No. 765,955. PATENTED JULY 26, 1904.

W. H. BIRDSALL.

RUNNING GEAR.

APPLICATION FILED MAR. 2, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

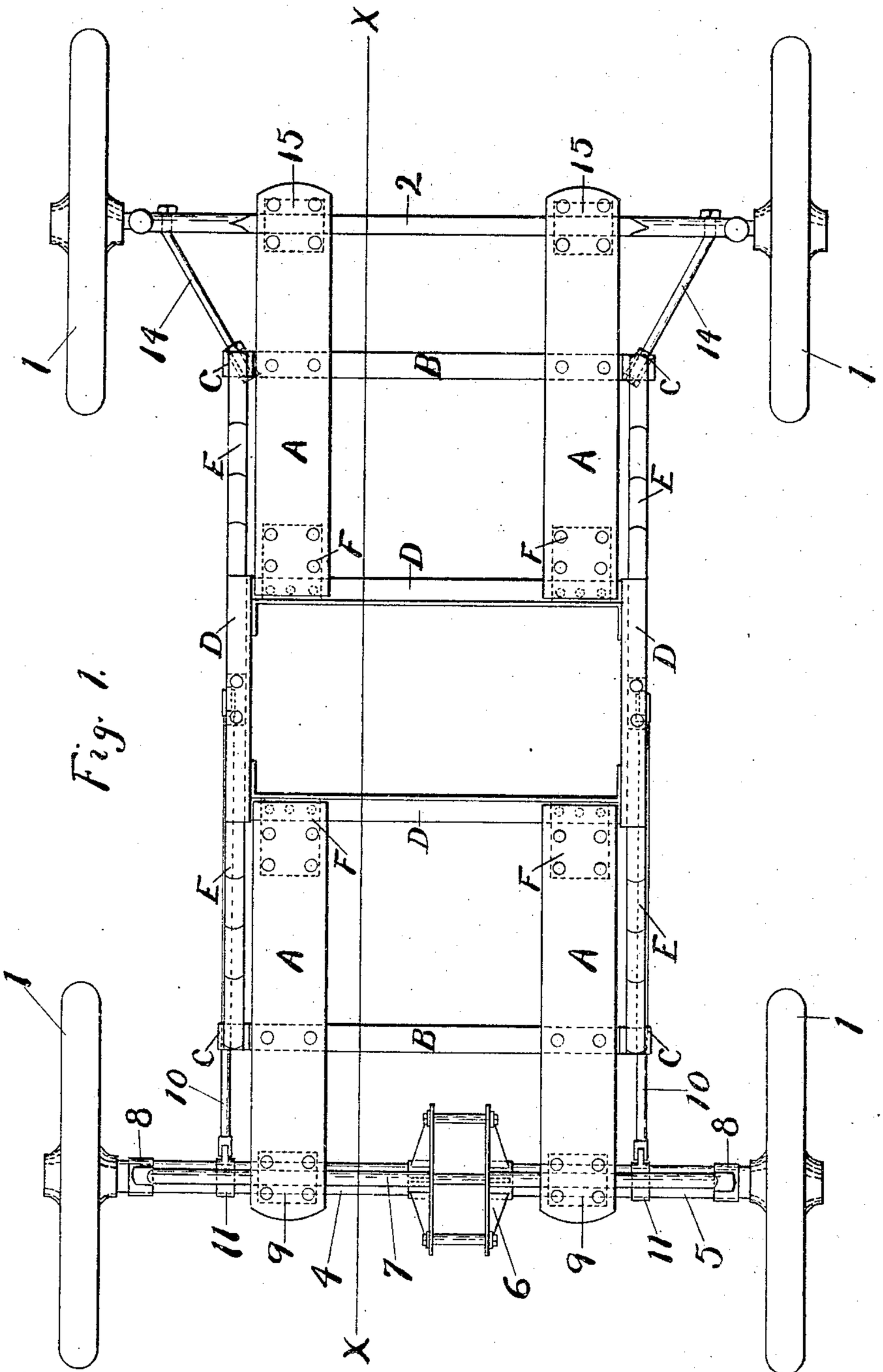

Fig. 1.

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NO MODEL. 3 SHEETS—SHEET 2.

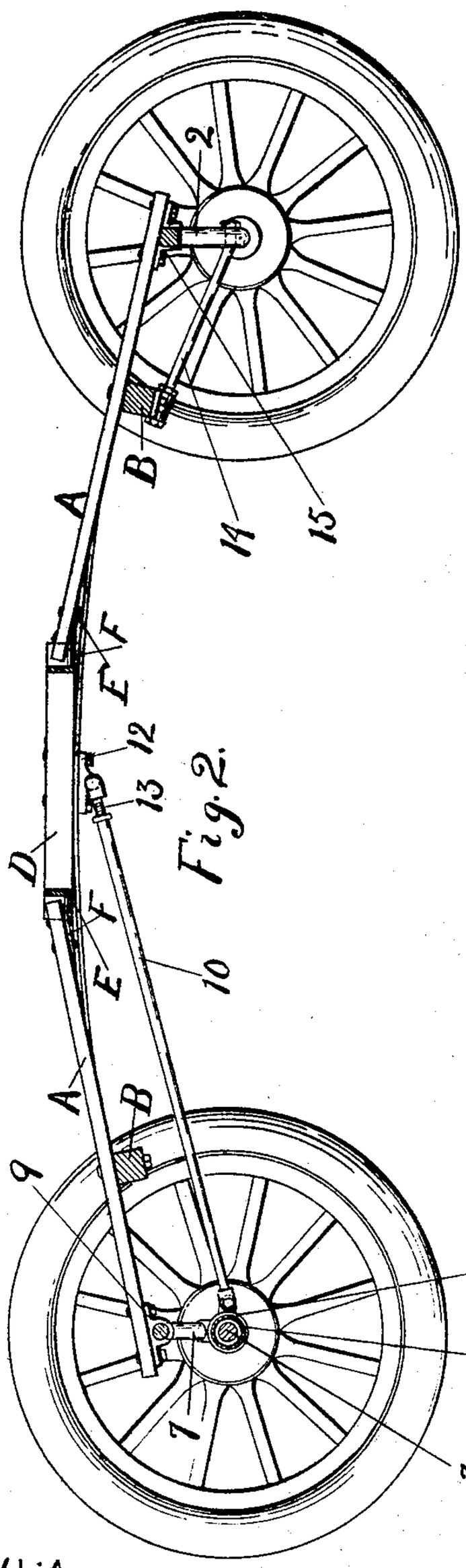

Fig. 2.

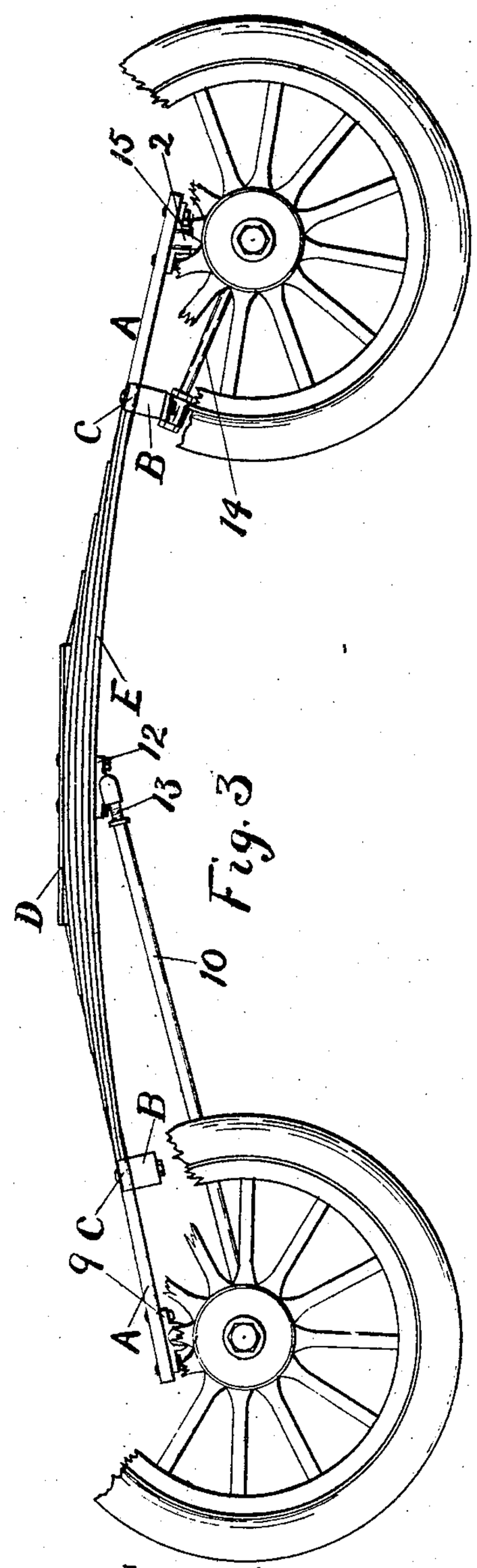

Fig. 3

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NO MODEL. 3 SHEETS—SHEET 3.

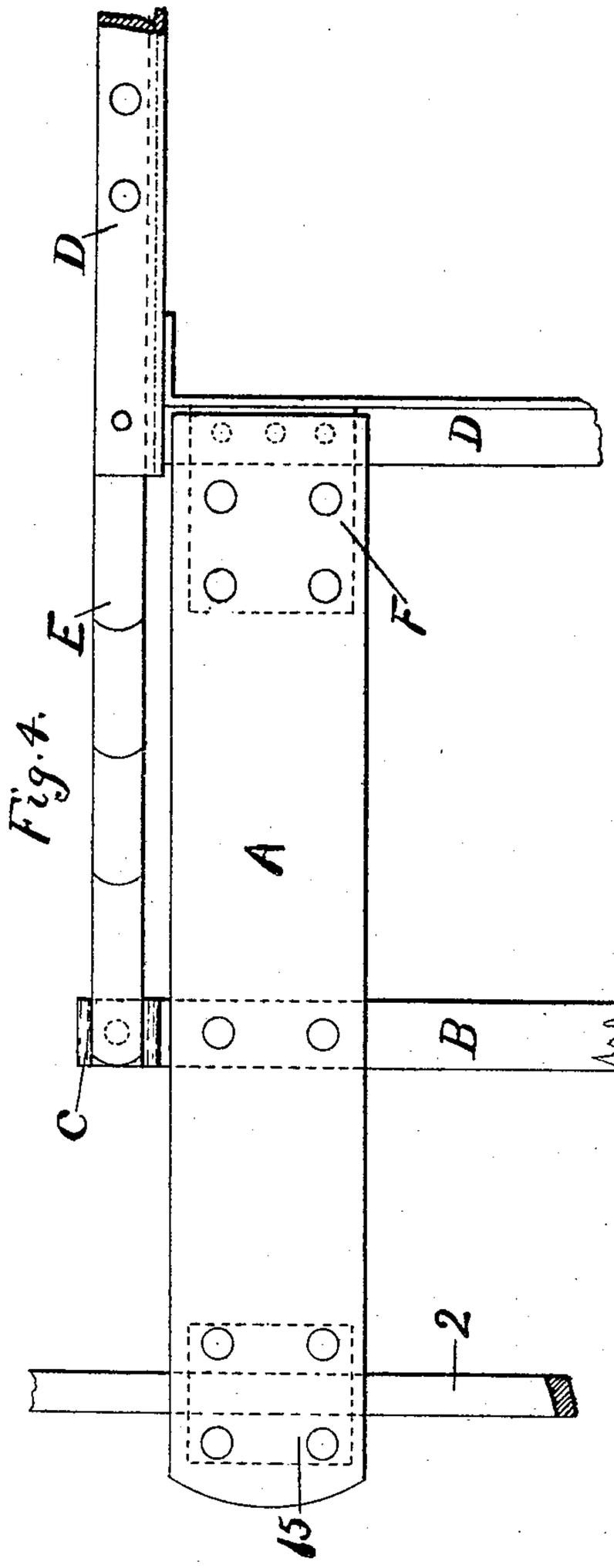

Fig. 4.

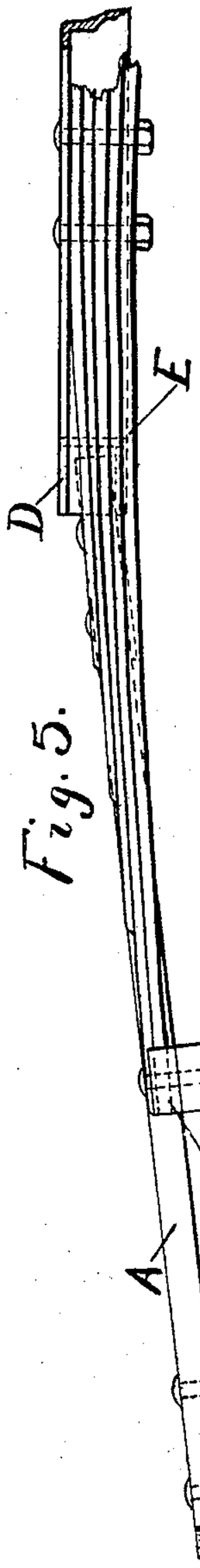

Fig. 5.

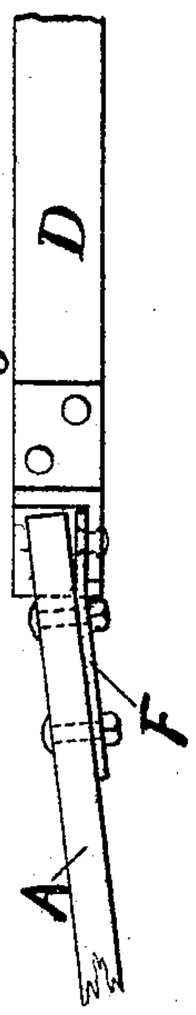

Fig. 6.

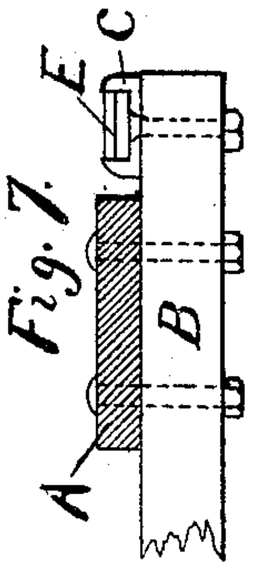

Fig. 7.

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No. 765,955. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM H. BIRDSALL, OF UTICA, NEW YORK, ASSIGNOR TO A. VEDDER BROWER, OF UTICA, NEW YORK.

RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 765,955, dated July 26, 1904.

Application filed March 2, 1903. Serial No. 145,623. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BIRDSALL, residing at Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Running-Gear, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in vehicle running-gears; and it consists in the features of construction, combinations of elements, and arrangement of parts as will be hereinafter set forth, and the novel features thereof pointed out in the claims.

In the drawings which illustrate an embodiment of the invention, Figure 1 is a top plan view of the wheels and axles of a vehicle with my improved running-gear attached thereto. Fig. 2 is a longitudinal section on the line X X of Fig. 1 looking in the direction of the arrow. Fig. 3 is a side elevation of the parts shown in Fig. 1 with portions of the wheels broken away. Fig. 4 is a detail in top plan on an enlarged scale. Fig. 5 is a side elevation of the parts shown in Fig. 4. Figs. 6 and 7 are details showing the manner of connecting various parts.

Similar reference characters refer to similar parts throughout the several views.

The running-gear as illustrated is especially designed for supporting the body, motor, and auxiliary parts of a motor-vehicle, and it will be described with that end in view, although it obviously is not limited thereto.

The wheels 1 are carried by a front axle 2 and a rear axle 3. The front axle is arched upwardly between its ends and is made rectangular throughout a portion of its central length. The rear axle is divided and the parts thereof inclosed by sleeves 4 and 5, a gear-frame 6 being interposed between said sleeves. This frame 6 carries the usual gears by which power is transmitted from the motor to the respective driving-wheels, and it is here illustrated in outline only. An arched supporting-bar 7 is secured at its ends to short sleeves 8, carried by the sleeves 4 and 5, respectively.

The primary supporting members of the running-gear comprise strips or boards A, which are of flexible material, preferably highly-seasoned wood, which may combine the qualities of flexibility and strength needed in a running-gear of this sort. For convenience of description these supporting members throughout the specification and claims will be termed "spring-boards," although it is not intended to use such term in a limiting sense. In the present instance and in the preferable construction there are two of these spring-boards at each end of the frame, the two spring-boards on each side of the vehicle constituting a pair, in that their ends extend inwardly toward each other, although they do not meet. The spring-boards at the front end of the frame are connected by clips 15 to the squared central portion of the arch of the front axle, while the spring-boards at the rear end are connected by clips 9 to the arched supporting-bar 7.

A second and in one sense a primary supporting member of the frame, in that it is adapted to carry the body, the motor, and other auxiliary parts, is constituted by a frame D, constructed of side and cross members, preferably rigidly secured together and preferably constructed, as shown, of angle-iron, although any other approved material and form of these frame members may be used. Upon the horizontal webs of the cross-pieces of this angle-iron frame are secured the ends of short leaf-springs F, to which the ends of the spring-boards A are bolted, as shown in Fig. 6, or otherwise secured. The side pieces of this frame are supported upon longitudinally-extending semi-elliptic or leaf springs E, to which they are suitably secured, preferably by bolts, which pass through the horizontally-extending web of the frame and the springs upon which said web rests, as shown in Fig. 5. The semi-elliptic springs constitute an elastic or resilient element of the spring system, and the ends of the semi-elliptic springs

on each side of the vehicle are supported upon the ends of cross-bars B, which cross-bars are secured to the spring-boards A intermediate the ends thereof, as shown in Fig. 1. At the ends of these cross-bars there are provided guides C, in which the ends of the semi-elliptic springs are loosely mounted to allow for the change of span of the springs occasioned by the load carried thereby and the shocks to which the running-gear is subjected in use. This construction of spring-base is such that a minimum amount of shock is transmitted from the wheels to the body and other parts supported by the running-gear, and such shock as is transmitted is distributed evenly among the various parts, preventing undue strain upon any one part and also preventing the disagreeable consequences attendant upon the abrupt motions of the vehicle-body caused by the sudden transmission of a shock or jolt to or through a single one or more of the parts of the running-gear. This construction of spring-gearing is also advantageous in that it allows, to a certain extent, for an independent raising and lowering of one of the wheels without affecting the other wheels and likewise affecting unduly the vehicle-body.

Under certain circumstances it is desirable, although not necessary, to provide tension members connecting various parts of the spring-gearing to the axles. These members must be of such character as to permit movements of the spring-frame and yet at the same time act as tension or compression members, or both. To this end rods 10 (best shown in Figs. 1 and 2) are secured at their outer ends to lugs projecting from short sleeves 11, which are mounted upon the sleeves 4 and 5. The inner ends of these rods are connected to blocks 12, which are secured to the lower sides of the semi-elliptic springs E, preferably by means of the same bolts by which the frame D are secured to said semi-elliptic springs. These rods are preferably made adjustable by making the connection between the block and the main portion of the rod a threaded one, as shown at 13. The running-gear may be further steadied by means of rods 14, extending from the lower sides of the front cross-pieces B to the front axle, as shown in Fig. 2. I thus provide a construction in which the motor and auxiliary parts may be rigidly supported on an angle-iron frame, to which also the body of the vehicle may be bolted, the said frame being supported on an elongated spring-base consisting of leaf-springs, the ends of which are supported from the axles by means of the spring-boards, the general spring system, stability, and ease of riding being further aided by a direct connection between the spring-boards and the angle-iron frame. This provides a very flexible running-gear and one in which the alinement of the machinery mounted on the frame is not affected by the position of the wheels. The theory underlying spring-gearings of this character is the transforming of vertical vibrations into horizontal or longitudinal vibrations, and vice versa. Along this line an important advantage of the construction described resides in the fact that the supports of the running-gear are pivotally mounted in a plane above the line of wheel-centers. This secures a maximum lengthening or shortening of the wheel base or distance between the axles when the body is subjected to vertical oscillation and a corresponding increase in ease of riding. Undue lengthening or shortening of the wheel-base may be avoided by increasing the tension of the springs through the adjustable tension-rods.

Further objects and advantages of the construction described as providing an efficient spring-support for the various parts of a vehicle which are to be carried by the running-gear will be obvious. It will also be obvious that various changes may be made in detail without departing from the spirit of my invention.

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

1. In a vehicle running-gear, in combination with the wheels and the front and rear axles, spring-boards connected to the front and rear axles respectively, and extending inwardly from the axles, resilient members connecting said spring-boards, and a supporting-frame carried by said resilient members, the inner ends of said spring-boards being elastically supported from said frame.

2. In a vehicle running-gear, in combination with the wheels and the front and rear axles, a main supporting-frame adapted to carry the body of the vehicle, spring-boards having their outer ends connected to the front axle and extending toward the center of the wheel-base, their ends being elastically connected to said frame, corresponding spring-boards attached at their outer ends to the rear axle and elastically connected at their inner ends to said frame, a cross-bar connecting said front spring-boards intermediate their ends, and a similar cross-bar for the rear spring-boards, longitudinally-extending spring members connecting the ends of said cross-bars on each side of the vehicle, and connections between said spring members and the main supporting-frame.

3. In a vehicle running-gear, in combination with the wheels and the front and rear axles, a spring-board supported at one end upon the front axle and extending toward the rear axle, a corresponding spring-board supported at one end upon the rear axle and extending toward the opposing end of the front spring-board, a rigid frame to which the inner ends of said spring-boards are connected, and spring

members adapted to support said frame, said spring members being themselves supported from said spring-boards.

4. In a vehicle running-gear, in combination with the wheels and the front and rear axles, the spring-boards having their outer ends connected to the axles and extending inwardly toward each other, a spring-supported frame, the spring members of which are adapted to be carried by said spring-boards, and adjustable tension-rods extending from said spring members to one of the axles.

5. In a vehicle running-gear, in combination with the wheels and the front and rear axles, the spring-boards connected to said front and rear axles respectively and extending inwardly toward each other, the front and rear cross-bars connecting said spring-boards at each end of the vehicle, the longitudinally-extending springs connecting said cross-bars on each side of the vehicle, and the main supporting-frame carried by said longitudinal springs, the ends of said spring-boards being elastically connected to said main frame.

6. In a vehicle running-gear, in combination with the wheels and axles, spring-boards supported at their outer ends upon the front and rear axles respectively and having their inner ends extended toward the center of the vehicle, longitudinally-extending supporting-springs adapted to carry the body of the vehicle supported at their ends from said spring-boards, and a connection between the inner ends of opposing spring-boards, such that they coöperate in the general spring system of the running-gear, and yet are capable of limited independent movements.

7. In a vehicle running-gear, in combination with the wheels and axles, spring-boards supported at their outer ends upon the front and rear axles respectively, and having their inner ends extending toward the center of the vehicle, means for connecting the inner ends of the opposing spring-boards, such that they are allowed a limited amount of independent movement, and means for supporting the vehicle-body upon said spring-boards.

8. In a vehicle running-gear, in combination with the wheels and axles, spring-boards supported at their outer ends upon the front and rear axles respectively, and having their inner ends extending toward the center of the vehicle, means for connecting the inner ends of the opposing spring-boards, such that they are allowed a limited amount of independent movement, and means for elastically supporting the vehicle-body upon said spring-boards.

9. In a vehicle running-gear, in combination with the wheels and the front and rear axles, the spring-boards connected to the axles, and having their inner ends connected so as to be capable of limited independent movements, and members adapted to carry the vehicle-body, said members connecting the opposing spring-boards at opposite ends of the running-gear.

10. In a vehicle running-gear, in combination with the wheels and the front and rear axles, the spring-boards connected to the axles, and having their inner ends connected so as to be capable of limited independent movements, and spring members adapted to carry the vehicle-body, said members connecting the opposing spring-boards at opposite ends of the running-gear.

11. In a vehicle running-gear, in combination with the wheels and the front and rear axles, spring-boards having their outer ends connected to the axles and extending inwardly toward each other and a spring-supported frame, the spring members of which are adapted to be carried by said spring-boards.

12. In a vehicle running-gear, in combination with the wheels and front and rear axles, a spring-board connected to the front axle and extending rearwardly toward but not to the rear axle, a corresponding spring-board connected to the rear axle and extending toward but not to the front axle, means comprising rigid angle-iron members for connecting the inner ends of said spring-boards and means for supporting a vehicle-body thereon, the ends of each of said spring-boards being supported upon one of the flanges of one of said angle-iron members.

13. In a vehicle running-gear, in combination with the front and rear axles, a plurality of spring-boards connected to the front axle and extending rearwardly but not to the rear axle, a plurality of corresponding spring-boards connected to the rear axle and extending toward but not to the front axle, means comprising rigid angle-iron members for connecting the inner ends of said spring-boards and means for supporting a vehicle-body thereon, the ends of said boards lying parallel to and being secured between the flanges of said angle-iron members.

14. In a vehicle running-gear, in combination with the wheels and axles, spring-boards supported at their outer ends upon the front and rear axles respectively, and having their inner ends extending toward the center of the vehicle, and a rigid angle-iron frame upon the flanges of which are mounted the inner ends of said spring-boards.

15. In a vehicle running-gear, in combination with the wheels and axles, spring-boards supported at their outer ends upon the front and rear axles respectively, and having their inner ends extending toward the center of the vehicle, means for connecting the inner ends of the opposing spring-boards and means for elastically supporting the vehicle-body upon said spring-boards.

16. In combination, two axles, a flanged

body-supporting member, and separate spring-boards extending from the flanges of the front and rear portions of said supporting member to the front and rear axles respectively.

17. In combination, two axles, a body-supporting member, and separate spring-boards resiliently connected to the front and rear portions of said body-supporting member and extending therefrom to the front and rear axles respectively.

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

WILLIAM H. BIRDSALL.

Witnesses:
R. R. MARTIN,
H. J. COOKINHAM.