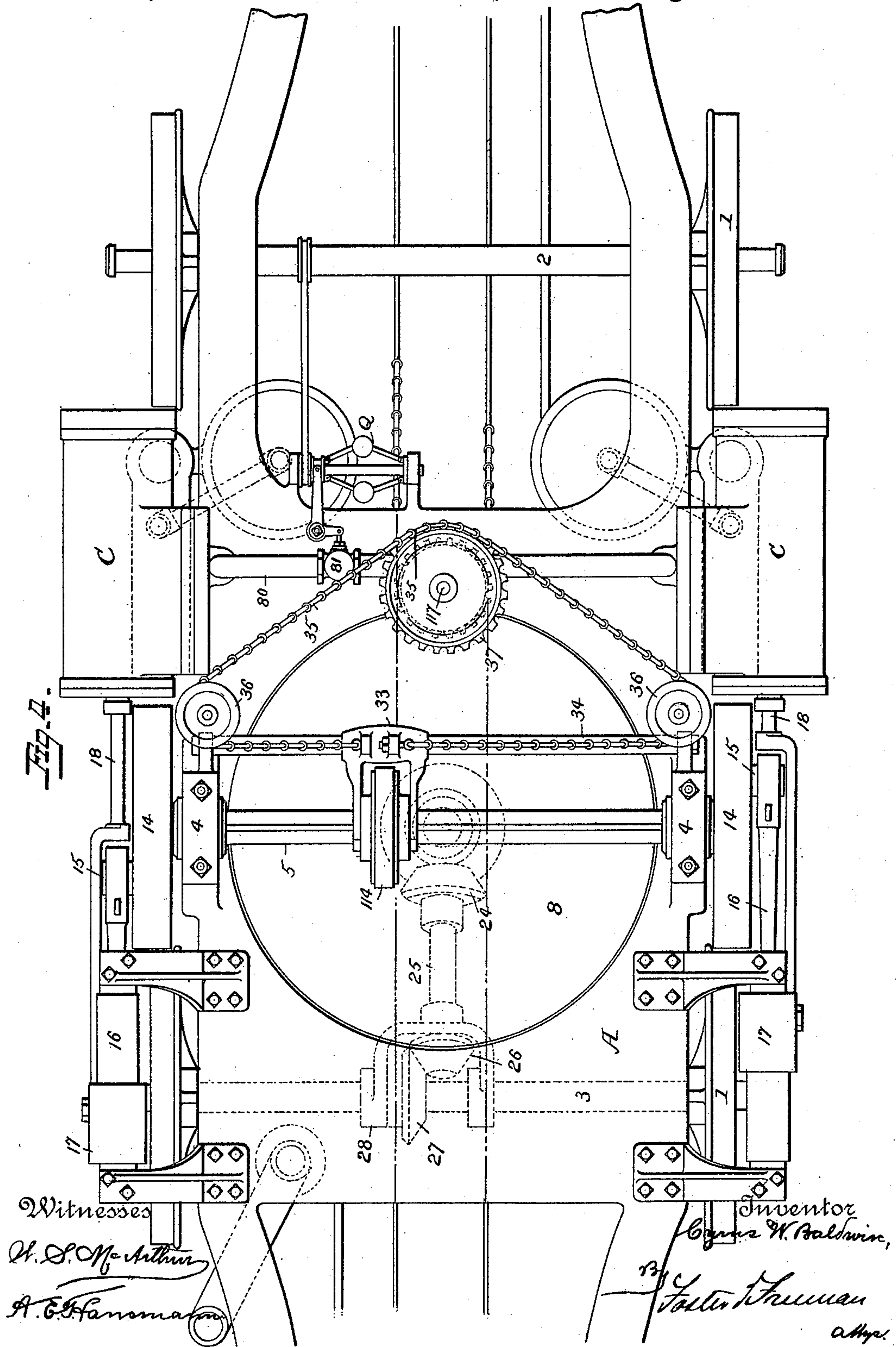
(No Model.)

5 Sheets—Sheet 4.

C. W. BALDWIN.  
TRAM CAR.

No. 434,172.

Patented Aug. 12, 1890.



(No Model.)

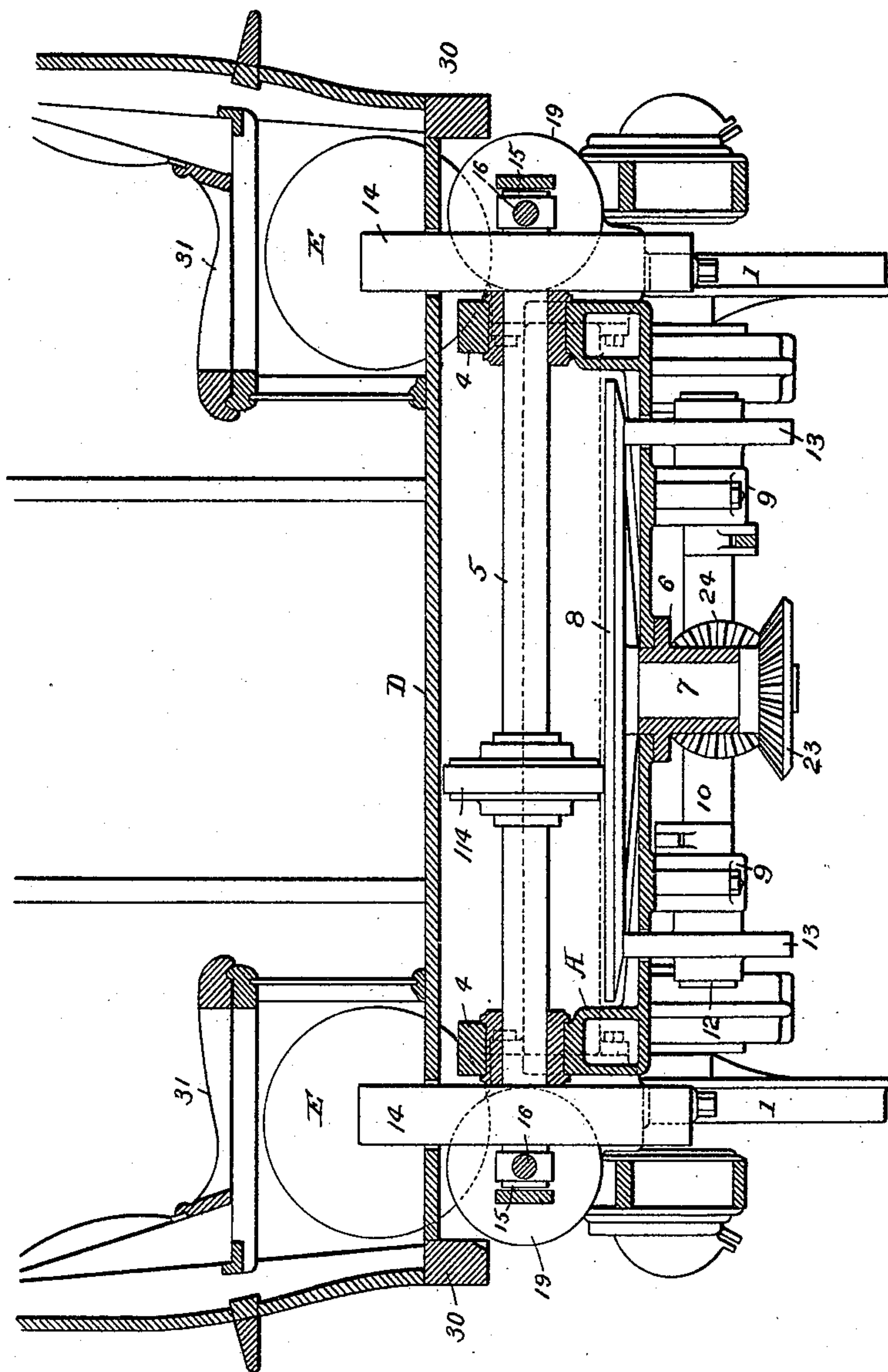
5 Sheets—Sheet 5.

C. W. BALDWIN.  
TRAM CAR.

No. 434,172.

Patented Aug. 12, 1890.

Fig. 5.



Witnesses

H. S. McArthur  
A. E. Hansmann.

Inventor

Cyrus W. Baldwin,

By his Attorneys

Foster & Freeman



# UNITED STATES PATENT OFFICE.

CYRUS W. BALDWIN, OF YONKERS, NEW YORK.

## TRAM-CAR.

SPECIFICATION forming part of Letters Patent No. 434,172, dated August 12, 1890.

Application filed March 14, 1890. Serial No. 343,892. (No model.)

*To all whom it may concern:*

Be it known that I, CYRUS W. BALDWIN, a citizen of the United States, residing at Yonkers, Westchester county, New York, have invented certain new and useful Improvements in Tram-Cars, of which the following is a specification.

My invention relates to driving-engines for tram-cars; and it consists in constructing and arranging the same in a relation to the body and supporting wheels and axles of a car, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a tram-car and driving-engine embodying my invention. Fig. 2 is a plan view showing the sills of a car and the parts beneath. Fig. 3 is an enlarged side view of the engine and supporting-truck. Fig. 4 is an enlarged plan of Fig. 3. Fig. 5 is a sectional view on the line 5 5, Fig. 1.

The wheels 1 of the car are connected with axles 2 3, upon which is supported rigidly the truck-frame A, of suitable construction, but which, as shown, is in the general form of a plate extending above the axles, having side bearings or pillow-blocks 4 4, supporting the driving-shaft 5, and below the latter a hollow boss 6, receiving a shaft 7 of a horizontal driving-disk 8.

Below the frame A are hangers 9 9, in which turn short crank-shafts 10, having eccentric-journals 12, upon which turn rollers 13, that extend through slots in the frame A and serve as bearings for the disk.

Upon the driving-shaft 5 slides so as to turn with the shaft a friction driving-wheel 11 4, which may be brought above a recess or sunken surface in the center of the disk 8 above the shaft 7, so as not to turn the disk, and which may then be moved radially across the disk to either side, so as to drive it in one direction or the other, according to the side toward which it is moved, the position of the driving-wheel upon the disk determining the rapidity of the motion imparted to the latter. The disk may be raised or lowered in any suitable manner, so as to throw it out of connection with the driving-gear, which is important, in order that the latter may in many cases, especially when moving rapidly, be first

brought in contact with the disk at the periphery, so that the disk will start with a slower motion than that which it subsequently acquires when moved farther inward toward the center of the disk.

One means of raising and lowering the disk is by raising and lowering the bearing-wheels 13, which may be done by rocking the shafts 10, having the eccentric-journals 12.

The driving-shaft 5 is preferably provided with one or more balance-wheels 14, one being shown upon each end of the shaft, and either or both of said wheels may constitute a crank-wheel when the driving-shaft is driven from a reciprocating piston. Thus each wheel 14 has a wrist-pin 15 for connection with the connecting-rod 16, also jointed to the sliding cross-head 17, attached to the piston-rod 18 of the engine C, which may be a steam, gas, or other suitable engine, but, as shown, is provided with a cylinder 19, receiving the piston 20, said cylinder receiving explosive charges of gas and air, which are successively ignited and exhausted to propel the piston, as in ordinary gas-engines.

In order that the engine may be stowed in a small compass and maintained in proper relation to the parts driven thereby, I mount it rigidly upon the frame A of the truck, and I place the cross-head 17, supported by suitable guides 21, on the side of the crank-shaft opposite the engine, the connecting-rod extending with its swinging end toward the cylinder, thereby securing a connecting-rod of any desired length, while arranging the cylinder in close proximity to the crank-shaft.

One or both of the axles may be geared directly with and driven from the shaft 7 in any suitable manner. I prefer to provide said shaft with beveled gear 23, engaging with a gear 24 on a shaft 25, the end of which turns in a bearing on the boss 26, while the outer end turns in a hanger 28, swung upon the axle 3, and is geared with the latter through the medium of beveled gears 26 27.

By constructing the truck-frame, which is rigidly supported upon the axles, to support the engine or engines, driving and connecting shafts, and driving-wheels and balance-wheels, I provide a locomotive in a most compact form capable of being substituted for



the trucks of ordinary tram-cars, whereby the bodies of cars already in use may be economically and easily transferred to and used in connection with said locomotive. It will be seen that the cylinders 19 19 are carried at the sides of the truck-frame, and I so arrange them that they will be within the space between the side sills 30 of the car-platform D, and by arranging the crank between the cylinder and sliding head, as before described, it is practicable to put the cylinder and crank or balance wheel in the space between the opposite wheels on each side, so that these parts may be used in their proper position regardless of the gage of the track, which cannot be the case when the cylinders and their connections occupy such a space that they cannot be placed between the wheels. It will further be seen that although the driving-shaft 5 is above the axles the parts are so compact that no portion of the locomotive extends above the car-platform or the car-body, except a very small section of the balance-wheel on each side, which projects through an opening in the platform beneath a seat 31.

When the engine is a gas-engine or derives its power from a fluid stored in a cylinder or reservoir E, I prefer to arrange the latter so as to be carried by the platform of the car and beneath the seat, as illustrated, and the passage of the motor-fluid from the reservoir to the engine is regulated by a cock provided with an operating-handle 132 at one or both ends of the platform, according as the car is a "single-ender" or "double-ender."

The shifting of the driving-wheel 114 to vary the speed of the car is effected from either or both end platforms through the medium of any suitable shifting devices. Thus a carrier 33, provided with arms embracing the hub of the wheel, slides upon a transverse guide 34, and is moved by means of a chain 35, passing around guide-rolls 36 and around a sprocket-wheel 37 on a shaft 117, turning in a stud 116 upon the frame. The shaft of the wheel 37 carries at the lower end two sprocket-wheels 38 and 39, from each of which a chain passes to a sprocket-wheel 40 upon a shaft 41 turning in bearings upon one of the platforms and provided with a hand-wheel 42.

The crank-shafts 10 are turned to raise and lower the bearing-wheels 13 by means of foot-levers 47, pivoted beneath the end platforms and each connected by a rod 44 with a crank of one of the shafts, and the long arm of each lever is connected with a foot-rod 43, passing vertically through the platform and provided with a rack 45, with which engages a pawl 46.

To prevent waste of gas when running without power, I connect the pump ends of the two cylinders by a pipe 80, having in it a valve 81, which when open permits air to pass from one cylinder to the other and back alternately without drawing in more air or

forcing any charge into the cylinders. This valve 81 may be connected with a governor Q, driven from the shaft 5, so as to open the valve if the speed is excessive or close it when the speed is normal.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The truck-frame supported directly upon the axles and supporting the reciprocating motor-engine, driving-shaft provided with balance wheel or wheels, and the bearings for the separable connections between the driving-shaft and the axle, all independent of the car-body, substantially as set forth.

2. The combination of the axles, the frame supported rigidly directly thereon, a driving crank-shaft, reciprocating engine connected therewith at each end and supported directly by the frame, sliding cross-heads supported on the frame at the side opposite the engines, and connections between the cross-heads and the shaft, substantially as set forth.

3. The combination of the axles, driving crank-shaft, a cylinder upon one side of said shaft, a cross-head upon the opposite side of said crank-shaft, and piston and connecting-rod extending from the cross-head toward the cylinder, substantially as set forth.

4. The combination of the wheels and axles, frames supported upon the axles, a cylinder and crank-shaft supported by the frame between the wheels at one side, and the crank of the shaft connected to a cross-head on the opposite side of the shaft from the cylinder, substantially as set forth.

5. The combination, with the cylinder and crank-shaft provided with a balance-wheel, of a supporting-frame resting directly upon the car-axles, with the cylinder and balance-wheel between the wheels of the car on one side of the frame, substantially as set forth.

6. The combination of the frame supported by the axle, horizontal cylinders at opposite sides of the frame, and a crank-shaft supported by the frame and extending above the same, and carrying balance wheel or wheels, and geared with the axle below the frame, substantially as set forth.

7. A rigid frame provided with bearings for the axles of a car-wheel and for the driving shaft and shafts, having gears connecting the latter with one of the axles and supporting the reciprocating motor-engines, and also supporting bearings for the connections between the motor-engine and the driving-shaft, substantially as set forth.

8. The combination, with a car-body and its supporting wheels and axles, of a truck-frame supported directly by the axles and supporting the cylinders of driving-engines, extending outside the frame at opposite sides within the outer sills of the body, substantially as set forth.

9. The combination, with a car-body and supporting wheels and axles, of a frame supported on said axles and supporting the



motor-engines, and motor-fluid reservoirs also supported by the frame and controlling cocks or valves, with devices for operating the same arranged at the end of the car, substantially  
5 as set forth.

10. The combination, with the truck-frame supported directly by the axles, and the driving-shaft supported by the frame and connected with the driving-engine and carrying  
10 a shifting friction-wheel, of a disk 8, driven from the friction-wheel, and the shaft of which turns in bearings upon the frames and is geared with one of the axles, substantially  
as set forth.

15 11. The combination, with the frame supported directly by the axles, of a driving-disk supported by the frame and geared with the axle, and a driving-shaft supported by the frame, extending across the face of the disk,  
20 carrying a movable friction driving-wheel, and connected with the driving-engine, substantially as set forth.

12. The combination, with the frame supported by the axles, of a horizontal driving-  
25 disk gearing with one of the axles, a driving-shaft carrying an adjustable wheel extending across the disk, and driving-engines carried by the frame and connected with said driving-shaft, substantially as set forth.

30 13. The combination, with the car-body and supporting axles and wheels, of a frame supported directly by the axles below the car-body and carrying a driving-shaft, driving-engines, and a horizontal driving-disk geared  
35 with one of the axles, substantially as set forth.

14. The combination, with the wheels, axles, frames supported thereby, and driving-disk,

of gears and connections below the driving-disk, with one of the axles and a driving-  
40 shaft above the disk carrying the movable driving-wheel, substantially as set forth.

15. The combination, with the driving shaft and wheel and driving-disk, of supporting  
45 wheels or rollers, and means for moving the latter to carry the disk to and from the wheel, substantially as set forth.

16. The combination, with the driving-disk, of supporting-wheels turning upon eccentric-  
pins, rock-shafts, and means for turning said  
50 shafts, substantially as described.

17. The combination, with the car-body and truck and driving shaft and wheel and driv-  
ing-disk, of a movable support for said disk,  
connected with adjusting devices at the end  
55 of the car, substantially as set forth.

18. The combination, with the car-body and truck supporting the driving-shaft, driving-  
wheel, and driving-disk, of a sliding carrier  
for the driving-wheel connected with the  
60 shifting device at the end of the car, substantially as set forth.

19. The combination, with the carrier, of a driving-wheel arranged below a car-body,  
a chain passing around pulleys, and an op-  
65 erating-chain passing around a pulley upon one of the pulley-shafts and around the pulley upon the shaft at the end of the car-plat-  
form, substantially as set forth.

In testimony whereof I have signed my  
70 name to this specification in the presence of two subscribing witnesses.

CYRUS W. BALDWIN.

Witnesses:

H. L. GARRISON,  
CHAS. E. BACK.