

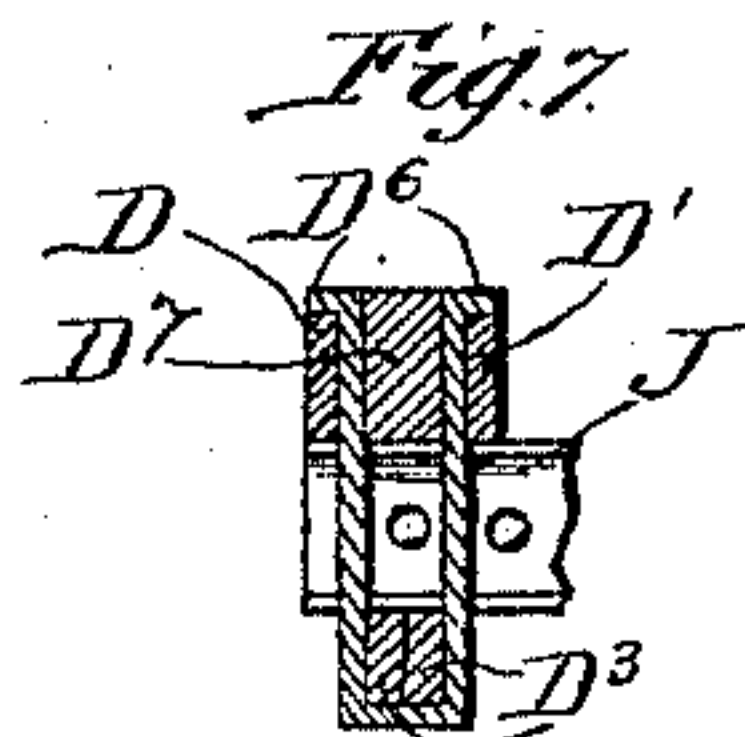
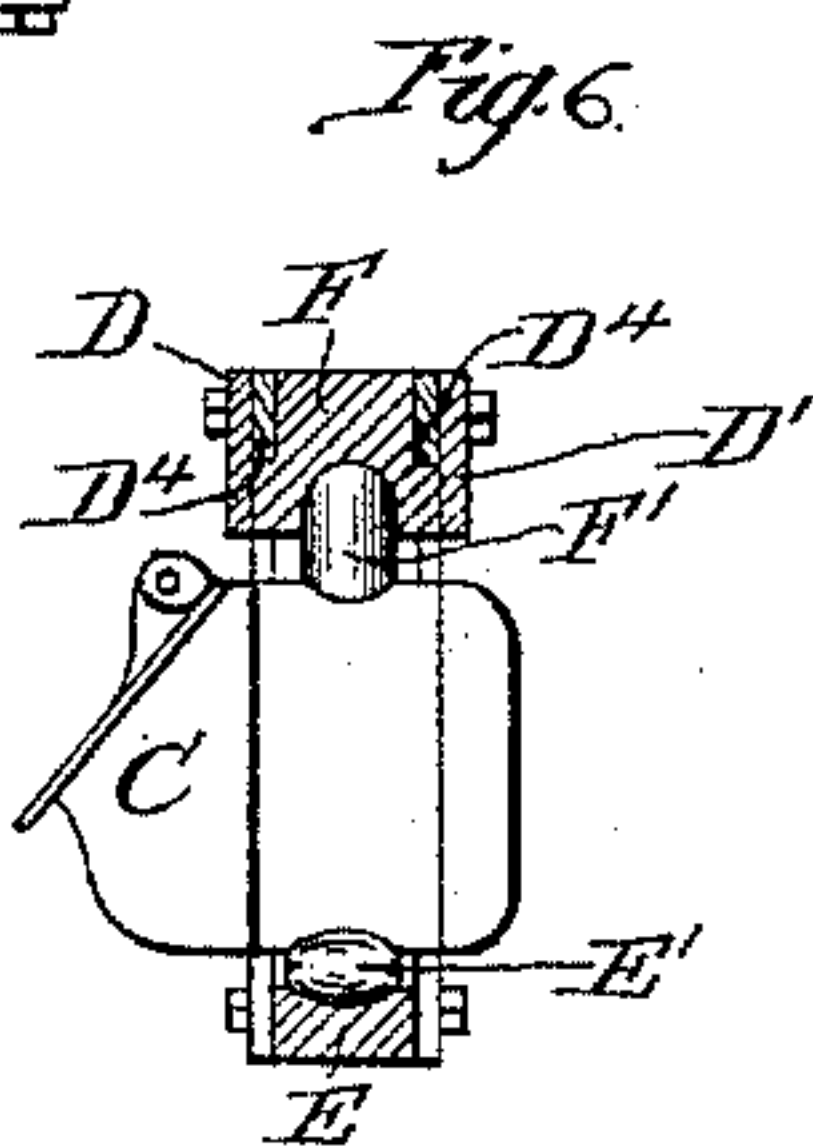
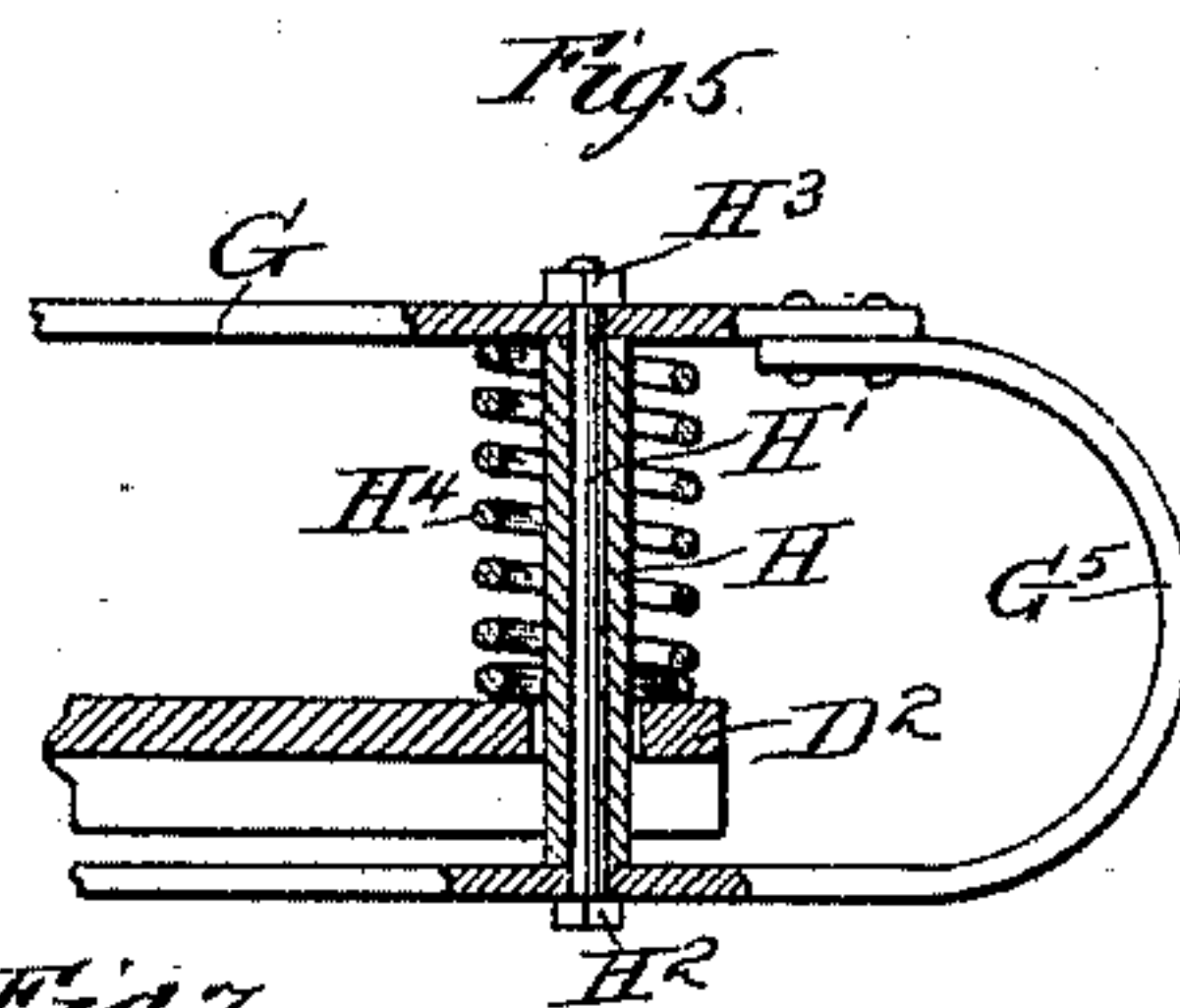
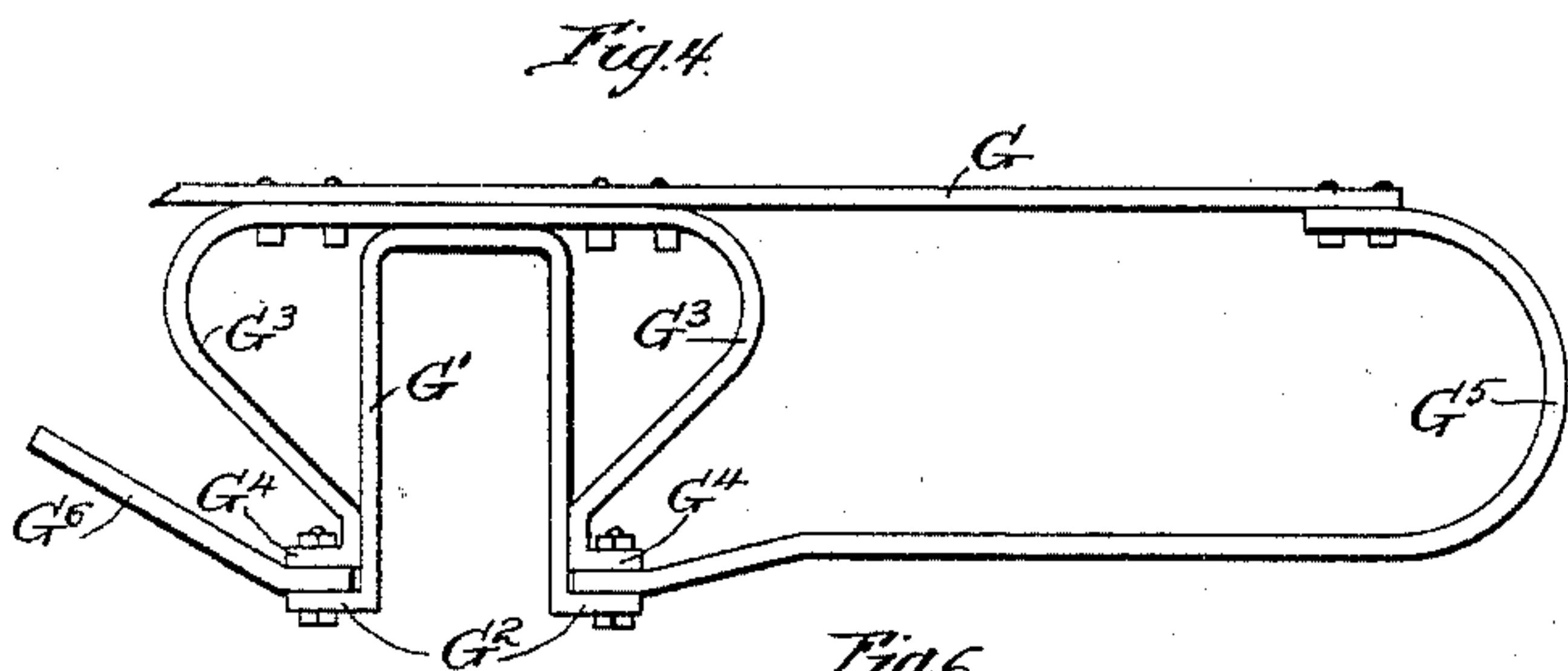
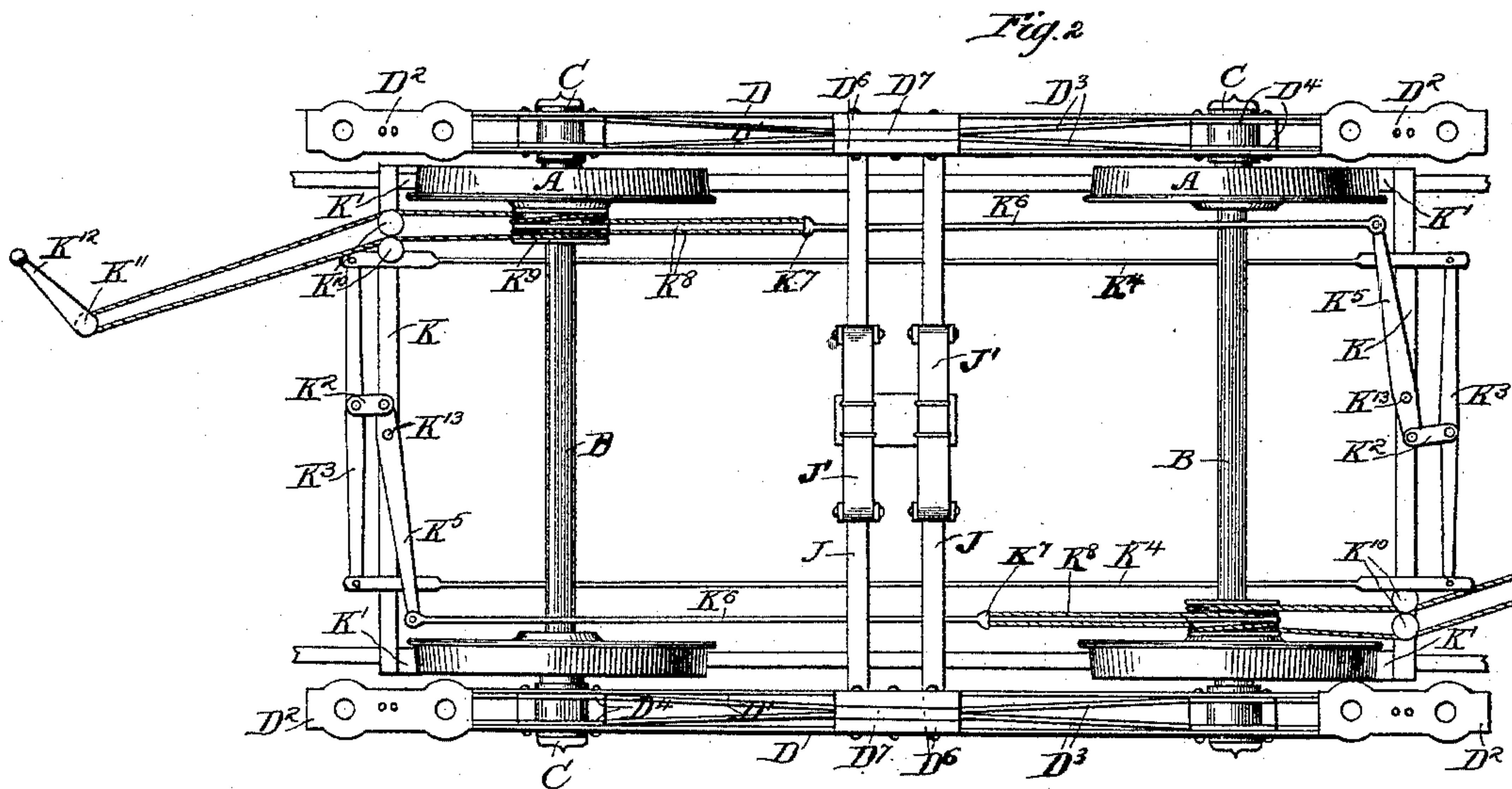
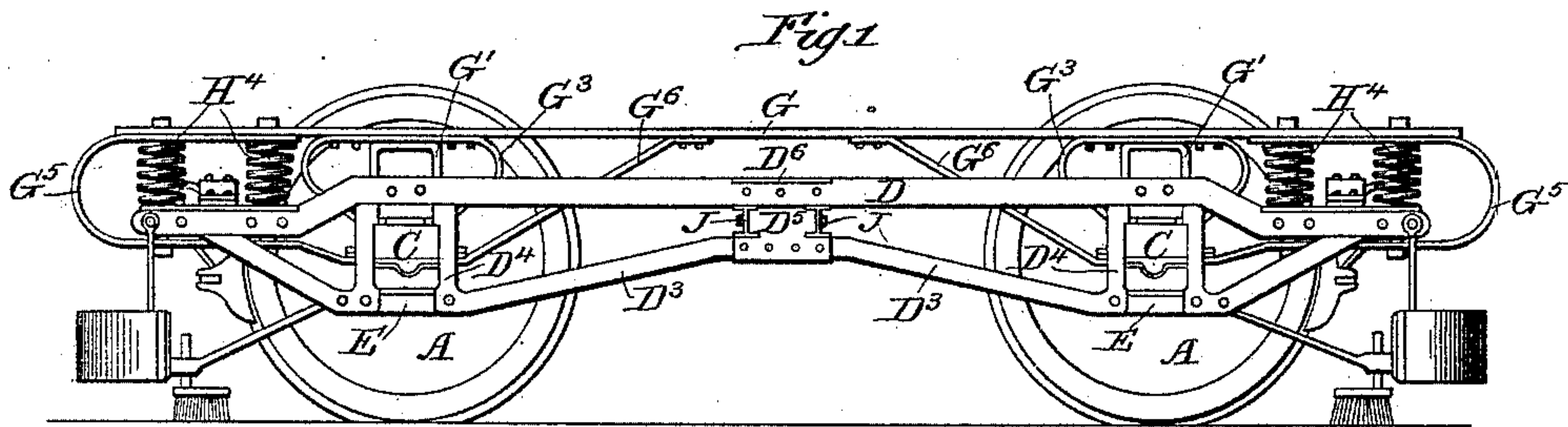
(No Model.)

2 Sheets—Sheet 1.

G. H. GRAHAM.
CAR TRUCK.

No. 496,933.

Patented May 9, 1893.



Witnesses:
Wm. J. Hanning
Lute B. Allen

Inventor:
George H. Graham
by Francis W. Parker
Attorney

UNITED STATES PATENT OFFICE.

GEORGE H. GRAHAM, OF OAK PARK, ILLINOIS.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 496,933, dated May 9, 1893.

Application filed May 31, 1892. Serial No. 435,090. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. GRAHAM, a citizen of the United States, residing at Oak Park, Cook county, Illinois, have invented a new and useful Improvement in Car-Trucks, of which the following is a specification.

My invention relates to car trucks and has for its object to provide, simple, convenient and cheap trucks especially designed for electric cars. It is illustrated in the accompanying drawings, wherein—

Figure 1, is a side view with certain parts omitted. Fig. 2, is a plan view. Fig. 3, is a detail perspective view of one side, with parts removed and others broken away. Fig. 4, is a detail of a portion of the secondary frame. Fig. 5, is a detail of the spring connection between two frames. Fig. 6, is a detail cross section through the main frames at center of the axle box. Fig. 7, is a cross section through the middle of the main frame. Fig. 8, is a detail of the motor support. Fig. 9, is an enlarged diagrammatic view of the brake mechanism.

Like parts are indicated by the same letter in all the figures.

A A are the wheels of the car on the axles B B, which rest in the axle boxes C C. The main frame is composed of two chords or bars D D', placed parallel to each other and bent downwardly at each end to receive the interposed block D², one at each end. Let into these blocks at each side and emerging from the block beneath the bars are the bars D³ D³, which are formed with an upper U-shaped portion D⁴ and are brought together midway of the main frame in the hanger or loop D⁵, where their ends abut against the ends of the similar bars D³ D³ approaching from the opposite direction. The U-shaped hanger D⁵ is outwardly bent at its upper ends and let into a slot in the upper edges of the bars D D', as indicated at D⁶. Between the upper end of such hanger and hence between the bars D D' is placed the separating block D⁷. These several parts are D³, D⁵, D⁷, and D D' are secured together by bolts or otherwise as may be desired, but in substantially the manner indicated, to form a strong connection between the several bars. This structure, so described constitutes the main frame proper.

The axle box is constructed so as to be capable of vertical reciprocation within and to be guided by the two associated, upwardly-turned U-shaped parts D⁴ D⁴.

E is a plate connecting the four bars or parts of bars D³ D³ at the angles which they make with the upwardly turned loops D⁴ D⁴ and this plate therefore serves as the limit of motion of the axle box. A cushion E' is placed upon such plate to receive the axle box. F is a somewhat similar block secured between the bars D' D² and the upper extremities of the U-shaped pieces D⁴ D⁴, and a cushioning block F' is placed beneath the same and on top of the axle box.

A secondary frame is composed of the following elements: An upper flat plate G has secured to it near each end a double yoke, consisting of the U-shaped yoke G', with outwardly turned lower ends G² G² and the auxiliary wide-spreading yoke G³, having the lower outwardly extending ends G⁴ G⁴. These two yokes are preferably electrically welded together at their engaging parts and they are secured in any desired manner to the plate G. A curved bar G⁵ is secured to each end of the bar G and returns parallel with such bar and enters between the ends G² G⁴ and is securely attached to them. A somewhat similar but straight bar G⁶ is secured beneath and about midway to the bar G and extends forward between and is secured to the other ends of the yoke pieces G² G⁴. The yoke piece G' is let into the block F at its sides and is free to reciprocate along such block but normally extends down to or beyond the horizontal plane of the axle of the car. The two bars G and G⁵ are connected together by the tube H, bearing at its end against each and the bolt H' passing through the tube and having the head H² at one end and the nut H³ at the other, which bear respectively against the outer sides of the bars G G⁵. The block D² is free to reciprocate upon the tube, and a spring H⁴ encircles such tube between the bar G and the block D². I prefer two of such rods, tubes and springs, though one might be used. The same construction would be found at each end. Midway of the car and transversely thereto, and associated with, and resting upon the loops D⁵ D⁵ are the cross bars J. J. Mid-

way on these cross bars are the springs J', shaped as shown and secured at their middle portions to the cross bars and having the hanger rods J² J² at each end, and on opposite
 5 sides of the cross bars of these hanger rods, one end of the motor, which is supported at its other end upon and preferably concentric with the adjacent axle, is secured.

The braking attachment for the truck consists of the usual brake beams K K provided with the brake shoes K' K', and having pivoted near the centers of the said brake beams the levers K⁵ K⁵ by the bolts K¹³ K¹³, which levers are connected by the links K² K² to the
 15 equalizing beams K³ K³. The extremities of these equalizing beams are connected by the rods K⁴ K⁴, so that the pressure is equal on all the wheels, when applied from either end of car. The longer arms of the levers K⁵ K⁵
 20 are connected with the rods K⁶ K⁶, formed with heads K⁷ K⁷, to each of which is attached two ropes or chains. These ropes are wound in opposite directions in two grooves on the inwardly projecting hub K⁹ of the car wheel,
 25 and thence the cords pass over the rollers K¹⁰ K¹⁰ to the vertical brake shaft K¹¹, controlled by the handle K¹². The rope or cord which passes around the hub from the top is wound upon the brake shaft K¹¹ from left to right,
 30 while the rope which passes under the hub is wound upon the said brake shaft in the inverse direction.

It will be evident that the several features or parts here shown may be somewhat modified and some of them dispensed with without departing from the spirit of my invention or affecting the operation of the remaining parts. I do not wish, therefore, to be limited
 35 in all respects to the precise form or arrangement shown in regard to the employment of all of the several more or less independent features described.

The use and operation of my invention are as follows. It will not be difficult to comprehend in a general way the operation of my
 45 invention or my improved car truck with its associated features. The car body will rest upon the secondary frame having elasticity by reason of the fact that this frame is supported from the main frame by the springs
 50 H⁴ H⁴ and the main frame is elastically supported on the axles by means of the interposed cushions E' F'. The secondary frame is prevented from having a longitudinal motion independent of the main frame or axle
 55 by reason of the rigidity of the connection of the two frames which results from the arrangement of braces in the structure of the secondary frame and the fact that the two
 60 frames interlock about the axle box. By this means when the motion of the axle tends to impart motion to the car it tends simultaneously and equally to impart motion to both frames. At the same time the secondary
 65 frame is free to reciprocate to a certain degree and as far as occasion requires, upon the main frame, thus giving suitable vertical mo-

tion to the car body. The main frame is rendered exceedingly strong and capable of safely permitting the movement of the axle
 70 vertically thereto by the arrangement of the bars D D' and D³ D³, which reinforce each other and are braced together in such manner as to make an exceedingly strong frame. The main frame proper consists of but six
 75 pieces on each side, with their connecting associated parts, the part D³ being continuous with the U-shaped portion D⁴ and being rigidly connected at each end with the part D. The main frame is still further strengthened
 80 and supported by the cross-bars midway, and the motor when suspended at one end on the axle and at the other on the hanger bars which depend from the ends of the flat springs, is free to follow the motion of inclination of the axle
 85 for the spring support as shown will freely give at either end to accommodate itself to the position sought to be assumed by the motor. These braking mechanisms, which consist essentially of two cords or ropes or chains
 90 wrapped in opposite directions about the grooved inwardly projecting hub of the car wheel, are associated with a braking mechanism of the usual form and with a handle and brake shaft. The object of the operator is to
 95 turn the handle and shaft far enough to cause one of the cords or chains to grip its groove or pulley tight enough to secure and hold upon the same, and since the wheel is rotating it will tend to wind up such cord and thus
 100 set the brake shoes. If, now, it is desired to use the same brake handle while the car is moving in the opposite direction, it is necessary to tighten the other cord for the first
 105 mentioned cord would be continuously loosened by the motion of the wheel and could not be used to set the brakes. This is accomplished by having two cords and two grooves on the hub of the wheel, the two cords being
 110 wound in opposite directions. The arrangement is the same at either end of the car, and the right hand wheel on either end is provided with the inwardly projecting grooved hub. The motor being secured to the axle so
 115 as to incline therewith is preferably supported, as indicated, on hangers from the arc-shaped springs so as to permit the motor to easily assume any ordinary angle of inclination to the frame and thus accommodate the
 120 variations in the angle between the axle and the main frame incident to ordinary use.

I claim—

1. In a truck a main frame consisting of two upper longitudinal bars placed side by side edgewise with lower bracing bars, the ends of
 125 each secured respectively to the end and about midway of the longitudinal bar, the said bracing bars provided about midway each with an upwardly extending U-shaped portion, secured at the upper end to the longitudinal
 130 bars and adapted to receive the axle box.

2. In a truck a main frame consisting of two upper longitudinal bars placed side by side edgewise with lower bracing bars, the ends of

each secured respectively to the end and about midway of the longitudinal bar, the said bracing bars provided about midway each with an upwardly extending U-shaped portion, secured at the upper end to the longitudinal bars and adapted to receive the axle box, and a block at each end of the truck to which the outer ends of all of said bars are secured.

3. In a truck a main frame consisting of upper longitudinal bars with lower bracing bars secured thereto, the said bracing bars provided each with an upwardly extending U-shaped portion between the sides of which the axle box is placed and a U-shaped hanger secured above to the upper bars and supporting brace bars below.

4. In a truck a main frame consisting of two parallel upper bars downwardly bent at their ends with lower bracing bars upwardly bent toward the end and the middle of the upper bars, said braces arranged in pairs at each end and formed with upwardly projecting U-shaped portions secured at their upper ends to said parallel bars.

5. In a truck a main frame consisting of two parallel upper bars downwardly bent at their ends with lower bracing bars upwardly bent toward the end and the middle of the upper bars, said braces arranged in pairs at each end and formed with upwardly projecting U-shaped portions secured at their upper ends to said parallel bars, and a plate secured at the angles made by such bracing bars with their U-shaped portions.

6. In a truck a main frame consisting of two parallel upper bars downwardly bent at their ends with lower bracing bars upwardly bent toward the end and the middle of the upper bars, said braces arranged in pairs at each end and formed with upwardly projecting U-shaped portions secured at their upper ends to said parallel bars, and a plate secured at the angles made by such bracing bars with their U-shaped portions, said U-shaped portions adapted to receive the axle box and permit the same to have a reciprocating vertical motion therein.

7. In a truck a main frame consisting of two parallel upper bars downwardly bent at their ends with lower bracing bars upwardly bent toward the end and the middle of the upper bars, said braces arranged in pairs at each end and formed with upwardly projecting U-shaped portions secured at their upper ends to said parallel bars, and a plate secured at the angles made by such bracing bars with their U-shaped portions, said U-shaped portions adapted to receive the axle box and permit the same to have a reciprocating vertical motion therein, and cushions above and below the axle box.

8. In a truck a main frame consisting of upper parallel bars with lower bracing bars at each end, and a U-shaped hanger whose upper ends pass between and overlap the parallel bars which receives in its lower portion the ends of the bracing bars and a separate

block between the upper ends of the U-shaped hanger, and means for securing the whole together.

9. In a truck a main frame consisting of two parallel bars downwardly bent at their ends and secured at each end to the sides of a block and two sets of brace rods, each rod having an upwardly extending U-shaped portion with upwardly inclining ends departing in opposite directions therefrom, one end secured to said block, and a U-shaped hanger which receives the other end and is itself supported on the parallel bars, said U-shaped parts adapted to receive the axle box.

10. In a truck two main frames, one for each side, consisting each of parallel upper bars with bracing bars and a hanger connecting the ends of the latter to the middle of the former in combination with cross bars which are inserted between the brace bars and the upper parallel bars and are supported upon the hanger from the latter.

11. In a truck a secondary frame adapted to receive the car body and consisting of an upper plate with a downwardly projecting and opening U-shaped yoke secured thereon and adapted to inclose the axle box.

12. In a truck a secondary frame adapted to receive the car body and consisting of an upper plate with a downwardly projecting and opening U-shaped yoke secured thereon and adapted to inclose the axle box and a reinforcing, wide-spreading yoke, inclosing the first mentioned yoke.

13. In a truck a secondary frame adapted to receive the car body and consisting of an upper plate with a downwardly projecting and opening U-shaped yoke secured thereon and adapted to inclose the axle box, and brace bars secured to the lower end of such yoke and extending upwardly to the upper flat bar.

14. In a truck a secondary frame adapted to receive the car body and consisting of an upper plate with a downwardly projecting and opening U-shaped yoke secured thereon and adapted to inclose the axle box, and brace bars secured to the lower end of such yoke and extending upwardly to the upper flat bar, one of said brace bars parallel with the upper bar for a portion of its length and connected therewith by a curved end part.

15. In a truck a secondary frame to support the car body consisting of an upper flat bar or plate with a downwardly depending yoke having outwardly extending ends with a wide spreading reinforcing yoke embracing the first mentioned yoke and with outwardly extending ends and brace bars placed between such yoke ends and secured thereto and secured each at its other end to the upper flat bar or plate.

16. In a truck the combination of a main frame, having a block at each end with a secondary frame having two rigidly connected portions between which the block is disposed, and guide rods upon which such block is free to move vertically.

17. In a truck the combination of a main frame having a block at each end with a secondary frame having two rigidly connected portions between which the block is disposed, and guide rods upon which such block is free to move vertically, and springs between such block and the secondary frame so that the latter is elastically supported upon the main frame.
18. In a truck the combination of a main frame having a block at each end with a secondary frame having rigidly connected portions between which such block lies and a tube passing through the block and bearing against the inner end surfaces of the secondary frame portions and a bolt passing through such tube and with its head and nut engaging the outer surfaces of such secondary frame portions and cushioning springs which surround such tube and lie between the block and the secondary frame.
19. In a car truck the combination of a main frame having a vertical guide portion in which the axle box is secured being free to reciprocate vertically with a secondary frame to support the car body, having a downwardly depending yoke or U-shaped portion in which the axle box is free to reciprocate and an elastic connection between the two frames, whereby one is elastically supported on the other and the forward motion of the axle simultaneously and directly moves both frames in the direction of progress.
20. In a car truck the combination of a main frame having a vertical guide portion in which the axle box is secured, being free to vertically reciprocate, with cushions to form an elastic connection between such axle box and the main frame, and a secondary frame which supports the car body and an elastic connection between the two frames whereby the secondary frame is elastically supported on the main frame, and a downwardly depending vertical guide portion on the secondary frame adapted to inclose the axle box, whereby the axle is free to move vertically at either end relative to either or both of the frames, and the secondary frame is elastically supported on the main frame and the axle is connected so as to move both frames simultaneously in a longitudinal direction.
21. A combination of a truck frame proper with arc shaped springs resting midway on the cross bars of the truck with upwardly extending ends and hanger rods connected with such ends and adapted to support one end of the motor.
22. A combination of a truck frame proper with arc shaped springs resting midway on the cross bars of the truck with upwardly extending ends and hanger rods connected with such ends and adapted to support one end of the motor, and a motor secured at one end to such hangers and at the other end pivotally secured to the axle.
23. The combination of a car truck with wheels, having inwardly prolonged grooved hubs and brake-controlling cords passing about such hubs in opposite directions.
24. The combination of a car truck with wheels, having inwardly prolonged grooved hubs and brake-controlling cords passing about such hubs in opposite directions, and a brake handle and shaft connected with such cords at one end so as when rotated in one direction to tighten one cord and when rotated in another direction to tighten the other cord and enable the wheel to ply the brake when moving in either direction.

GEORGE H. GRAHAM.

Witnesses:

FRANCES W. PARKER,
WALTER J. GUNTHER.