A. F. BATCHELDER.

LOCOMOTIVE.

APPLICATION FILED DEC. 30, 1911.

1,026,552.

Patented May 14, 1912.

2 SHEETS—SHEET 1.

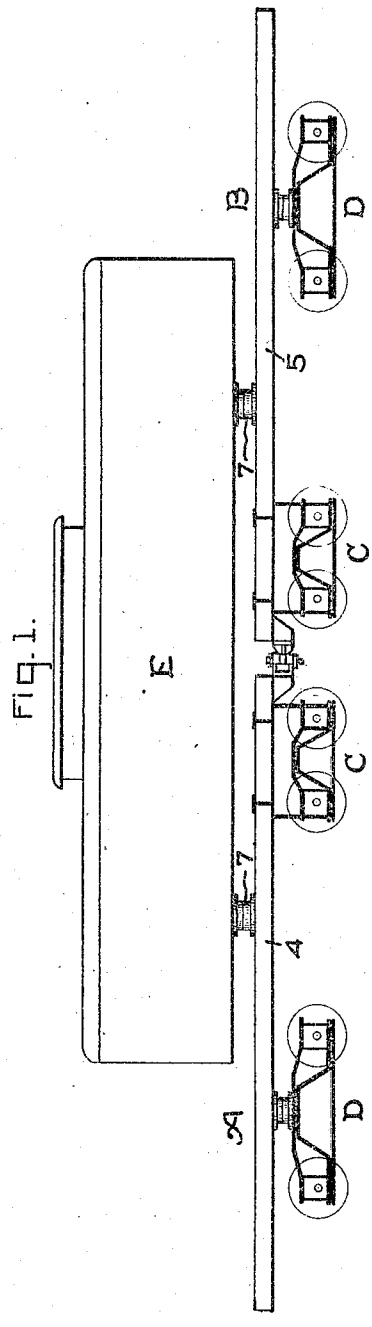

Fig. 1.

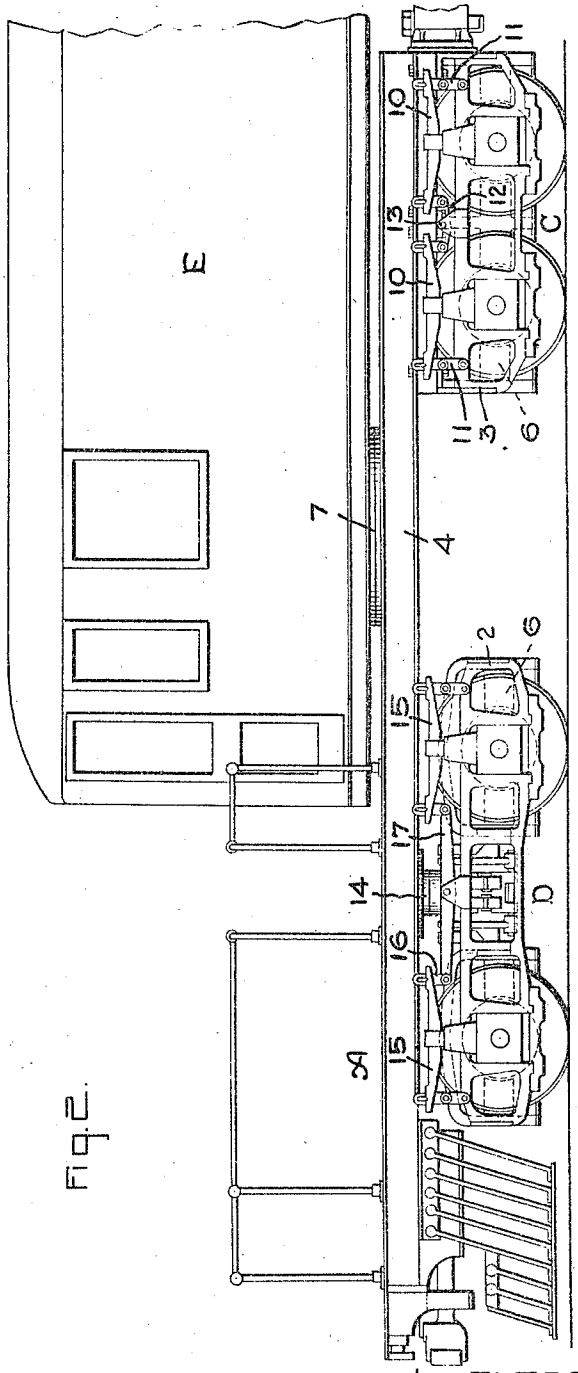

Fig. 2.

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2 SHEETS-SHEET 2.

Fig. 3.

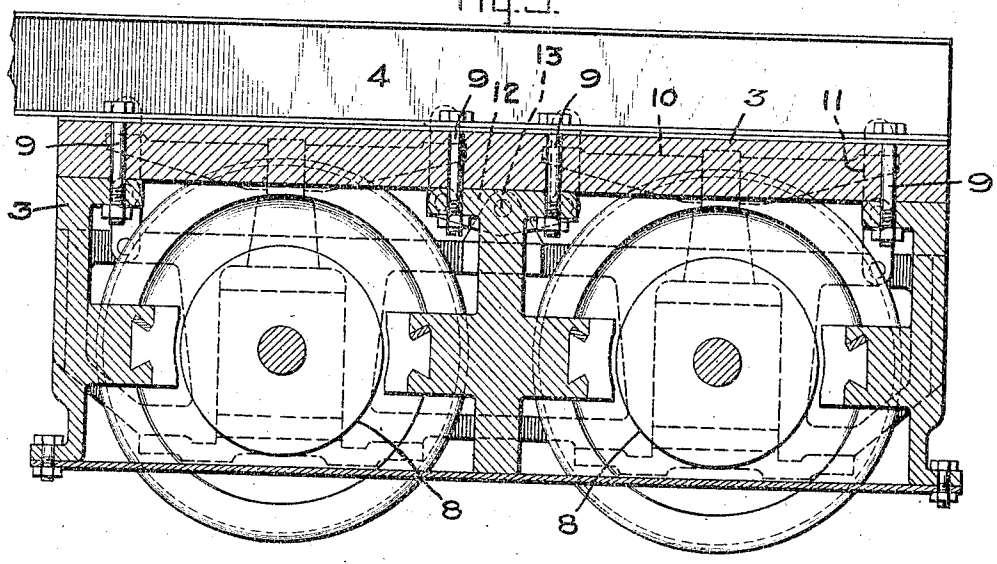
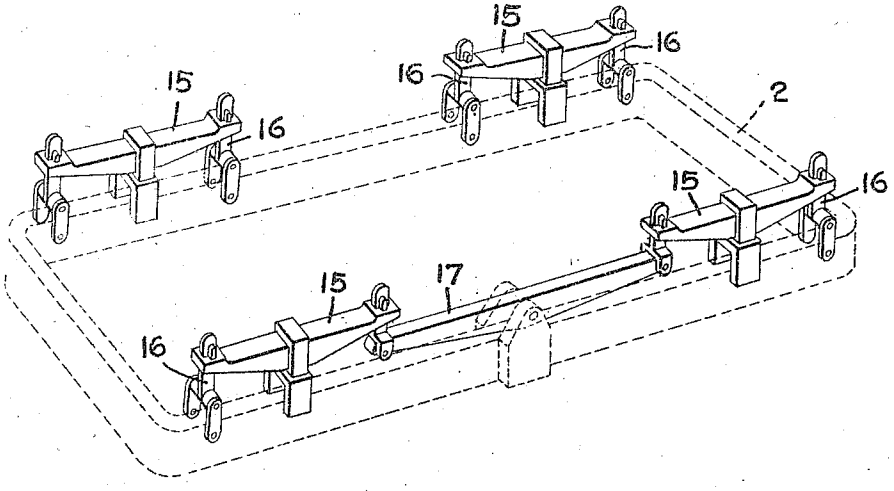


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE.

1,026,552. Specification of Letters Patent. Patented May 14, 1912.

Application filed December 30, 1911. Serial No. 668,770.

To all whom it may concern:

Be it known that I, ASA F. BATCHELDER, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

My invention relates to locomotives, and is particularly applicable to electric locomotives.

Heretofore in building locomotives which operate at high speeds and give high tractive effort, it has been found necessary to employ special friction devices and springs to absorb the blows which the trucks tend to deliver to the track by the lateral motion of the locomotive.

My invention has for its object, a novel construction of locomotive, in which the guiding of the locomotive is divided in such a way as to minimize any tendency to lateral swinging of the locomotive or the building up of any movement which tends to increase in magnitude with each lateral movement and thus to deliver blows to the track, and in which the wheel base is so flexible that it will easily operate around sharp curves. To this end, I build the running gear of the locomotive in two independent sections on which a single cab is mounted through two pivotal connections, and I provide each of the two sections of the running gear with trucks so arranged that the running gear will have an unsymmetrical truck arrangement. This lack of symmetry is obtained by securing the truck on that end of each section, which is under the middle of the cab, rigidly to the section frame and supporting the other end of each section frame by a pivotal connection to the truck on that end. The two running gear sections may be connected together only by the pivotal connections between the cab and the frame sections, but I prefer to employ also a connection between the adjacent ends of the section frames and in the preferred construction this connection is in the form of an articulated joint which prevents any lateral movement between these ends while still permitting the sections to move with respect to one another around the articulated joint when the locomotive is going around a curve in the track.

For a better understanding of my invention reference may be had to the following description taken in connection with the accompanying drawings, in which—

Figure 1 is a skeleton view of a locomotive embodying my invention; Fig. 2 is a side elevation of one half of the locomotive shown in Fig. 1; Fig. 3 is a section through one of the trucks rigidly fastened to one of the section frames, and Fig. 4 is a perspective view of the system of spring suspension of one of the trucks pivotally connected to the section frames.

Referring to the drawings, each of the two running gear sections A and B of my locomotive has mounted thereon two trucks C and D, the axles of which are mounted for limited vertical movement in truck frames 2 and 3. The journal boxes for these axles and the manner in which they are mounted in the truck frames may be of any well known style and form no part of my invention. The truck frames C are rigidly connected to frames 4 and 5 of the sections A and B, and the truck frames of the trucks D are pivotally connected to the section frames 4 and 5, the rigidly mounted truck frames being nearest the middle of the locomotive, and the pivoted or swivel trucks being near the ends of the locomotive. This unsymmetrical truck arrangement of each running gear section permits the locomotive to operate in either direction and minimizes any tendency to lateral vibrations of the section frames by reason of the fact that the rigid connection of one of the trucks to the section frame acts as a drag to resist any vibration that may be set up by the lateral movement of the leading truck due to irregularities in the track. The single cab E is mounted through two pivotal connections or center pins 7 on the two running gear sections, each of which is preferably substantially half way between the two trucks on that section. With this arrangement the cab rides very steadily because each of its points of support receives only one half of the lateral or vertical motion of each truck. As stated above, the running gear sections may be connected together only by these pivotal connections 7, but I prefer to employ also a connection between the adjacent ends of the section frame and in the preferred construction this connection is in the form of an articulated joint which pre-

vents relative lateral movement between the two sections.

I preferably provide each truck with motive power, and, in the particular locomotive shown, in which each truck has two pairs of wheels, I provide each axle with an electric motor 6. Each axle is therefore a driving axle and consequently the required weight for traction is equally distributed and the weight per axle is much less than is usually required in locomotives of heavy tractive power. This reduces to a minimum the damage to the track, due to the vertical or lateral movement of the trucks.

When the two section frames are connected together by an articulated joint it is necessary that one of the two center pins 7 shall also permit of some longitudinal sliding motion as well as pivotal motion. This is accomplished in one of several well known ways, as, for instance, by providing a long slot in the lower portion of the center pin, in which a projection from the upper portion of the center pin moves. The center pins 7 are of sufficient width to prevent the cab from tipping over, but are not wide enough to prevent the trucks from having a reasonable amount of tipping motion. These center pins 7 are mounted on each section frame substantially half way between the two trucks thereon. Within the cab are the control apparatus, air compressor, etc. In the particular locomotive shown the draw-bars are mounted upon the section frames.

In both of the trucks I have shown the electric motors as being of the bipolar type in which the armature 8 surrounds the axles, the field structure of each motor being built into and forming a part of the truck frame. Referring particularly to Fig. 3 in which is shown a cross section of one of the rigid trucks, the truck frame 3 is fastened to the section frame 4 by means of bolts 9. The truck frame is supported upon its four journal boxes by springs 10, links 11, and equalizing levers 12. With this arrangement each side of the truck is, in effect, supported jointly upon the two journal boxes on that side at a point 13. This truck is therefore, equalized so as to have an axis crosswise and between the two axles through a line joining the points 13. In this way the spring borne portion of the truck is held in stable equilibrium crosswise of the locomotive, but in unstable equilibrium lengthwise of the locomotive. The other end of the section frames is carried on a center plate 14 through which the trucks D are pivotally connected to the section frames. This center plate is practically equivalent to a point, and thus each section of the locomotive has a three-point suspension which is believed to be the proper method of equally distributing the weight. The frames 2 of each of the swivel trucks D are supported on their journal boxes through springs 15, links 16 and one equalizing lever 17 as clearly shown in Fig. 4. With this arrangement the frames of the trucks D are in effect supported at three points, two points being over the journal boxes of the axles on one side of the truck, and the other point being substantially half way between the axles on the other side of the truck. With this arrangement the frames of the trucks D have a three point suspension or equalization, and are therefore, in stable equilibrium. From this it will be seen that each section frame has a three point equalization and that the forward and rearward trucks of the locomotive also have a three point equalization, and consequently the whole locomotive is practically completely equalized.

I desire it to be understood that my invention is not limited to the particular construction and arrangement of parts shown and described, and I aim in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a locomotive, two running gear sections, each of said sections comprising a section frame and two trucks, said trucks nearest the middle of the locomotive being rigidly attached to said section frames, said trucks near the ends of said locomotive being pivotally connected to said section frames, a cab, and pivotal connection for said cab, one of said connections for said cab being located on each of said frames between the trucks.

2. In a locomotive, two running gear sections, each of said sections comprising a section frame and two trucks, said trucks nearest the middle of the locomotive being rigidly attached to said section frames, said trucks near the ends of said locomotive being pivotally connected to said section frames, means connecting the adjacent ends of said section frames, a cab, and pivotal connections for said cab, one of said connections for said cab being located on each of said section frames between the trucks.

3. In a locomotive, two running gear sections, each of said sections comprising a section frame and two trucks, said trucks nearest the middle of the locomotive being rigidly attached to said section frames, said trucks near the ends of said locomotive being pivotally connected to said section frames, an articulated joint connecting adjacent ends of said section frames, a cab, and pivotal connections for said cab, one of said connections for said cab being located on each of said section frames between the trucks.

4. In an electric locomotive, two running gear sections, each of said sections compris-

ing a section frame and two trucks, electric motive power for driving each truck, said trucks nearest the middle of the locomotive being rigidly attached to said section frames, said trucks near the end of the locomotive being pivotally connected to said section frames, a cab, and pivotal connections for said cab, one of the connections of said cab being located on each of said section frames between the trucks.

In witness whereof, I have hereunto set my hand this 29th day of December, 1911.

ASA F. BATCHELDER.

Witnesses:

BENJAMIN B. HULL,

HELEN ORFORD.