

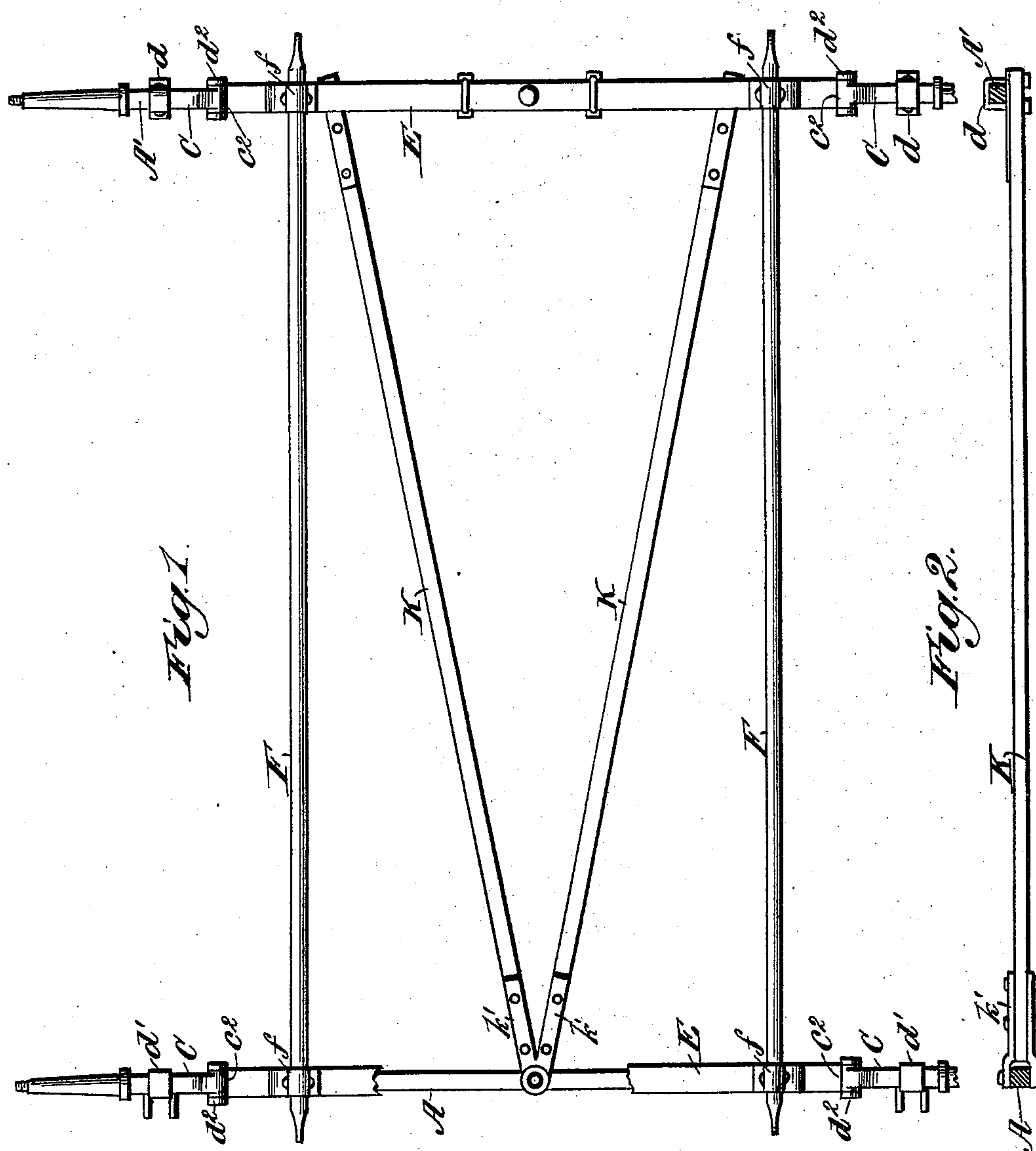
(No Model.)

3 Sheets—Sheet 1.

L. F. ROBARE.  
VEHICLE RUNNING GEAR.

No. 539,307..

Patented May 14, 1895.



Witnesses:  
Robert Everett.  
Dennie Sumby.

*Inventor:*  
*Louis F. Robare.*  
*By*  
*James L. Norrig.*  
*Atty.*

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

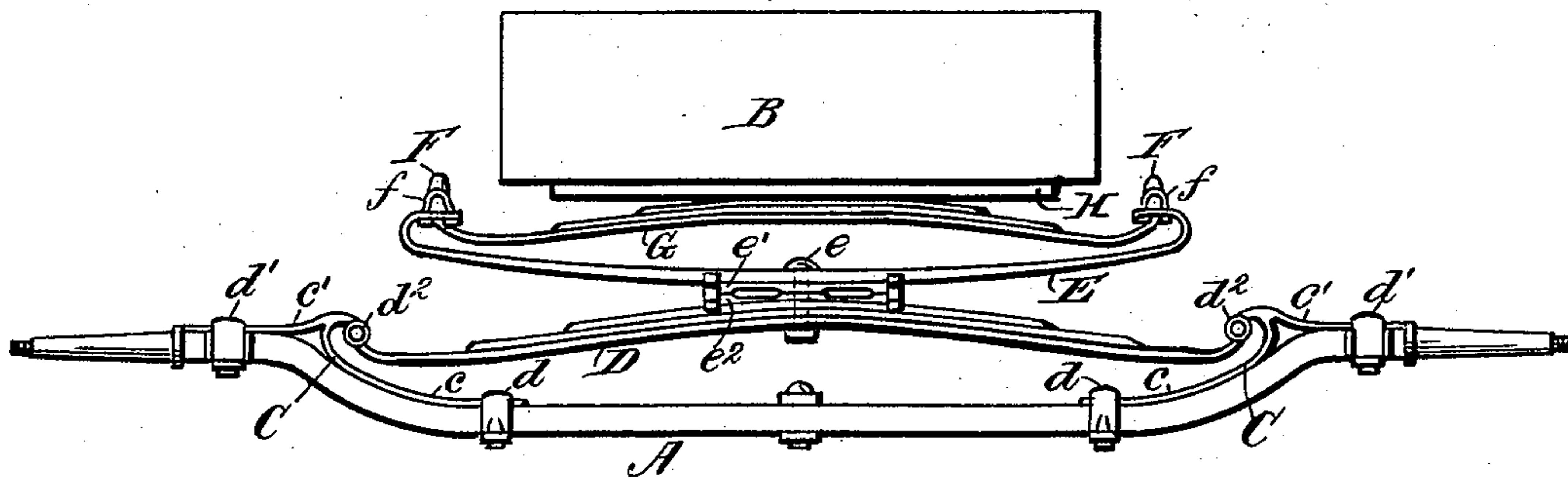


Fig. 4.

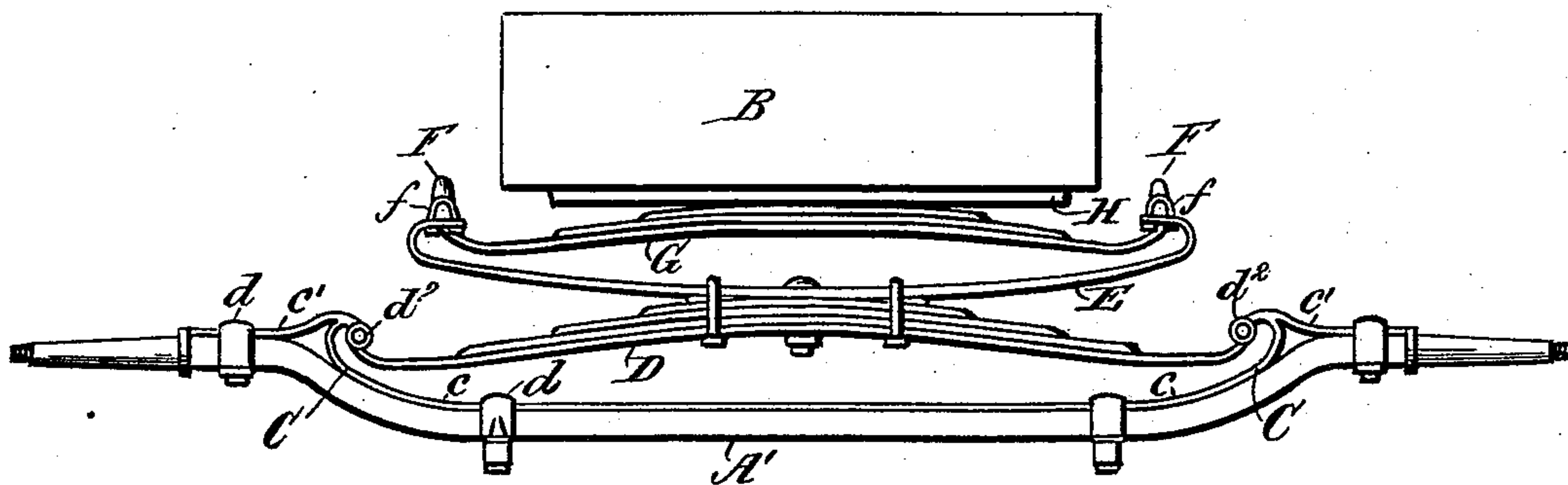


Fig. 5.

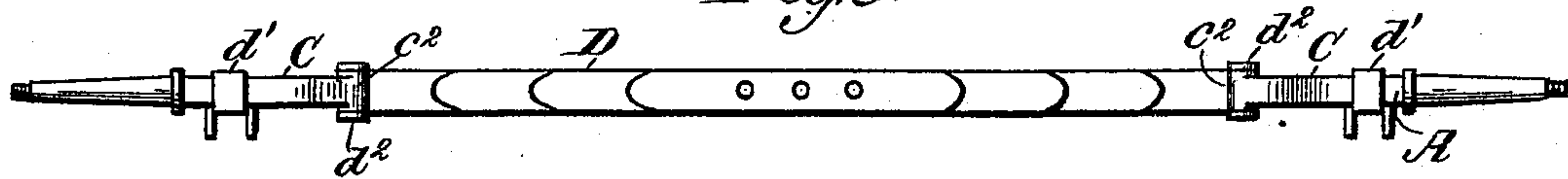


Fig. 6.

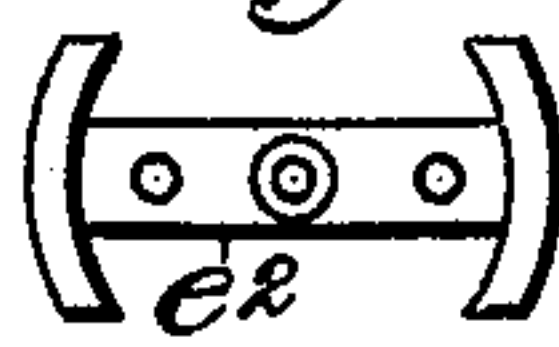


Fig. 7.



Witnesses.  
*Robert G. Gault,*  
*Dennis S. Sundry.*

Fig. 8.



Inventor.  
*Louis F. Robare.*  
By *Janus L. Norris,*  
*Atty.*

(No Model.)

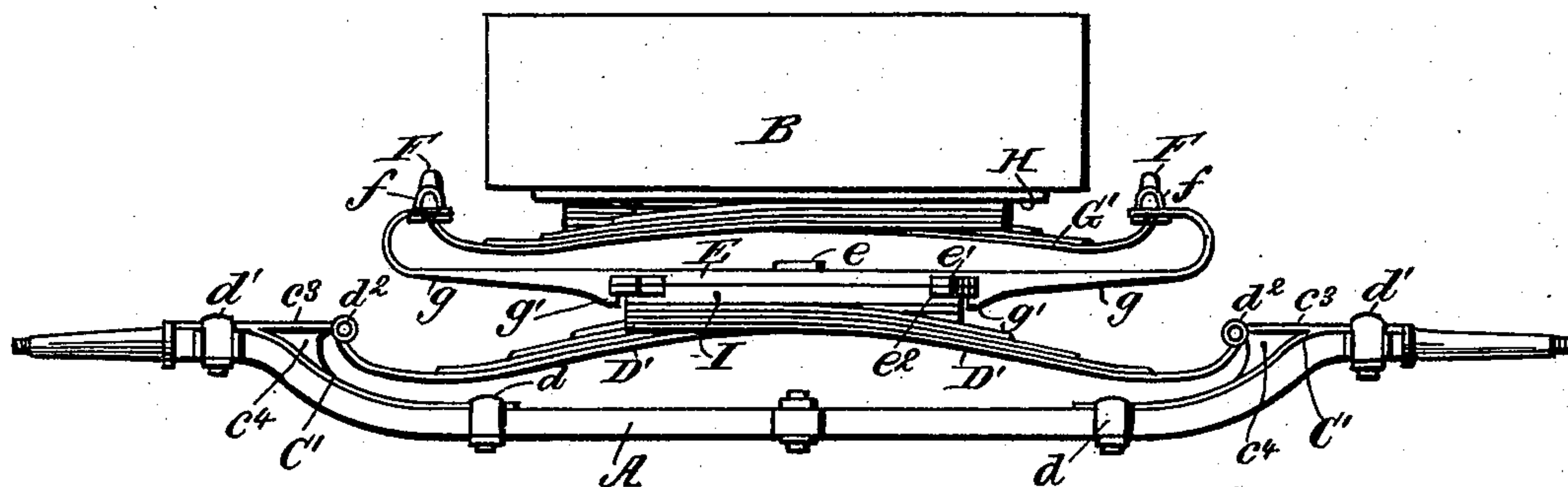
3 Sheets—Sheet 3.

L. F. ROBARE.  
VEHICLE RUNNING GEAR.

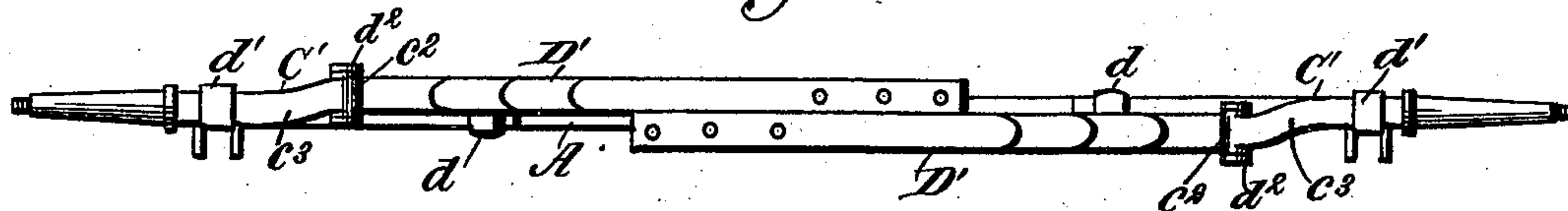
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*Fig. 9.*



*Fig. 10.*



*Witnesses,*  
*Robert Everett.*

*Dennis Sundry.*

*Inventor,*  
*Louis F. Robare.*  
*By*

*James L. Norris.*  
*Atty.*



# UNITED STATES PATENT OFFICE.

LOUIS F. ROBARE, OF AU SABLE FORKS, NEW YORK.

## VEHICLE RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 539,307, dated May 14, 1895.

Application filed March 4, 1895. Serial No. 540,483. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS F. ROBARE, a citizen of the United States, residing at Au Sable Forks, in the county of Essex and State of New York, have invented new and useful Improvements in Vehicle Running-Gear, of which the following is a specification.

My invention relates to improvements in vehicle running gear, and particularly to that class of running gears wherein the side bars are supported by springs carried on downwardly cranked axles.

The object of my invention is to provide improved means for permitting the body of the vehicle to extend over the axles and at the same time to be flexible and easy riding and to be supported sufficiently low to render access thereto easy and to throw the center of gravity of the vehicle to a point that will materially lessen the danger of the vehicle upsetting in turning at high speed, about or around a curve or corner.

To these ends my invention consists in the novel construction, arrangement and combination of parts hereinafter fully described and definitely pointed out in the claims following the description, due reference being had to the accompanying drawings forming a part of this specification, wherein—

Figure 1 is a top plan view of my improved running-gear, showing the general arrangement of the parts. Fig. 2 is a view illustrating the preferred manner of connecting the axles and reaches. Fig. 3 is a front end elevation of the running-gear. Fig. 4 is a rear end elevation. Fig. 5 is a top plan view of the front axle and spring, the bolster being removed. Fig. 6 is an elevation of the preferred form of bracket or support for carrying the axle-spring. Fig. 7 is a plan of the said spring-support. Fig. 8 shows views of the circle-iron between the forward bolster and axle-spring. Fig. 9 is a front end elevation showing the running-gear as fitted with springs of a two-part construction. Fig. 10 is a top plan view of an axle provided with offsetting supports for a two-part spring, the inner ends of which are extended past each other for connection with a bolster or bolster-plate.

Referring to the drawings, the letter A indicates the front axle and A' the rear axle,

both of said axles being cranked or bent downward near the spindle at each end, whereby the axle, for the greater portion of its length, is lower than the spindles, permitting the body B of the vehicle to extend over the axles and at the same time occupy a low position. To the opposite bent ends of each of the axles is secured in any convenient and suitable manner a bracket or spring support C, Figs. 3 to 7, designed not only to engage the ends of the axle springs D but to add, also, strength and beauty to that portion of the axle.

It will be understood that while the arms  $c$  and  $c'$  of the brackets C are shown as fastened to the axles by means of clips  $d$ , the same could be made integral with or welded to the axle. The thill couplings  $d'$ , on the front axle, also serve as clips for the spring supports or brackets C, when the said brackets are formed separately from the axle.

The springs D are each, preferably, composed of a series of leaves superposed upon or overlapping one another in the usual manner, and each spring is continuous from end to end and extended from one bracket C to the other at the opposite bent end portion of the axle. At each end the continuous springs D are provided with perforated ears  $d^2$  and are connected to the brackets C by means of a bolt passed through the ears of the springs and through the eye or cylinder  $c^2$  of the bracket. It will, however, be understood that a one leaf spring might be used, instead of a spring composed of several superposed leaves, and that the ends of the springs may be connected to the bracket by means of an intervening buckle or link.

The bolster E of the forward axle may be pivoted to the axle spring D by means of a king bolt  $e$  and a circle or wear iron of any suitable construction, one half  $e'$  of said circle iron to be bolted to the bolster and the other half  $e^2$  to the axle spring. The bolster E' of the rear axle is rigidly bolted to its spring. Each bolster may be made of spring steel like the leaf of a spring and may have any design and curvature. The bolsters E and E' are preferably the same width throughout their entire length, but are of greatest thickness at the center.

To the extreme ends of the bolsters E and E' are secured the side bars F by means



of clips *f*, as shown, or in any appropriate manner.

The body B of the vehicle may be supported by springs G of a construction similar to that  
5 used on the axle, or by springs of any other appropriate character; or the vehicle body may be supported between the side bars in any manner desired. In Figs. 3 and 4 the body springs G are shown as continuous from  
10 end to end, the opposite ends of each spring being connected to side bars by means of swivel clips or otherwise connected to the side bars and the central portion of each spring being bolted to bed plates H secured to the  
15 under side of the vehicle body.

Instead of making each axle spring and each body spring continuous from end to end they may have a two part construction as shown by the corresponding springs D' and  
20 G' in Fig. 9. The two part axle springs D' may each be composed of a series of leaves superposed upon and overlapping one another in the usual manner, the inner end of each half being extended past the other half as  
25 shown in Fig. 10. The inner ends of the two part front axle springs may be bolted to a bolster plate I, Fig. 9, that may be pivotally connected with the bolster by means of a king bolt *e* and by circle irons or wear plates  
30 *e'* *e'* secured to the adjacent faces of the bolster and bolster plate and operating in the usual manner.

In order to adequately support the outer ends of the two-part axle springs D' there  
35 may be formed on or secured to the bent portion of each axle a bracket or spring support C' having its uppermost and outer arm *c*<sup>3</sup> and attached eye *c*<sup>2</sup> offset somewhat from a parallel line with the axle. The upper arms *c*<sup>3</sup>  
40 of the brackets C' diverge slightly from the longitudinal plane of the axle in opposite directions, one projecting slightly in front of the axle and the other in rear thereof. The outer ends of the two front axle springs D'  
45 are connected to these offsetting bracket arms *c*<sup>3</sup> by means of bolts passed through the ears of the springs and through the eyes *c*<sup>2</sup> of the brackets, or in any other suitable manner, and it will be apparent that by reason of de-  
50 flecting these bracket arms *c*<sup>3</sup> to opposite sides of the axle, as shown in Fig. 10, the two halves of the spring D' will be permitted to extend past each other, at their inner ends, and yet lie in the same parallel plane with the axle.

55 Each of the spring supports or brackets C' may be formed with a rib or web *c*<sup>4</sup> that will serve to strengthen the bracket and assist it in supporting the weight of the vehicle body.

The under side of the front bolster may be  
60 provided, at each side of the bolster plate I with a downwardly projecting rib *g* that terminates in a tongue *g'* fitting under the lower wear plate or half of the circle iron to prevent the bolster from lifting or tilting. The bol-  
65 ster of the rear springs is directly and rigidly bolted to said springs and the ends of both

bolsters are clipped or connected to the side bars, as already described.

The front and rear axles are connected to-  
70 gether by the usual reaches K which are se- cured to the rear axle near each end of the latter, by means of clips *d d* that serve also to secure the spring supporting brackets to said axle; the front ends of the reaches be-  
75 ing converged and connected by irons *k' k'* that have a pivotal attachment to the front axle.

By means of my improved construction the vehicle body may be hung very low, the cranked axles affording ample space for the  
80 springs, bolsters and reaches, permitting the body to be proportionately lowered and yet extend over both axles, thus making access to the vehicle very easy and obviating in a great measure the liability of the vehicle up-  
85 setting or turning over. By causing the upper arms *c*<sup>3</sup> of the brackets or spring supports to diverge in opposite directions, the springs are permitted to be extended one past the other and yet lie in parallelism with the axle  
90 whereby all torsional strain or twist of the springs is avoided. I do not, however, wish to be understood as limiting myself to the employment of a two-part spring, either upon  
95 the axles or between the bolsters and the vehicle body, for it is obvious, as herein shown, that springs of continuous length may be used as well, if preferred. Neither do I limit myself to a spring composed of several leaves.

It is obvious, also, that a spring of continu-  
100 ous length may be carried on each or either axle and two-part springs be employed between the bolsters, or side bars, and the vehicle body.

The spring supporting brackets C or C' may  
105 be formed separately from each other, or each pair may be formed in one piece having their lower arms *c* connected as shown in Fig. 4; and the said brackets may be secured to the axles in any suitable manner or may be formed  
110 integral therewith.

The arrangement of the several parts of the running gear is such as will give great flexi-  
115 bility to the body and enable it to be placed low and extend over the axles. Both axles being cranked alike, and both provided with spring supporting brackets of the character described, it will be seen that the weight of the load is thrown near the spindles on the front axle, the same as on the rear one, and,  
120 therefore, the front axle need not be heavier than the rear, as in many other vehicles of this class.

Having described my invention, what I  
claim is—

1. In a vehicle running gear, the combina-  
125 tion of the front and rear cranked axles having spring supporting brackets on their cranked portions, the axle-springs connected to said brackets, bolsters mounted on said axle-  
130 springs and supporting the side bars at an elevation that will permit the vehicle body to



swing between them and extend over both axles, and springs that support said body from the side bars and adapted to allow it to have a flexibility of movement independent of the side bars and bolsters, substantially as described.

2. In a vehicle running gear, the combination with the front and rear axles, cranked alike, and the axle-springs connected with the cranked portions of said axles, of the upturned bolsters mounted on said axle-springs and having their ends elevated, the side bars clipped to the bolster ends at front and rear of the vehicle, the body-springs supported by the side bars, and the vehicle body mounted on said body-springs and extended over both axles and free to swing between the side bars, substantially as described.

3. In a vehicle running gear, the combination with the cranked axles, the side bars, and the bolsters, of the brackets  $C'$  secured to the cranked portions of the axles and provided with the laterally curved arms  $c^3$  deflected to opposite sides of the axle, two-part axle springs secured at their outer ends to said arms and at their inner ends extended past one another and secured to the bolsters that support the side bars, and other springs for supporting the vehicle body from the side bars, substantially as described.

4. In a vehicle running gear, the combination with the cranked axles, the side bars, and the axle-springs connected to the cranked portions of the axles, of the bolsters mounted on the axle-springs and having their ends bent upward and backward to connect with the side bars, and springs for supporting the vehicle body from the side bars, substantially as described.

5. In a vehicle running gear, the combination with the front cranked axle, and an axle

spring secured at its outer ends to the cranked portions of said axle, of the pivotal bolster  $E$  mounted on the axle spring and at its opposite ends bent upward and backward, the wear plates  $e' e^2$ , and ribs  $g$  formed on the under side of the bolster and terminating in tongues  $g'$  engaging the under side of the lower wear plates, substantially as described.

6. In a vehicle running gear the combination with a cranked axle, and the side bars, of brackets secured to the cranked portions of the axle, two-part springs secured at their outer ends to said brackets and at their inner ends extended past one another and secured to a bolster plate, a bolster secured to said plate and at its opposite ends bent upward and rearward, clips securing the side bars to the ends of the bolster, and springs secured to said side bars and to bed plates on the vehicle body, substantially as described.

7. In a vehicle running gear, the combination of the cranked axles having spring supporting brackets on their cranked portions, the axle-springs having their outer ends connected to said brackets, the bolsters mounted on the axle-springs and having their ends extended upward and backward, the side bars rigidly clipped to the ends of said bolsters, the vehicle body, and springs that support said body from the side bars and all arranged to give the said body an increased flexibility and permit it to be placed low and extend over the axles, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LOUIS F. ROBARE.

Witnesses:

FRED E. TRUMBULL,  
LOUIS J. FARLAND.