No. 640,507. Patented Jan. 2, 1900.

C. F. UEBELACKER.

MAXIMUM TRACTION TRUCK.

(Application filed Sept. 10, 1897.)

(No Model.)

4 Sheets—Sheet 1.

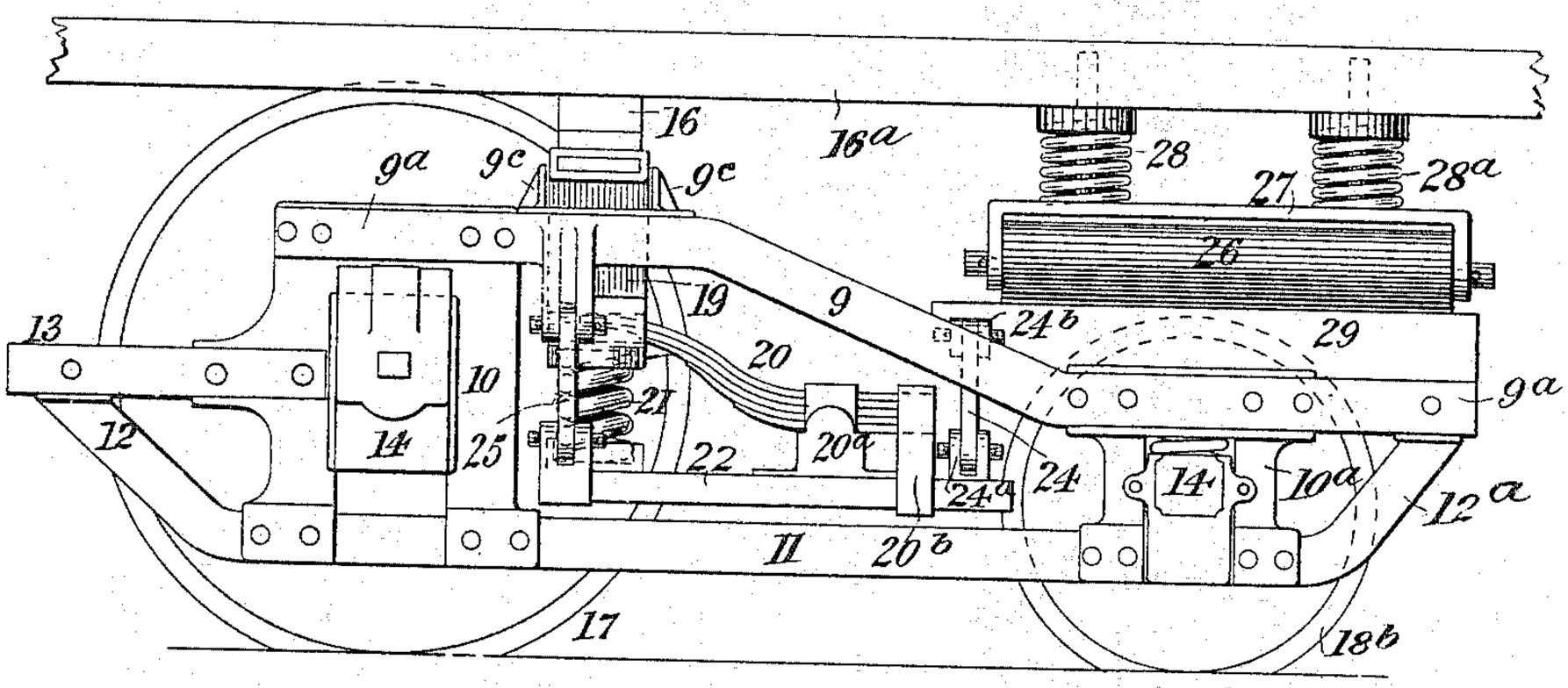

FIG. 1.

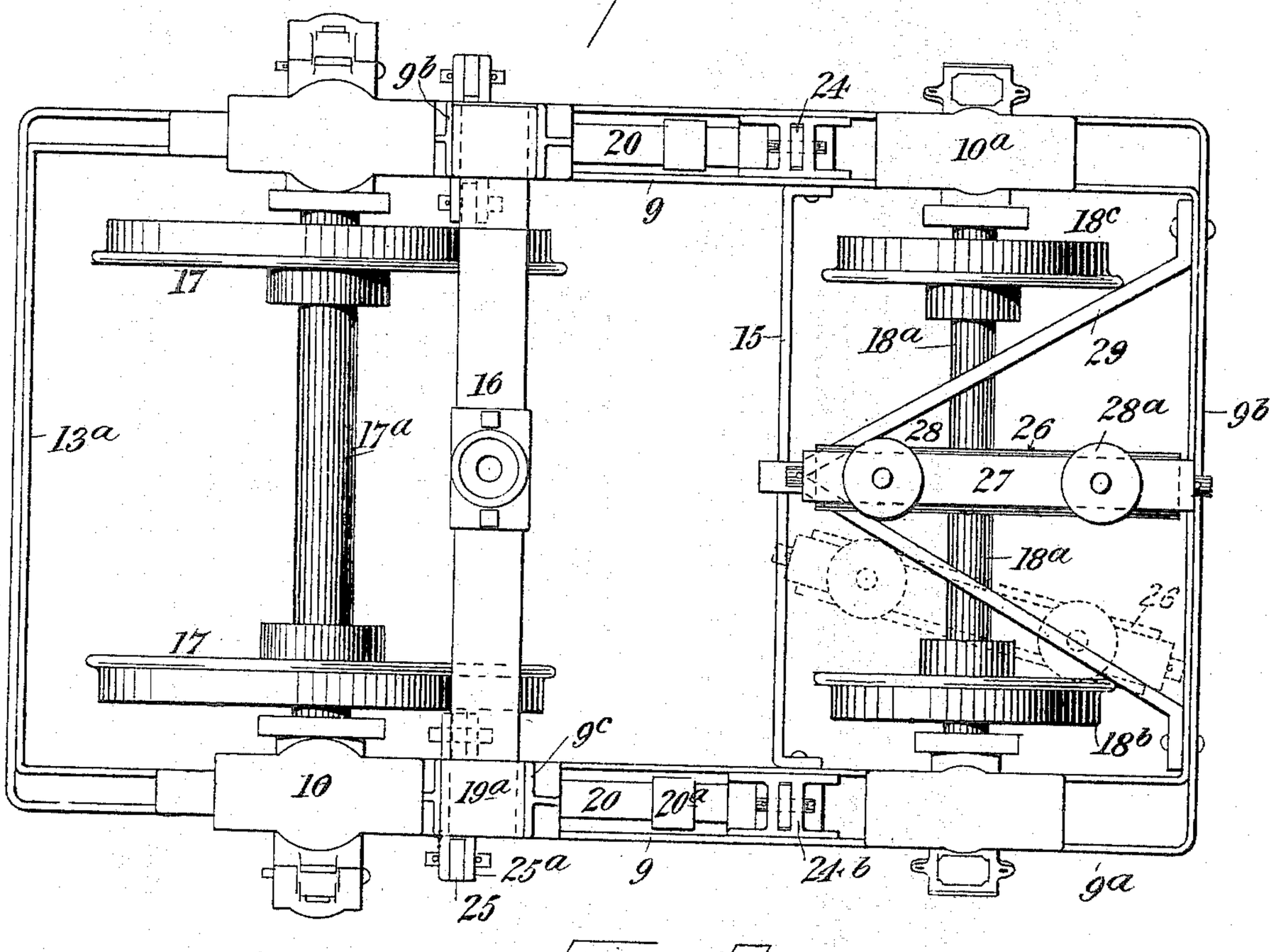

FIG. 2.

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(No Model.) 4 Sheets—Sheet 2.

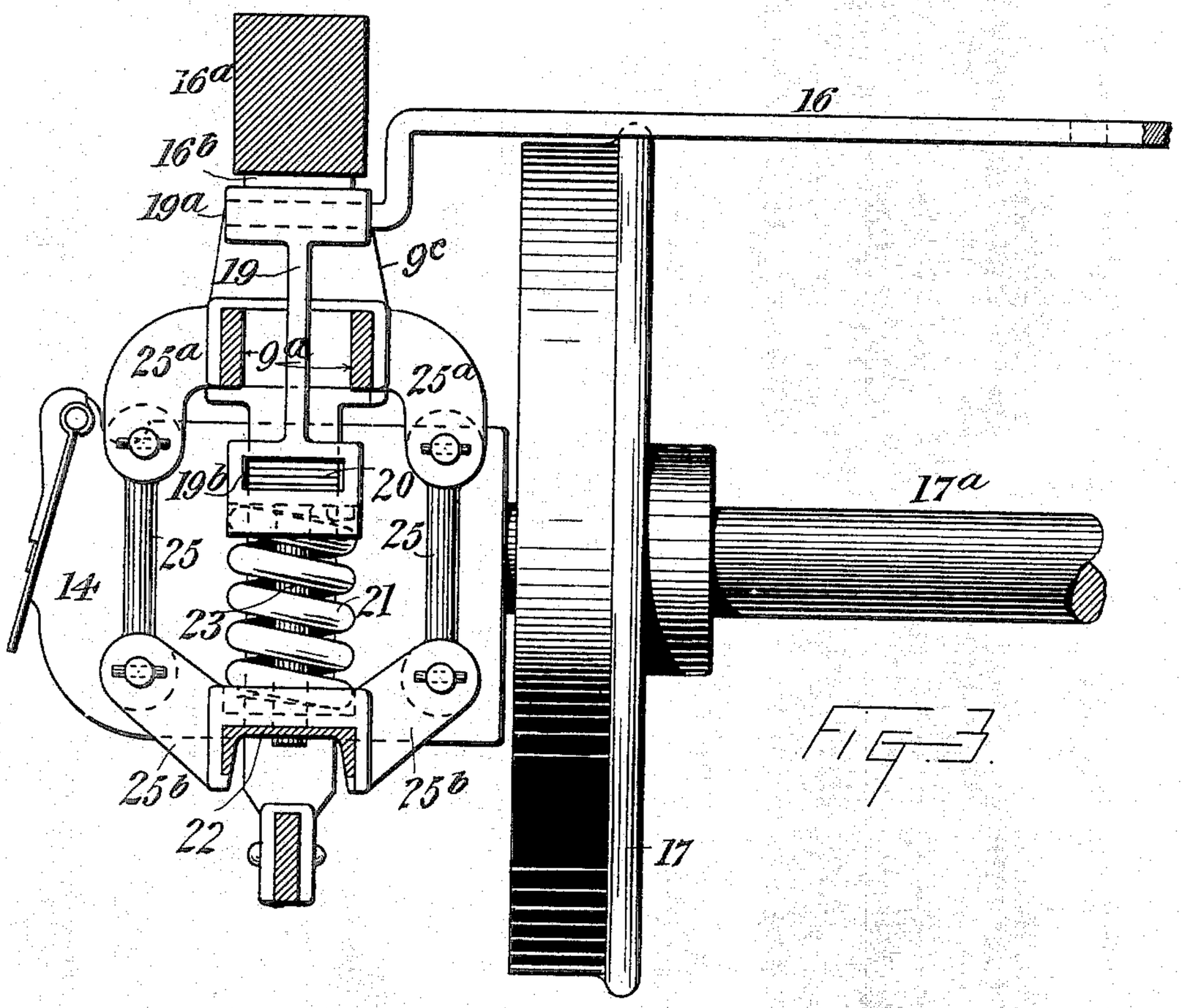

FIG. 3.

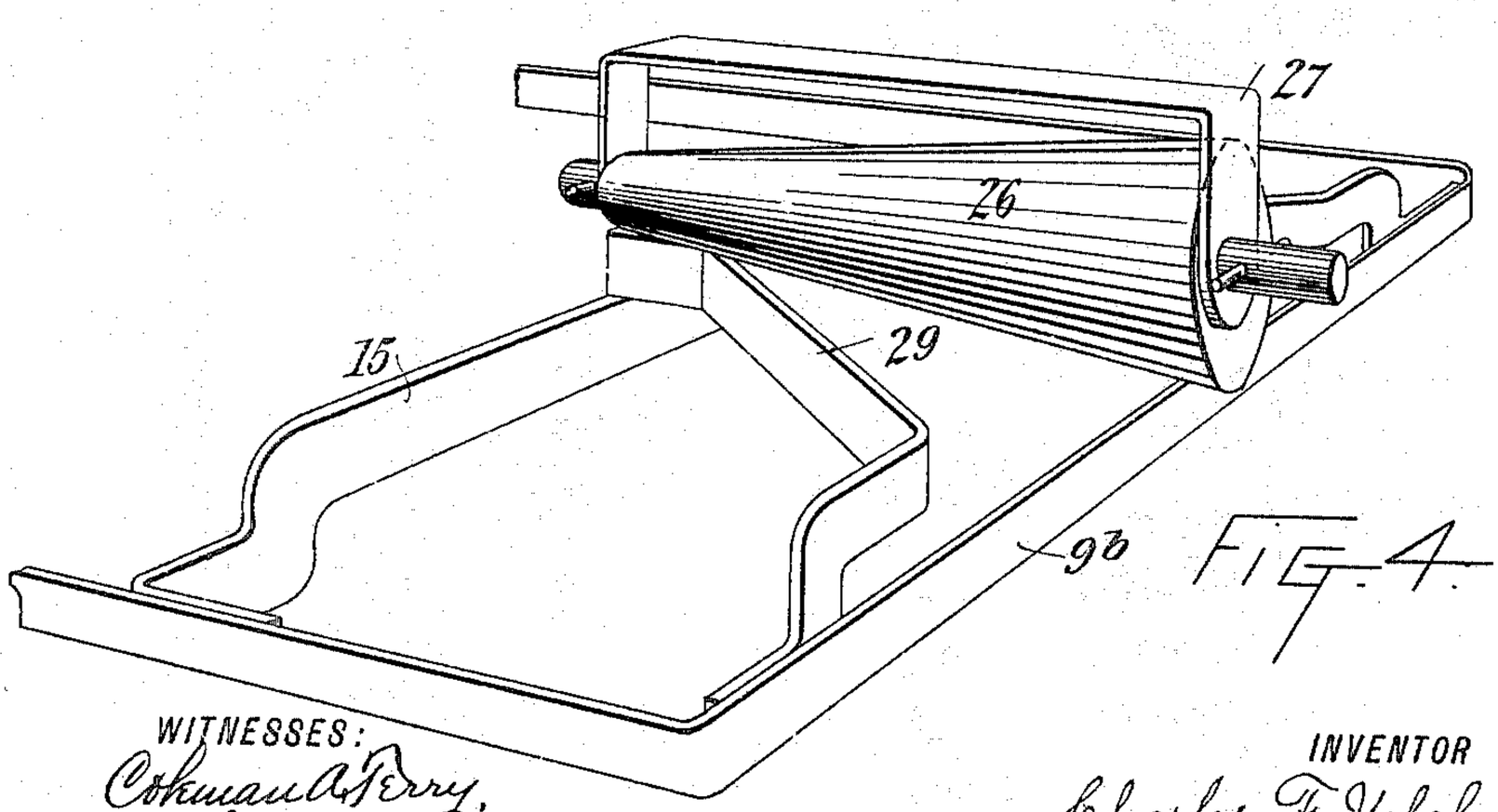

FIG. 4.

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No. 640,507. Patented Jan. 2, 1900.

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MAXIMUM TRACTION TRUCK.

(Application filed Sept. 10, 1897.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 6

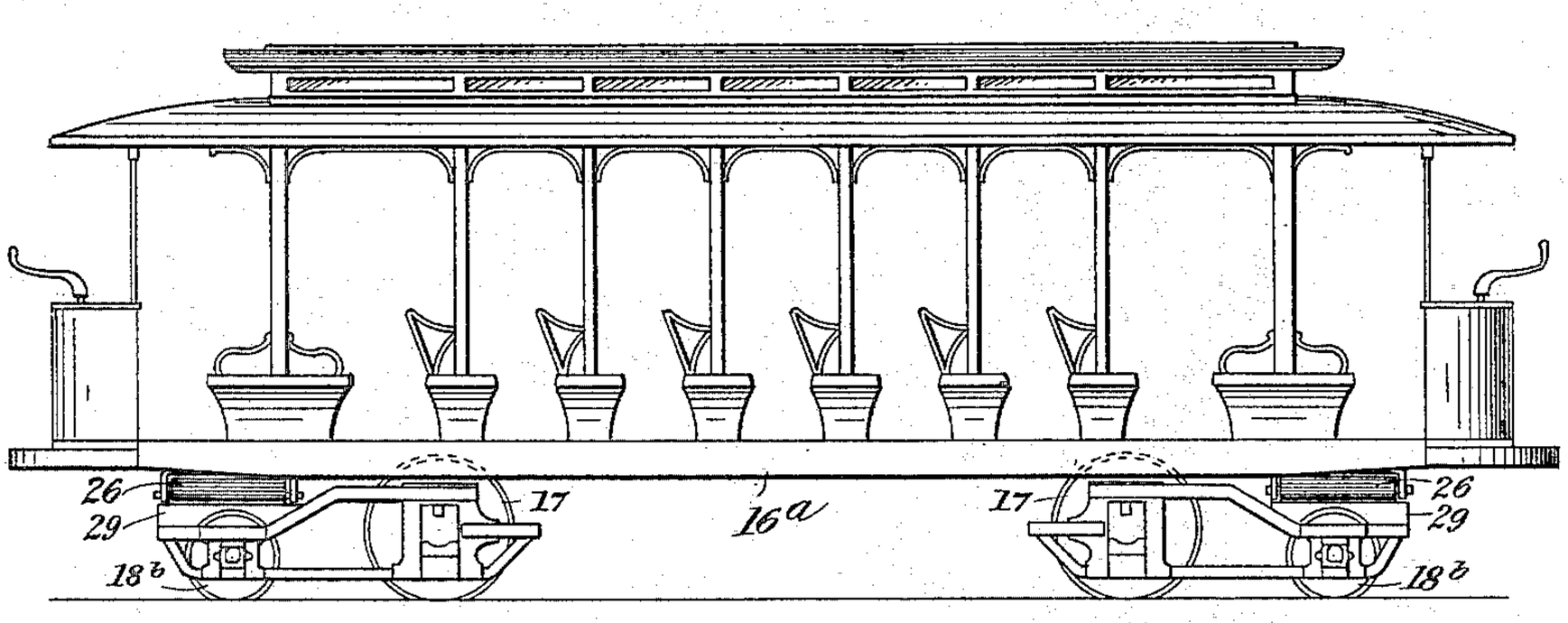
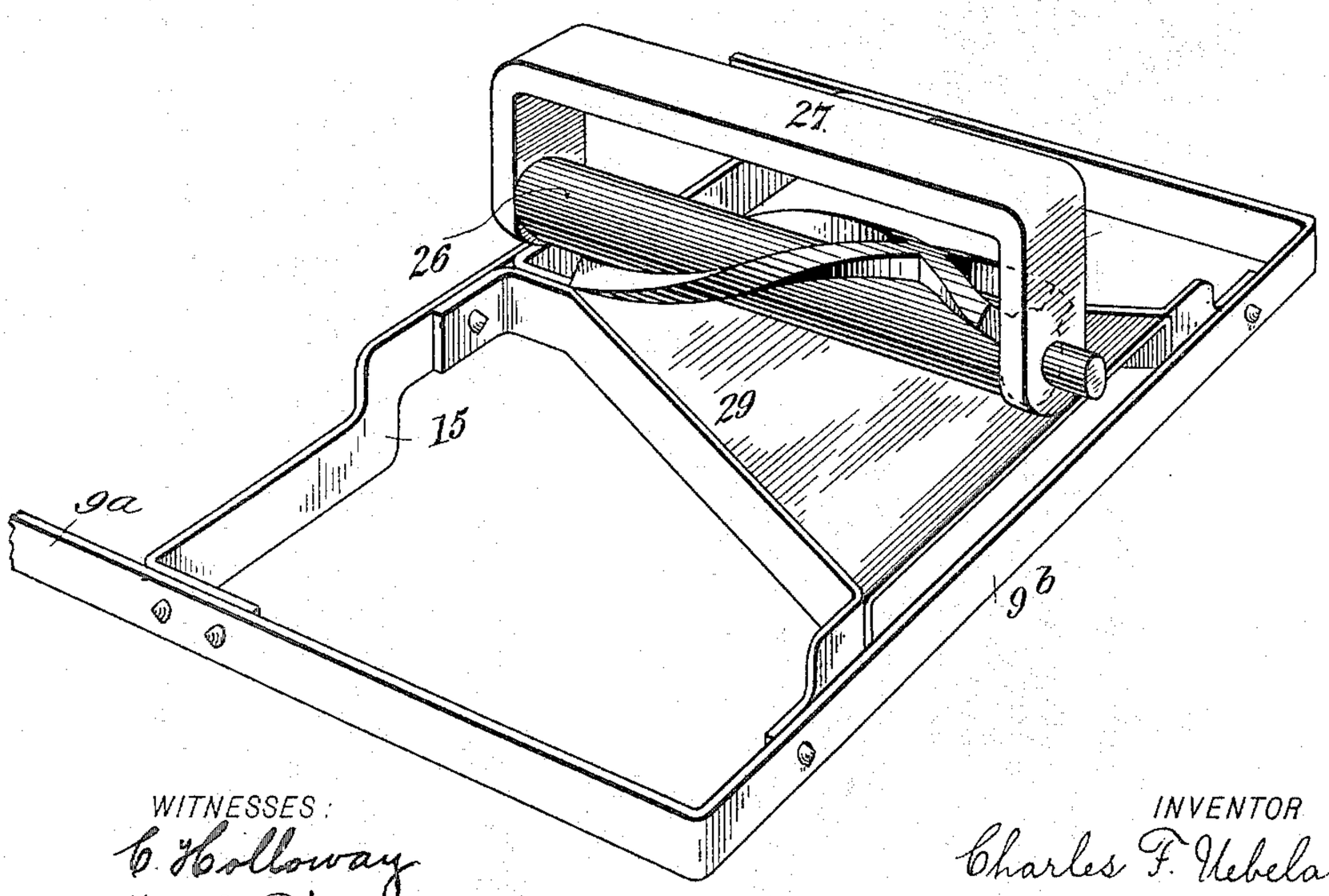


Fig. 5



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No. 640,507. Patented Jan. 2, 1900.

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MAXIMUM TRACTION TRUCK.

(Application filed Sept. 10, 1897.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 7

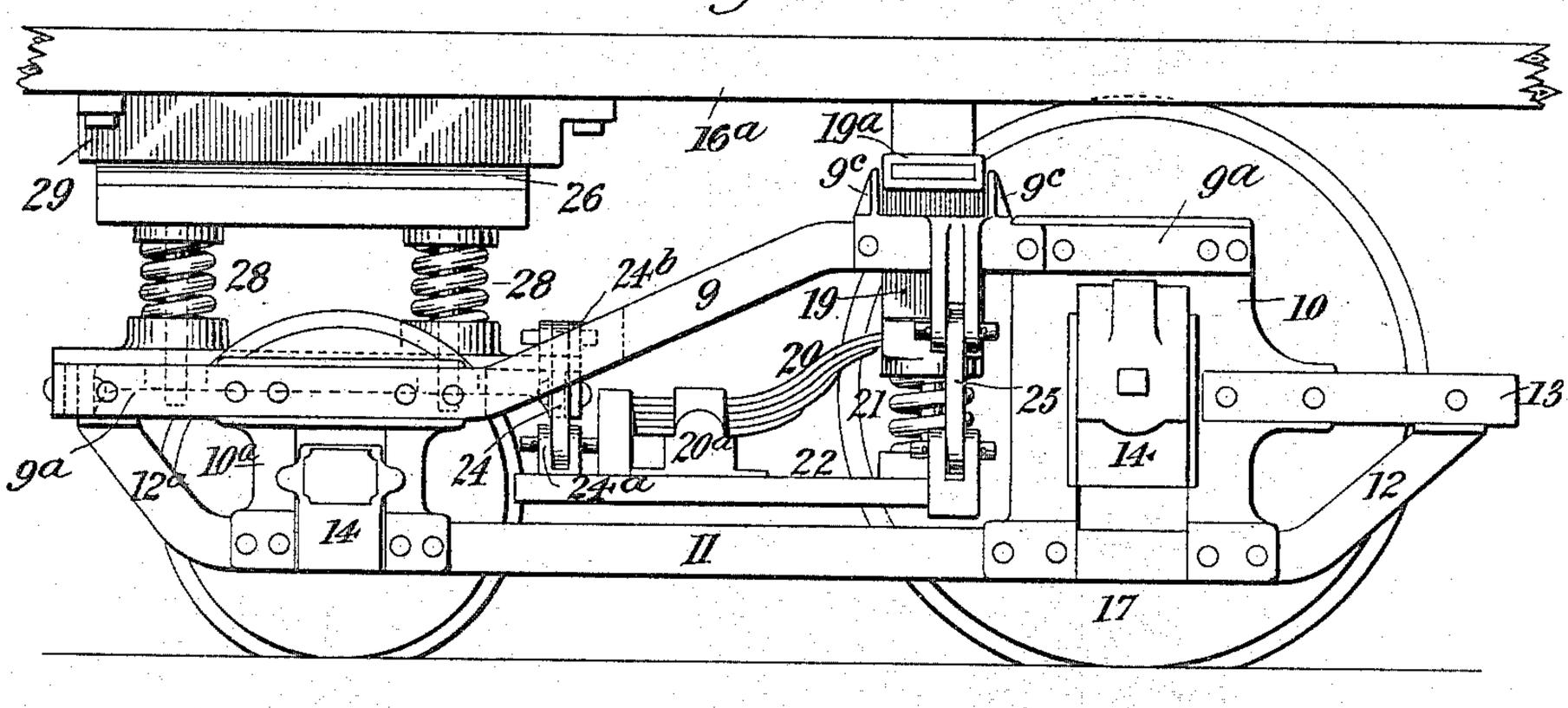
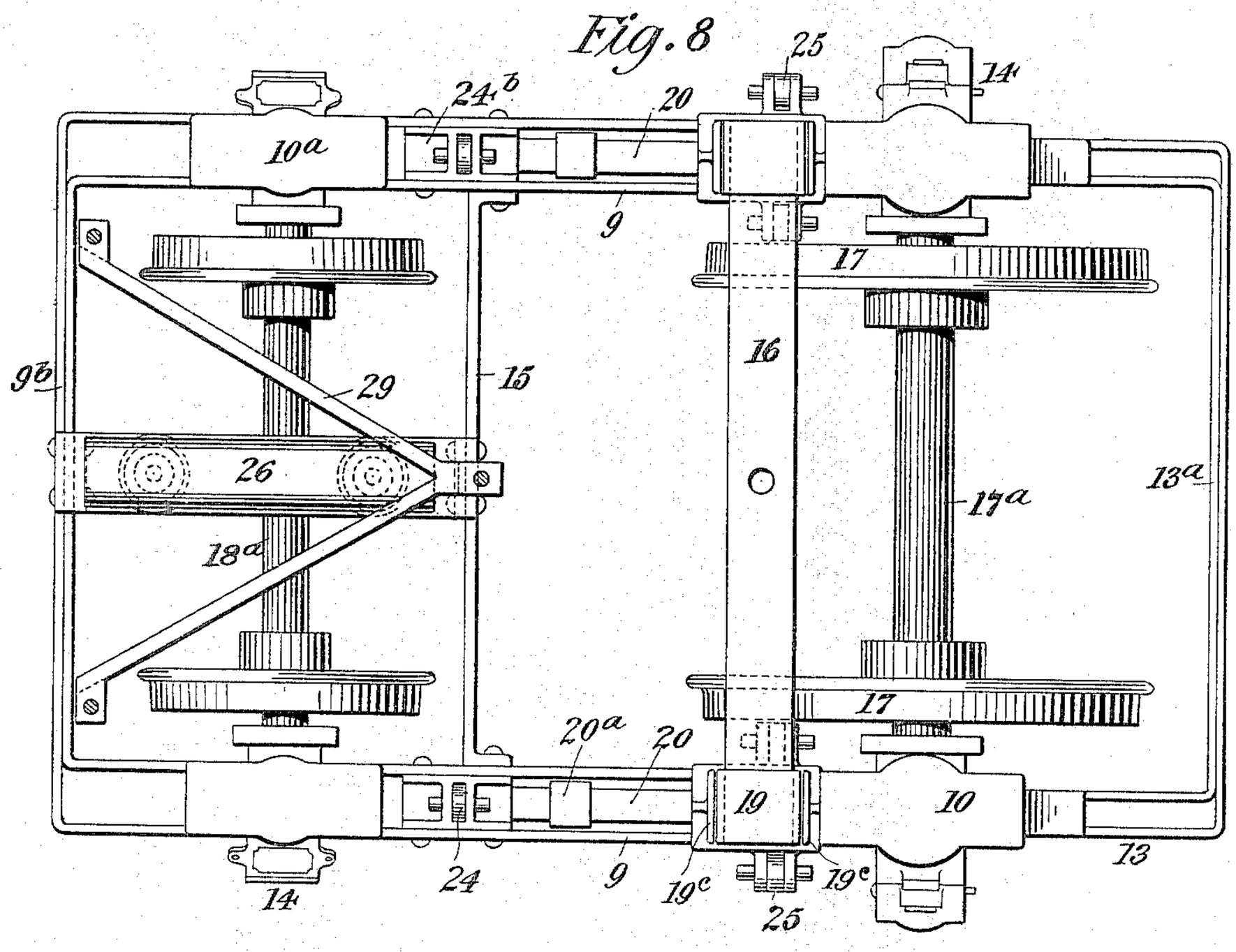


Fig. 8



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MAXIMUM-TRACTION TRUCK.

SPECIFICATION forming part of Letters Patent No. 640,507, dated January 2, 1900.

Application filed September 10, 1897. Serial No. 651,228. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. UEBELACKER, a citizen of the United States, and a resident of Kingston, Ulster county, State of New York, have invented a certain new and useful Maximum-Traction Truck, of which the following is a specification.

This invention relates to car-trucks intended more especially for electric-railway service; and the object of the invention is to improve that type of car-truck known as the "maximum-traction" truck, in which each swiveling truck is provided with two driving-wheels and with two pilot-wheels. In practice the car is mounted upon two trucks, and the trucks are equipped with suitable brake appliances capable of being operated from either platform of the car, so as to apply the brakes to the wheels of both trucks simultaneously.

My improvements include means for obtaining increased traction on the driving-wheels and for automatically adjusting the weight of the car-body on the pilot-wheels when running through curves.

The construction which I have adopted provides for a swinging bolster, to which the car-body is pivotally connected, the bolster being supported on a combination of spiral and elliptic springs which give the same easy motion of car-body that is obtained with swing-bolster swiveled trucks, while at the same time providing more weight on the driving-wheels. Preferably the truck will be provided with thirty-three-inch driving-wheels and twenty-inch pilot-wheels for closed-car work. The size of the pilot-wheels permits them to swing under the sills of closed cars or the steps of open cars. The bolster is provided with king-pin and swivel-plates, so that when the car-body is mounted on the trucks the point upon which the truck turns in curving will be fixed, thus obviating the wear incident to the play of the trucks under the car-body and the kicking of the brakes, objectionable features in all previously-constructed maximum-traction trucks. When the car-body is mounted on the trucks, the weight is carried on side plates elastically supported on the truck-frame and working under suitable rub-plates provided on the car-body.

A leading feature of my invention comprises the means whereby the weight for the pilot-wheels is automatically adjusted. For this purpose I preferably use a drum or roller coöperating with a track, these parts being located at that end of the truck which carries the pilot-axle and being there fixed, respectively, to the truck-frame and the bottom of the car-body, as hereinafter explained. Various modifications in the form of these appliances are practicable, some of which are herein described and all of which may be utilized to carry the point of application of the weight when the truck is running into a curve away from the driving-wheels, and thus transfer a greater proportion of the weight to the pilot-wheels to prevent the latter from mounting the rails.

The truck is especially designed with a view of securing great strength and endurance, and it embodies peculiar and novel features and combinations, as will hereinafter appear.

The invention is illustrated in the accompanying drawings, which form part of this specification, and wherein—

Figure 1 is a side elevation of a maximum-traction truck in which my improvements are embodied. Fig. 2 is a plan view of Fig. 1. Fig. 3 is an enlarged detail view showing the means for supporting the side bearing-plates which carry the weight of the car-body. Fig. 4 shows one embodiment of the appliances for the automatic adjustment of the weight on the pilot-wheels. Fig. 5 shows another embodiment of said appliances. Fig. 6 is a side elevation of an open car mounted upon a pair of maximum-traction trucks constructed according to my invention and showing the pilot-wheels on the outside or at the ends of the car. Fig. 7 shows a view similar to Fig. 1 with a slide substituted for the roller in the combination of means for the automatic adjustment of the weight on the pilot-wheels and showing such slide and its supporting-springs fixed to the truck-frame instead of to the car-body. In this construction the car-body will be mounted on the trucks with the pilot-wheels on the inside and the driving-wheels on the outside or at the ends of the car for reasons hereinafter explained. Fig. 8 is a plan view of Fig. 7.

The same numerals of reference are used throughout the several views to indicate the same or corresponding parts in the construction.

Referring to the drawings, it will be seen that each side frame of the truck comprises duplex upper beams 9, having horizontal end portions 9^a and intermediate inclined portions, as shown, the members of each of said side beams being arranged sufficiently wide apart to permit of locating between them the link appliances for sustaining a spring-plank and to permit the proper operation of the side bearing-plates, to which the bolster is secured. The beams 9 9^a are suitably riveted to the pedestals 10 10^a, and at one end of the truck said beams extend beyond the pedestals 10^a. Each side frame also comprises a lower longitudinal beam 11, which is riveted to the bottoms of the pedestals, and also under truss-beams 12 and 12^a, the latter riveted to the bottom of the pedestal 10^a and sustaining at its top the extended end 9^a of the upper side beam and the former riveted to the bottom of the pedestal 10 and sustaining the extended end beam 13, projecting from said pedestal, midway of its height, at that end of the truck which carries the axle of the driving-wheels. The journal-boxes are indicated at 14 and operate within the pedestal in the usual way. At the ends of the truck the beams 9^a and 13 continue around transverse of the truck with the duplex members in close contact, thus forming transverse tie-beams 9^b and 13^a. The two side frames 9 are also connected together by the transverse beam 15, serving to hold said frames in proper alinement.

The bolster is indicated at 16 and is located as near as practicable to the driving-axle 17^a, to which axle the motor will be sleeved. The pilot-wheels are indicated at 18^b 18^c and their axle at 18^a. The bolster 16 is provided with a king-pin and swivel-plates of the usual form, so that the car-body may be connected to the bolster, and thus provide a fixed point upon which the truck turns in curving.

The bolster 16 is bent at its ends, so that its main portion occupies a higher plane than its ends, which latter are fitted into pockets 19^a in the tops of the bearing-plates 19. (See Fig. 3.) The plates 19, preferably of the cross-section seen in Fig. 3, extend down between the duplex beams 9, between suitable guides 9^c, and bear directly upon the free ends of the partial elliptic springs 20 and also upon the spiral springs 21, as shown, said elliptic spring 20 being fixed in a socket 19^b in the lower end of the spring-plate 19, the upper end of the spiral spring 21 seating in a pocket beneath the socket 19^b. The lower end of the spiral spring 21 is seated in a pocket secured to the spring-plank 22. A pin 23 projects from the upper pocket of the spiral spring and works in a long guide formed integrally with the spring-pocket carried by the spring-plank 22, thus serving to prevent the displacement of spiral spring 21 and the binding of the same in the swing of spring-plank 22.

In Fig. 3 a section of the car-body is indicated at 16^a provided with the rub-plate 16^b, against which rub-plates the side bearing-plates 19, which support the weight of the load, work.

The spring-planks 22, one at each side of the truck-frame, are swung in three links in the manner presently explained, thus allowing a transverse movement of about two inches either way. This mode of carrying the spring-plank 22 in three links also insures its remaining always horizontal and furnishes a support for the springs 20 and 21, that is always maintained parallel with the direction of the motion of the bolster 16 as it swings.

The partial elliptic spring 20 is fixed in a socket 20^a, secured to the spring-plank 22, the horizontal end of the said spring entering a bracket 20^b, also secured to the spring-plank. The curved end of the spring 20 is confined in a socket in the lower end of the side bearing-plate 19, as already explained.

That end of the spring-plank 22 near the axle of the pilot-wheels is supported by a single link 24, hinged to a bracket 24^a on the spring-plank, with its other end hinged to a bracket 24^b, secured betwen the duplex members of the upper side beam of the truck-frame, while the end of the spring-plank near the axle of the driving-wheels is supported by two links 25, as shown on an enlarged scale in Fig. 3, the links 25 being hinged to brackets 25^a on the respective sides of the duplex beam 9 and to corresponding brackets 25^b on the spring-plank. This mode of supporting the spring-plank provides, as previously stated, for a transverse swinging movement of the plank of about two inches either way.

From the above-described construction it will be seen that while the swivel connection between the truck and the car-body insures a fixed point upon which the truck turns in curving the load is directly carried on the elastically-supported bearing-plates at the sides of the truck-frame. The free ends of the partial elliptic springs 20, reinforced by the underlying spiral springs 21, secured to the spring-plank, sustain the load at a point so related to the axle of the driving-wheels as to give about seventy-five per cent. of the weight of the load on the driving-wheels.

To obtain the automatic adjustment of the weight of the pilot-wheels, the preferable construction is shown in Fig. 1, where to the bottom of the car-body, near its end and immediately over the axle of the little wheels, there is secured a roller or drum 26, supported in a frame 27 so as to revolve therein. The frame 27 is secured to the car-body by suitable bolts surrounded by spiral springs 28 28^a, which bear on said frame and seat in pockets attached to the flooring of the car.

To the truck-frame, beneath the roller 26, there is secured a V-shaped track 29, upon which the roller 26 is adapted to travel, that portion of said track where its ends converge being between the axle of the pilot-wheels and the center of the truck. As the truck runs in a tangent, the roller 26 will bear under the spring 28 at the point of the V-shaped track 29 which is nearest the driving-axle 17^a, and as the truck swings in running into a curve the point of bearing of the roller 26 will be transferred from under spring 28 toward the spring 28^a, thus carrying the point of application of the weight farther away from the driving-wheels 17 and adding weight to the small wheels 18^b 18^c, thereby preventing the latter from mounting the rail.

In Figs. 1, 2, and 6 the construction just described is shown—that is, the roller 26 is secured to the car-body and the track 29 to the truck. This arrangement is necessary where the trucks are placed under the car-body with the little wheels of each truck on the outside or near the ends of the car, as shown in Fig. 6, the roller 26 being secured to the car-body over the axle of the pilot-wheels in a line with the longitudinal axis of the car-body. With the pilot-wheels at the ends of the car, as shown in Fig. 6, it is evident that the application of the weight transmitted through the drum or roller 26 (secured to the car-body on a line coinciding with its central longitudinal axis and over the axle of the pilot-wheels) to the axle 18^a when the truck runs into a curve will be transferred toward the pilot-wheels 18^b, (of each truck,) which, it is to be understood, are on the outside of the curve, one of which wheels, depending on the direction in which the car is traveling, will be the leading outside wheel of the car. It is evident that I thus increase the percentage of total weight on the small wheels, first, by transferring the point of application of the weight through the roller 26, when the trucks are running in a curve, from a point between the axles 17^a and 18^a to a point nearer the axle 18^a than the previous point of application or to a point directly over or beyond the axle 18^a, and, secondly, by transferring the point of application of the weight transmitted through the roller 26 to a point on the axle 18^a which is nearer the wheel 18^b than the wheel 18^c. This will be understood from Fig. 2, where the roller is shown in dotted lines in the position it occupies when the truck is running through a curve. It will also be evident that in the above application of the invention, with the pilot-wheels at the ends of the car, by reducing the length of the roller 26 and substituting for the V-shaped track 29 a single track running transversely of the truck and either straight or curved or of any other desired shape the transferring of the weight as the shortened roller travels over such track would increase the pressure on the wheels 18^b on the outside of the curve when the car carried by the trucks entered a curve, and thereby tend to prevent the wheels 18^b from leaving the rail.

The roller 26, while representing the preferred construction, is the equivalent in the relation in which it is applied of a slide which may be mounted in the frame or carrier 27 in lieu of the roller. It is also evident that the springs 28 28^a (shown in Fig. 1 arranged between the carrier and the bottom of the car) may be located between the truck-frame and the track 29, thus making the track the yielding portion of the appliances for automatically adjusting the weight. It will be further understood that the springs 28 28^a, which are of the spiral type, as shown in Fig. 1, may be of elliptic form or of any other design which will provide a yielding support for the roller or for the track upon which the roller travels.

When the trucks are placed under a car with the small wheels on the inside or toward the center of the car, the track 29 will be secured to the bottom of the car-body, and the roller 26 or its equivalent and the springs 28 28^a will be carried on the truck-frame and arranged over the axle of the pilot-wheels. This arrangement is shown in Figs. 7 and 8, which illustrate a slide 26, fixed to the truck-frame, and a track 29, carried at the bottom of the car. With this arrangement of the trucks under the car-body—that is, with the pilot-wheels on the inside—if the slide or roller 26 be secured to the car-body it is evident that it would be carried toward the small wheels on the inside of the curve when the car enters a curve and that of the weight which it transfers to the axles of the small wheels a larger percentage would be carried by the pilot-wheels on the inside of the curve than by the pilot-wheels on the outside of the curve. This would be distinctly undesirable, inasmuch as it is well known that in rounding a curve it is the flange of the leading outside wheel which presses against the rail and tends to guide all the remaining wheels around the curve, the flanges of the other wheels not being normally in contact with the rail and have therefore no tendency to ride the rail, or, in other words, to leave the track, the whole tendency being confined to one of the wheels on the outside of the curve, presupposing, of course, that the conditions under which the truck rounds the curve are normal in every respect. Now, if the drum or roller 26 be secured to the car-body with the pilot-wheels of the trucks on the inside, as explained, the main object of altering the distribution of the weight between the driving-axles 17^a and the pilot-axles 18^a would be defeated, inasmuch as on one of the pilot-axles the point of application of the weight would be transferred away from the wheel which tends to rise and ride the rail. On the other hand, it will be apparent if the slide or roller 26 be secured to the truck and the track 29 to the car-body (where the pilot-wheels are on the inside or toward the center of the car)

the point of application of the weight transferred through the roller will in all positions of the truck remain central with the pilot-axles.

It will be evident that the roller 26 (shown in Figs. 1 and 2) may be of conical formation, as indicated in Fig. 4, or of any other suitable shape that would effect the compression of the springs 28 28ª when the roller travels over the track 29 from the central position which it assumes when the car is running on a tangent to such a position as it will assume when the car runs into a curve. A warped plate representing, approximately, the trace of the track 29 upon the roller 26, as shown in Fig. 5, could be used instead of the roller 26, in which case the track 29 could be replaced by a surface such as a stiff sheet of metal, and this surface could be either plain, as shown in Fig. 6, or curved. The warped plate, however, may be run on a V-shaped track, such as shown in Figs. 1 and 2.

I do not wish to limit myself to the exact location of the roller and track shown in the drawings, and appliances for the described automatic adjustment of the weight for the pilot-wheels may, it is obvious, be so organized as that they may be either arranged on that end of the truck carrying the axle of the pilot-wheels (and they are preferably so arranged) or on that end of the truck carrying the axle of the driving-wheels, or such appliances may be arranged on both ends of the truck, and when applied to both ends of the truck the effect will be to raise that end near the driving-axle and depress or force down that end near the pilot-axle at the same time. Furthermore, the roller 26 may be replaced by an eccentric, preferably toothed, to match with teeth in the track 29, in which case the eccentric action of the roller would increase the compression on the spring of the organization.

The braking appliances are not illustrated in the present case; but they will be of such character as to permit the application of most of the pressure on the driving-wheels and only an amount on the pilot-wheels in proportion to the weight carried by the latter. This will prevent skidding and flattening of the pilot-wheels.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a swiveling car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the pedestals and the upper duplex side beams having horizontal end portions on different planes and over the pedestals and an intermediate inclined portion, of a lower side beam connecting the pedestals together at their bottoms, end beams riveted to the driving-axle pedestals at the center of their vertical height and under truss-beams supporting the side frames at each end of the truck.

2. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, of a bolster arranged nearer the driving-axle than the pilot-axle and adapted to have a car-body swiveled to it and to receive the load wholly on its ends immediately over the upper beams of the side frames, and elastic supporting appliances connected to the ends of the bolster and arranged beneath said beams.

3. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, of a bolster arranged nearer the driving-axle than the pilot-axle and adapted, when the car-body is swiveled to it, to receive the load on its ends immediately over the upper side beams, shoes upon which said bolster rests, and elastic supporting means placed underneath said upper side beams.

4. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, of a bolster to which the car-body is adapted to be swiveled to provide a fixed point upon which the truck turns in curving, said bolster arranged between the driving-axle and the center of the truck, and bearing-plates connected to the ends of the bolster and extending below the upper side beams and elastically supported at their lower ends and adapted to receive the load on their upper ends.

5. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, of a bolster to which a car-body is adapted to be swiveled to provide a fixed point upon which the truck turns in curving, said bolster arranged between the driving-axle and the center of the truck and having its ends in a plane below its central part, bearing-plates connected to the ends of the bolster and extending below the upper side beams and elastically supported at their lower ends and adapted to receive the load on their upper ends.

6. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, a bolster provided with means whereby the car-body may be swiveled thereto and arranged near the driving-axle, bearing-plates connected to the ends of said bolster and extending below the upper side beams, and appliances for elastically supporting said bearing-plates on the side frames, of a car-body resting on said side bearing-plates which carry the weight of the load.

7. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side frames, a bolster provided with means whereby the car-body may be swiveled thereto and arranged near the driving-axle, appliances for elastically supporting said bol-

ster, and bearing-plates interposed between the ends of said bolster and said elastic appliances and extending below the upper side beams, of a car-body resting on said bearing-plates which carry the weight of the load and rub-plates attached to the car-body between the latter and the bearing-plates.

8. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with pedestals, lower side beams connecting the pedestals together at the bottom, on each side of the truck, duplex end beams riveted to the driving-axle pedestals and under truss-beams at the ends of the truck, of duplex upper side beams having horizontal end portions riveted to the pedestals and an intermediate inclined portion, the duplex members of the respective beams at the ends of the truck being continued around transverse of the truck with the duplex members in close contact with each other.

9. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the upper side beams, a pair of spring-planks suspended from said side beams to have a swinging motion transverse of the truck and a system of springs carried by said spring-planks, of bearing-plates at each side of the truck bearing directly upon the springs of the spring-planks, and a bolster arranged between the driving-axle and the center of the truck and having its ends connected with the tops of said side bearing-plates.

10. In a car-truck, the combination with the upper side beams and a bolster arranged between one end of the truck and its center, of spring-planks at each side of the truck suspended at one end from the truck-frame by a single link and at the opposite end by a pair of links to afford a limited swinging motion transverse of the truck, a system of springs mounted on said spring-planks, and bearing-plates resting on said springs, extending above the side beams of the truck-frame and adapted to receive the ends of the bolster and support the same.

11. In a car-truck, the combination with the upper side beams and a bolster arranged between the end of the truck and its center, of spring-planks at each side of the truck suspended at one end from the truck-frame by a single link and at the opposite end by a pair of links to afford a limited swinging motion transverse of the truck, a spiral spring supported on one end of each of said spring-planks, a partial elliptic spring secured to each of said spring-planks with its free end projecting over the spiral spring, and a bearing-plate at each side of the truck-frame immediately over said spiral spring and the free end of the partial elliptic spring and bearing on said springs, the upper ends of said bearing-plates extending above the upper side beams of the truck-frame and affording side bearings for a car-body.

12. In a car-truck, the combination with upper duplex side beams provided with guide-pieces, as 9^b, and a bolster arranged in proper relation to said guide-pieces, of spring-planks at the sides of the truck supported at one end by a single link hinged between the duplex members of said side beams, pairs of links hinged to brackets on said side beams and also to brackets on the opposite ends of said spring-planks, spiral springs seated in pockets on the ends of the spring-planks supported by the pairs of links, partial elliptic springs fixed in sockets on the spring-planks with their free ends projecting over the spiral springs, and side bearing-plates having pockets at their bottoms to receive said spiral springs and sockets above the pockets to receive the ends of the partial elliptic springs, said bearing-plates extending between and above the duplex side beams of the truck-frame and provided at their tops with pockets to receive the ends of the bolster and with bearing-surfaces adapted to support a car-body.

13. In a car-truck, the combination with the upper side beams and a bolster arranged between the end of the truck and its center, of spring-planks at each side of the truck suspended from the truck-frame by links, a spiral spring seated in a pocket at one end of each of said spring-planks, a partial elliptic spring fixed in a socket on each of said spring-planks with its free end projecting over the spiral spring, bearing-plates at each side of the truck-frame provided with pockets at their bottoms to receive said spiral springs and sockets above the pockets to receive the ends of the partial elliptic springs, said bearing-plates extending above the side beams of the truck-frame and provided with bearing-surfaces for a car-body, and pins projecting from the pockets in the bottoms of the bearing-plates and working in guides in the pockets on the spring-planks in which the spiral springs are seated.

14. In a car-truck having a pair of driving-wheels and a pair of pilot-wheels of less diameter than the driving-wheels, the combination with the side beams, of spring-planks at each side of the truck-frame, that end of each of said planks nearer the axle of the pilot-wheels being suspended from the side beams by a single link and that end nearer the axle of the driving-wheels being suspended by two links, the hinging of the links being such as to afford a limited swinging motion to the spring-planks transverse of the truck, a system of springs carried by said spring-planks and side bearing-plates supported on the springs of said spring-planks at the ends of the latter nearer the axle of the driving-wheels, said side bearing-plates extending above the side beams of the truck-frame and coöperating with the bolster and affording bearing-surfaces for a car-body.

15. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the

combination with a car-body to which the truck is swiveled, of a track suitably secured on top of the truck-frame, a drum or roller, a mounting for the same suitably connected to the flooring of the car-body, said drum or roller adapted to coöperate with said track, and suitable springs arranged between said mounting and the car-body at different distances from the swivel, for the purpose set forth.

16. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a bolster connected at its ends to side bearings elastically supported on the truck-frame, a car-body resting on said side bearings, and a central swivel connection between truck and car-body, of a track suitably secured on the top of the truck-frame, a drum or roller, a mounting for the same suitably connected to the flooring of the car-body, said drum or roller adapted to coöperate with said track, and suitable springs arranged between said mounting and the car-body at different distances from the swivel, for the purpose set forth.

17. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a car-body to which the truck is swiveled and a track secured on the top of the truck-frame over the axle of the pilot-wheels, of a drum or roller, a mounting for the same suitably connected to the framing of the car-body, said drum or roller adapted to coöperate with said track, and suitable springs arranged between said mounting and the car-body.

18. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a car-body to which the truck is swiveled, of a V-shaped track secured to the truck-frame over the axle of the pilot-wheels with that portion of the track where its ends converge located between the axle of the pilot-wheels and the center of the truck, a drum or roller connected to the framing of the car-body and adapted to cooperate with said track, and suitable springs arranged between said drum or roller and the car-body.

19. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a car-body to which the truck is swiveled, of a track secured to the truck-frame over the axle of the pilot-wheels, a roller adapted to coöperate with said track, a framing supporting said roller and connected to the framing of the car-body and suitable springs arranged between said roller-support and the floor of the car-body, at different distances from the swivel.

20. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a bolster located near the axle of the driving-wheels, side bearing-plates elastically supported at the sides of the truck-frame and connected at their upper ends with the ends of the bolster and a car-body having a central swivel connection with the truck and resting on the tops of said side bearing-plates, of a track secured to the truck-frame over the pilot-axle, a roller connected to the car-body over said track and adapted to cooperate therewith and springs arranged between said roller and the car.

21. In a car-truck provided with a pair of driving-wheels and a pair of pilot-wheels, the combination with a car-body to which the truck is swiveled, of a suitable track secured to the truck-frame over the axle of the pilot-wheels, a roller 26, a frame 27 in which said roller is supported, the said frame being connected to the car-body and suitable springs, as 28, 28ª, arranged between the frame 27 and the car-body at different distances from the swivel, substantially as set forth.

22. The combination with a car-body and two trucks provided with driving-wheels and pilot-wheels and supporting the car-body with the pilot-wheels outside or at the ends of the car, of suitable tracks arranged on the ends of the truck-frames over the axles of the pilot-wheels, rollers connected to the flooring of the car-body in suitable supports and adapted to coact with the tracks on the truck-frames and springs arranged between the supports for said rollers and the car-flooring at different distances from the swivel, substantially as set forth.

23. The combination with the frame of a car-truck, a car-body, a swivel connection between the truck and car-body, and the truck-wheels, of an additional contact device on the car-body and a coacting contact device on said truck-frame, and springs supporting one of said contact devices and placed at different distances from the swivel.

24. The combination with the truck frame and wheels, the car-body, a bolster elastically supported on the truck-frame, and a swivel connection between the car-body and the bolster, of an additional contact device on the car-body and a coacting contact device on the truck-frame and springs supporting one of said contact devices and placed at different distances from the swivel.

25. The combination with a truck frame and wheels, a car-body, and a swivel connection between the truck and the car-body, of an additional contact device on the truck-frame and an additional contact device on the car-body, said two devices being adapted to contact at varying distances from the swivel-joint during relative displacements of the truck-frame and the car-body.

Signed at New York, in the county and State of New York, this 4th day of August, 1897.

CHARLES F. UEBELACKER.

Witnesses:

J. E. M. BOWEN,

C. HOLLOWAY.