

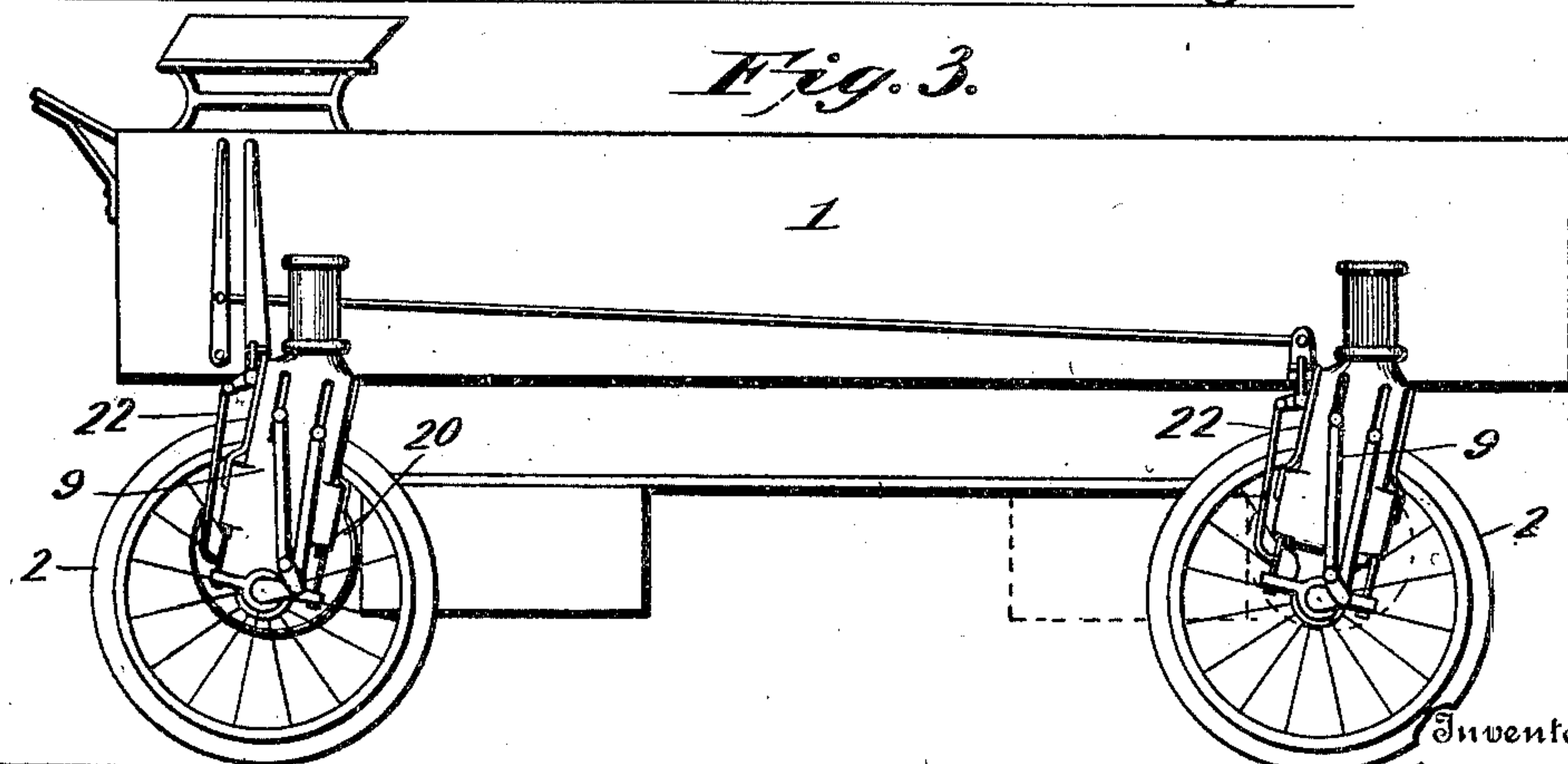
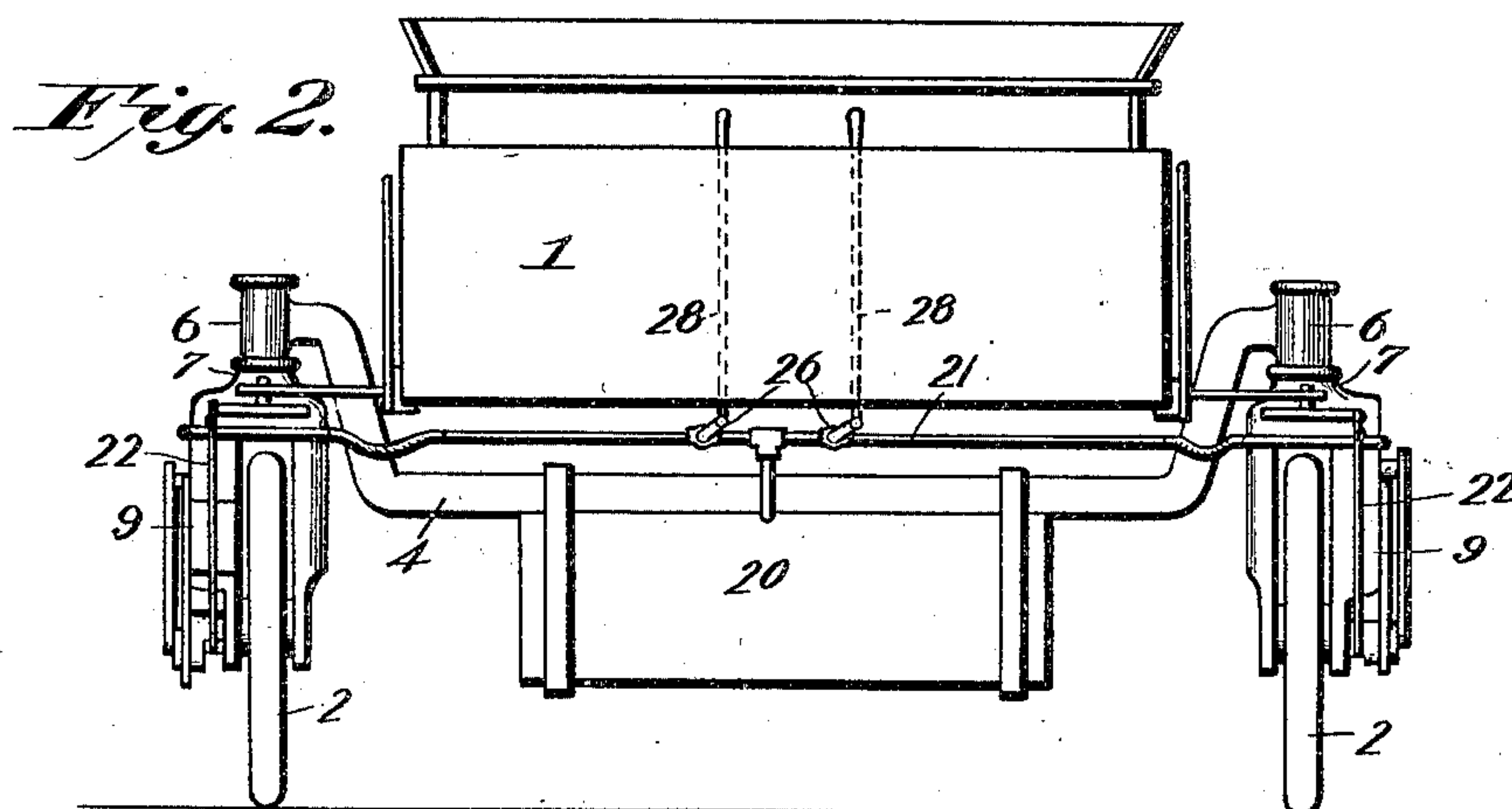
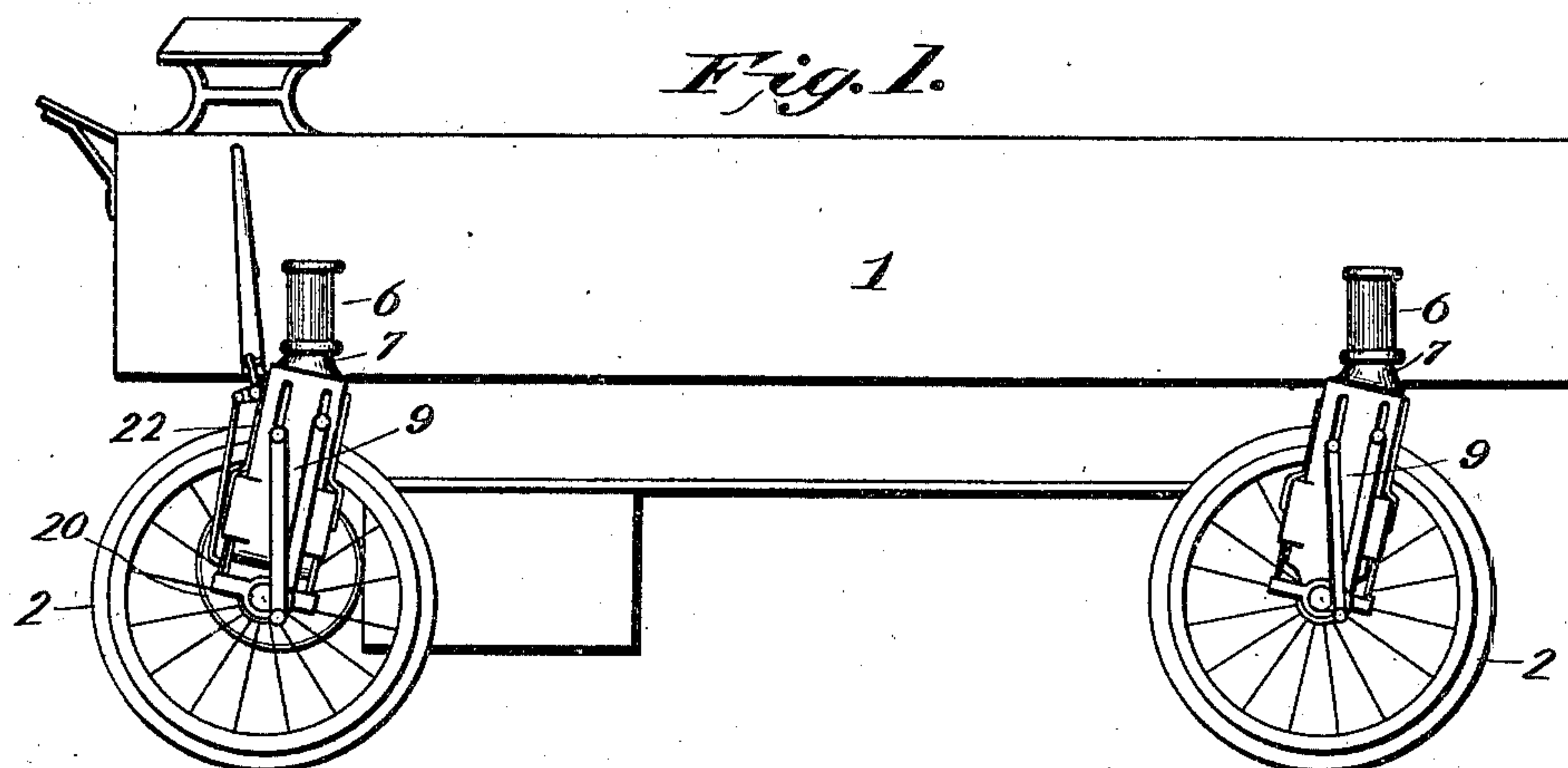
No. 696,694.

Patented Apr. 1, 1902.

E. J. PENNINGTON.  
MOTOR VEHICLE.

(Application filed June 22, 1901.)

(No Model.)



Witnesses

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# UNITED STATES PATENT OFFICE.

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TO J. W. PLANK AND GEORGE EDWARD MILLS, OF CARLISLE, PENN-  
SYLVANIA.

## MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 696,694, dated April 1, 1902.

Application filed June 22, 1901. Serial No. 65,722. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD J. PENNINGTON, a citizen of the United States, residing at the Hotel Metropole, London, England,  
5 have invented new and useful Improvements in Motor Driven and Steered Vehicles, of which the following is a specification.

My invention relates more particularly to improvements in motor-driven vehicles the  
10 moving power of which is steam; but the invention is equally applicable to a vehicle driven by electricity, compressed air, or other fluid. In application, Serial No. 65,721, filed June 22, 1901, I have described and  
15 claimed an improvement in automobiles wherein each wheel is provided with an independent motor which in itself forms a part of or is attached to the fork or standard in which the wheel is mounted, and means are  
20 therein described whereby the steering is accomplished by a mechanical connection made between certain of the driving-wheels, two companion wheels being simultaneously given partial rotation on their forks. My present  
25 invention, while retaining much of the mechanism described in my said application, Serial No. 65,721, dispenses with the mechanical steering devices therein specified, the steering being herein mainly accomplished by di-  
30 minishing or increasing at will the admission of steam or other motive agent supplied to either motor. For instance, if I wish to run the wagon to the right I increase the admis-  
35 sion of steam on the left-side motor, so as to drive more rapidly the wheel on the left, and I can accelerate this action by partially or entirely cutting off the steam or other motive fluid from the right-side motor. It will be  
40 evident that the wheels, being capable of pivotal or swiveling movement, will be rotated upon the fork-standard in accordance with the peripheral speed at which they are driven. When only one valve is used, it is so designed that the allowing of greater admission of fluid  
45 to one motor will automatically cut off the same proportion of fluid-supply to the other motor.

With very powerful motors—such, for example, as are used in carrying heavy loads  
50 of merchandise—I prefer to use two steam-valves, one being placed on each side of the

branch steam-pipe, each conveying steam to a separate motor. Each motor, it must be understood, is fitted with necessary devices for reversing, and in this way not only can I  
55 drive one motor forward, but at the same time can drive the other in the opposite direction, and either the forward or backward drive may be at a speed desired by the driver. The value of such a steering device when turning  
60 on narrow streets or maneuvering in confined spaces or backing in contracted or crowded areas for loading goods will be readily understood.

In vehicles such as omnibuses, but partic-  
65 ularly wagons designed for the carrying of heavy goods and merchandise-wagons which might themselves be occasionally used to draw other vehicles behind them, and where it is consequently desirable to get as good a grip  
70 on the ground as possible, I prefer to place a motor or motors on each wheel of the vehicle.

I have preferred to illustrate the use of my invention with steam as the motive power; but it will be obvious that for compressed air  
75 or gas (which would be carried in steel cylinders attached to the frame or bridge work uniting each pair of wheels or to the body of the vehicle itself) or electricity it is equally  
80 applicable. The steam or motive agent is conveyed by flexible tubing or conductors to the several motors, and by means of valves or their equivalent the feed of the fluid there-  
85 to may be controlled, whereby the relative speed of each driven wheel may be altered at will by the driver and steering in any desired direction accomplished.

In the accompanying drawings, Figure 1 is a side elevation of a vehicle to which my in-  
90 vention is applied. Fig. 2 is a front view of the same. Fig. 3 shows a modified form of the invention.

Similar numerals of reference indicate similar parts in the respective figures.

1 1 may represent, generally, the body of a  
95 vehicle of any approved type, of which 2 2, &c., are the four wheels. The general disposition of the wheels and forks in which they are mounted is substantially the same as described in my aforesaid application. For in-  
100 stance, the motor on each driving-wheel forms a part of or is attached to its fork, and the



forks are mounted in sleeves 6, carried by the respective axles 4 5. In Figs. 1 and 2 I have shown the front wheels only adapted for steering, while in Fig. 3 all of the four wheels, each  
 5 being provided with an independent motor, are intended to be employed, as desired, in the steering action.

As in my aforesaid application, each fork standard or pillar 7 is adapted to have rota-  
 10 tory motion within a sleeve 6, and each fork is provided with a motor or motors or, as explained in my said application, with a pair of twin cylinders 9, the general construction of the cylinders, with their cross-heads, con-  
 15 necting-rods, crank-shaft, and other features, being substantially the same as therein described. Furthermore, my present invention contemplates the use of a power generating, producing, or distributing device, which, as  
 20 represented in Figs. 1 and 2, is carried by the front axle 4. This power-generating device, whether a steam-boiler or otherwise, may, if desired, be used for transmitting the motive fluid to all the cylinders of the respective mo-  
 25 tors, or a separate boiler or equivalent device may be used, especially for the rear wheels, and attached to the rear axle or other convenient point. Such an arrangement is shown by dotted lines in Fig. 3. My present inven-  
 30 tion not reaching to details of construction entering into the boiler or its equivalent device, said boiler is not herein specifically described, but with its appurtenances is represented as an entirety by 20.

35 If steam or compressed air is used, suitable flexible tubing 21 is provided, connecting the power producer or distributor with the cylinders 9. If electricity is the motive agent, the conductors and their adjuncts would be  
 40 the equivalent of the steam or air ducts and valves. The tubing or pipes 21 are furnished with valves 26, each of which by means of a rod 28 is brought within convenient reach of  
 45 the driver, each valve being generally adapted for independent operation.

Each motor is provided with suitable reversing-gear, (here shown by 22,) it being understood that for short turns on narrow streets or in contracted or crowded places it is desirable to reverse the motor of one wheel while  
 50 the companion wheel is stationary or being rotated in the opposite direction.

While it is believed my invention is set forth in the full, clear, and exact terms enabling those skilled in the art to construct an  
 55 operative device from the description given, I have not explained the invention with all the particularity as to detail of which it is capable, reserving to myself the right to make future application for such details or specific  
 60 structures as I may deem expedient to incorporate in a motor-driven vehicle of this class.

The invention herein described may be varied in minor and unimportant features which may suggest themselves to the skilled me-  
 65 chanic without the exercise of invention, and all such deviations from the structure here disclosed not involving invention I claim as fully within the scope of my improvement.

I claim—

70 In a motor-driven vehicle, the combination of driving-wheels, each mounted in a fork or standard, comprising or embodying the independent motor or driver of said wheel; a generator or distributor of motive power com-  
 75 mon to each of said motors; means for independently conveying or transmitting power to each individual motor, and an independent reversing device for each motor, whereby the vehicle may be steered by varying the  
 80 peripheral speeds of the driving-wheels or changing the direction of certain of said wheels with respect to the direction of other wheels, substantially as set forth.

In testimony whereof I affix my signature  
 85 in presence of two witnesses.

EDWARD J. PENNINGTON.

Witnesses:

GEORGE H. HOWARD,  
 JOHN B. TOBIN.