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C. L. HEISLER.

LOCOMOTIVE.

No. 482,828. Patented Sept. 20, 1892.

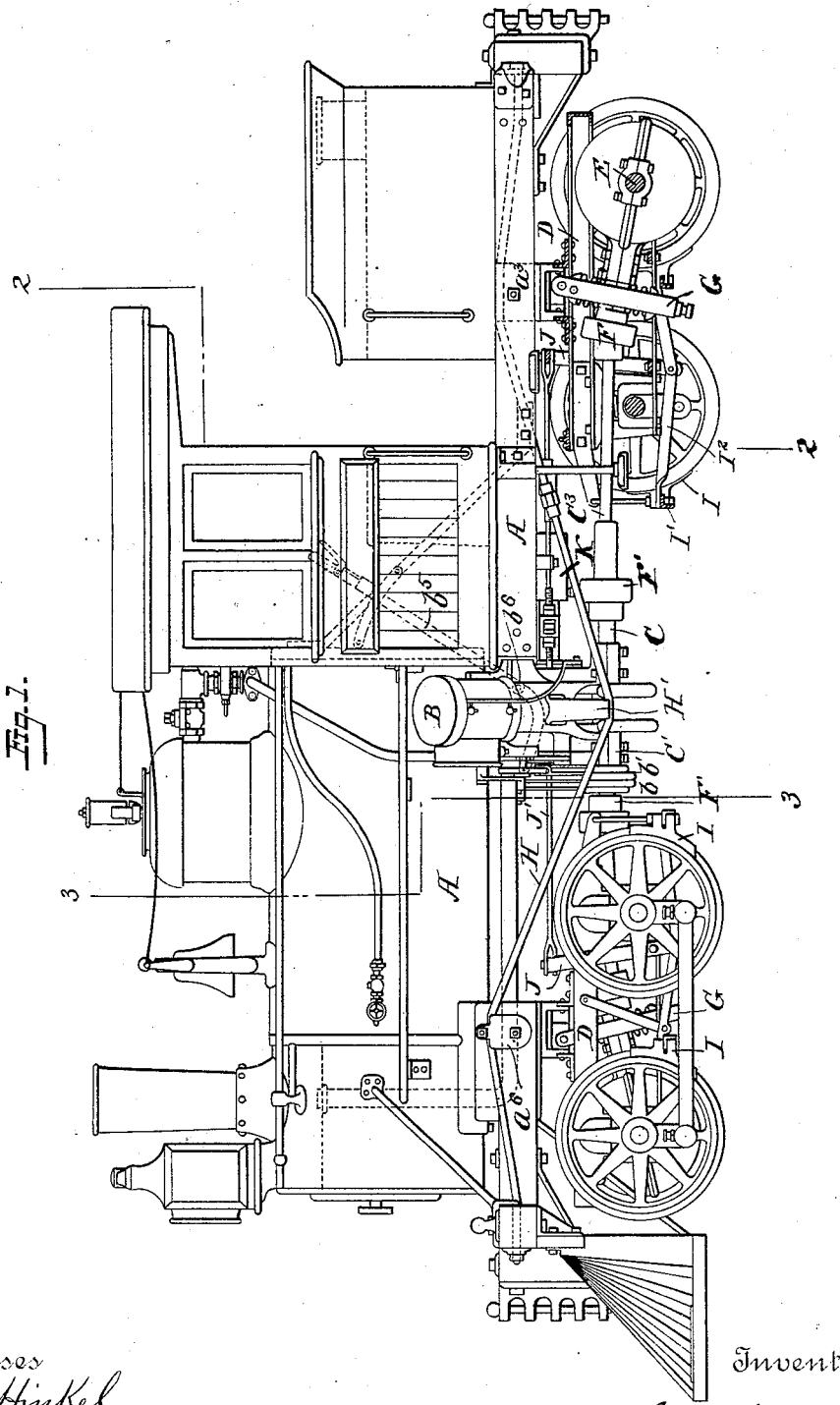

Fig. 1.

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Fig. 2.

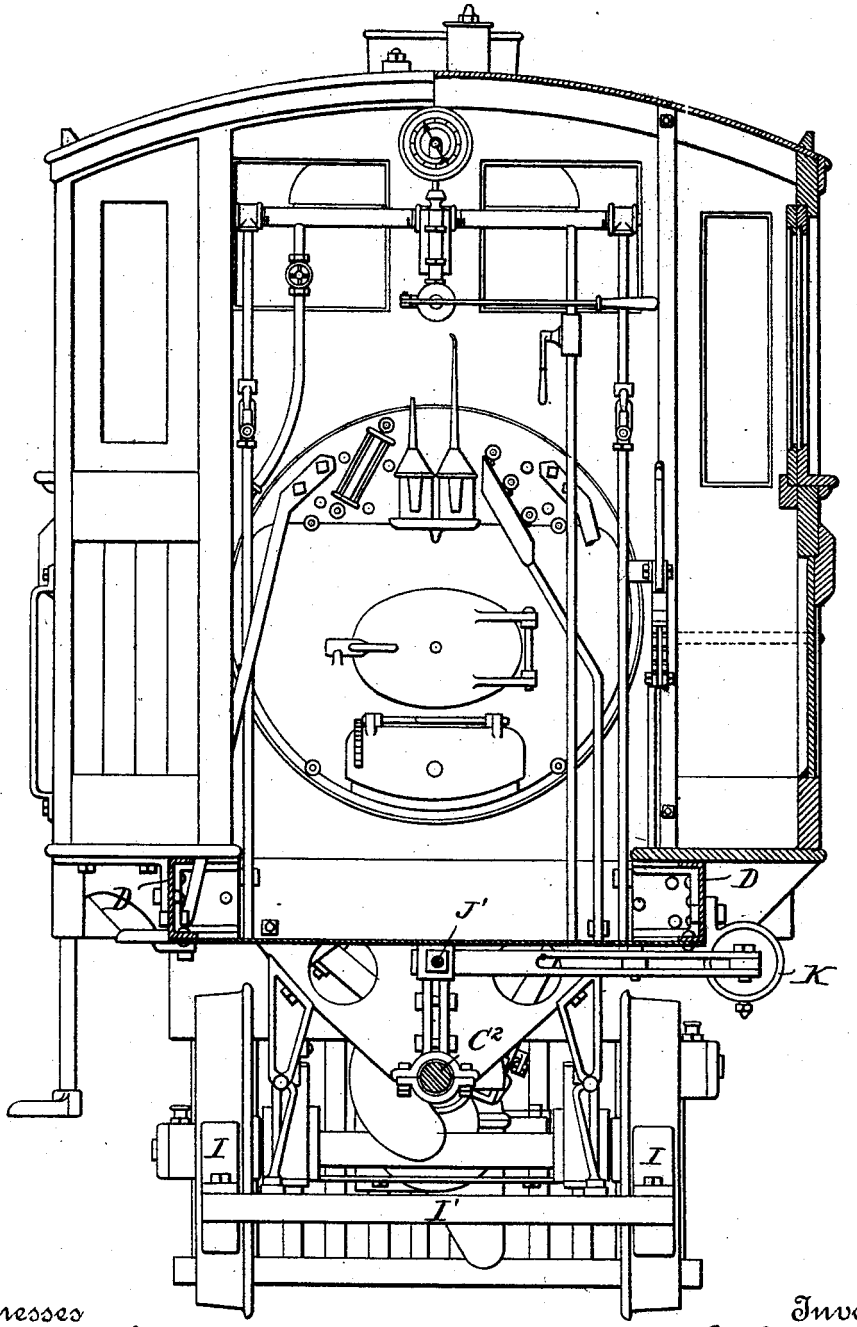

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Fig. 3

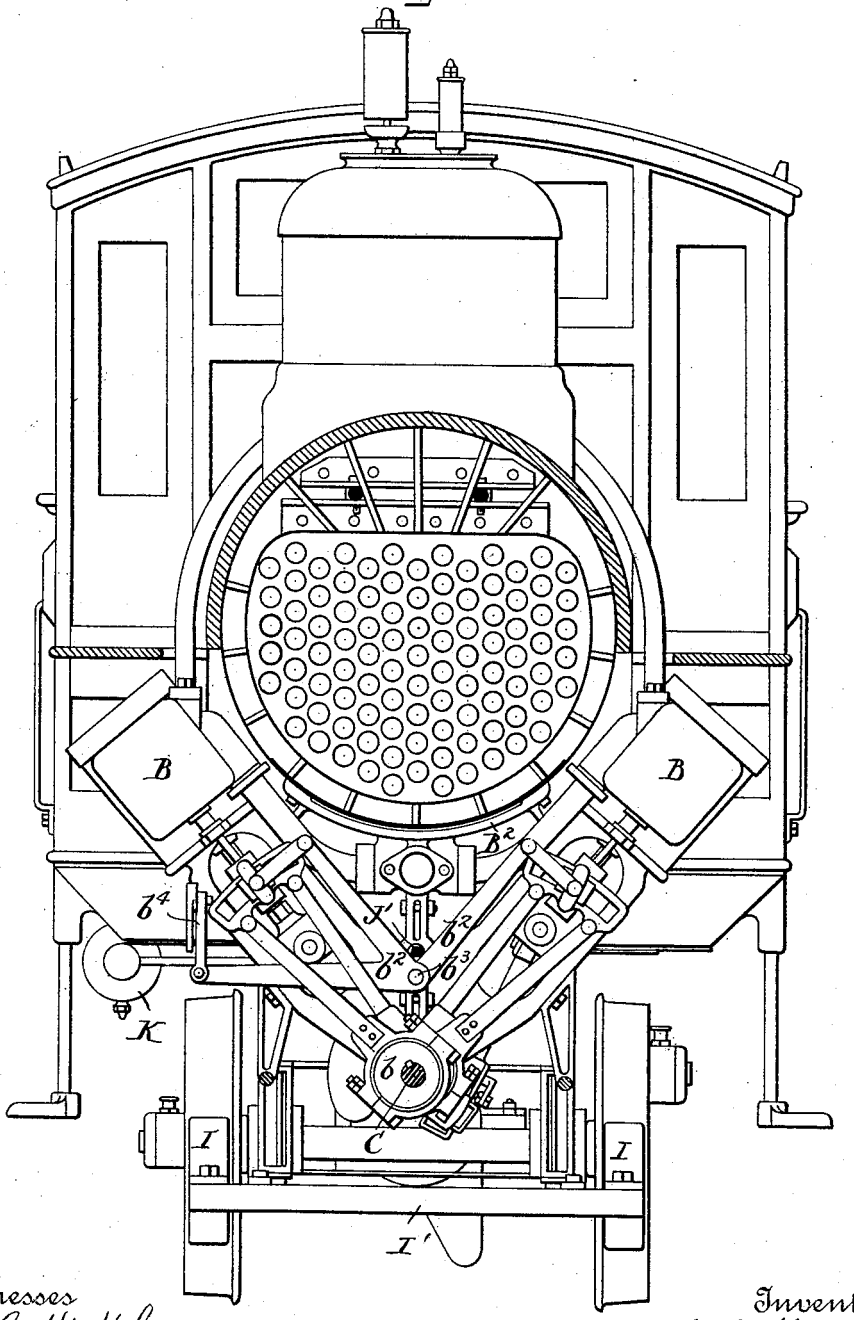

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Fig. 4

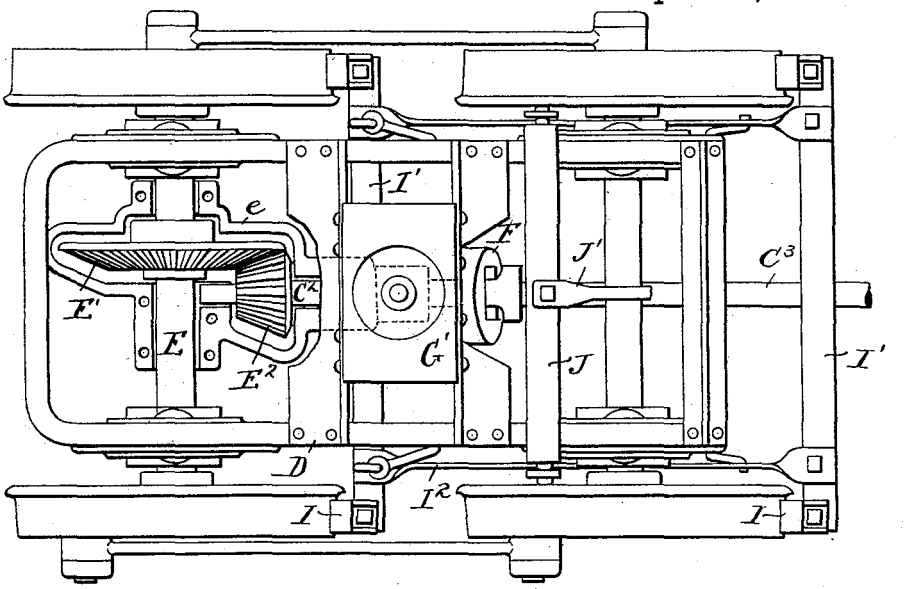

Fig. 5.

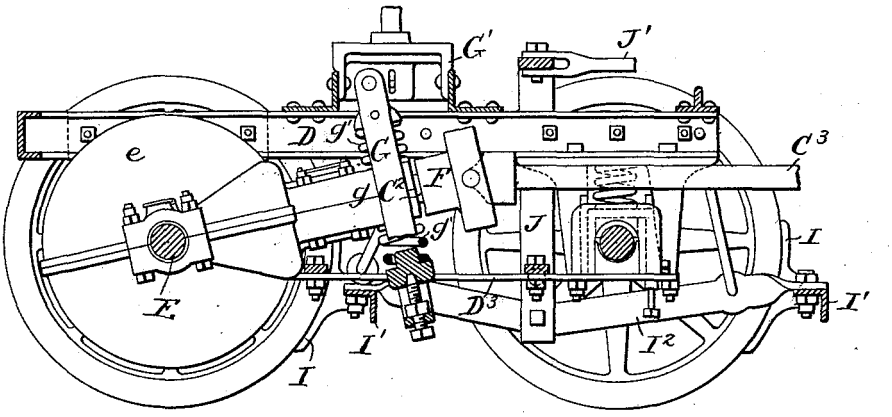

Fig. 6.

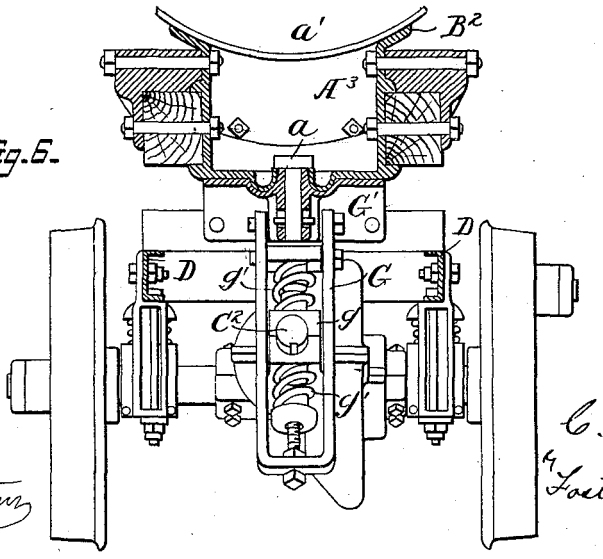

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Fig. 7.

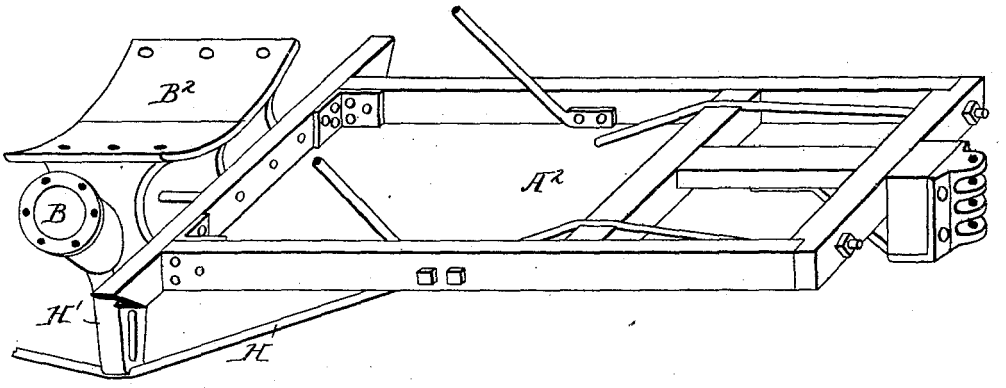
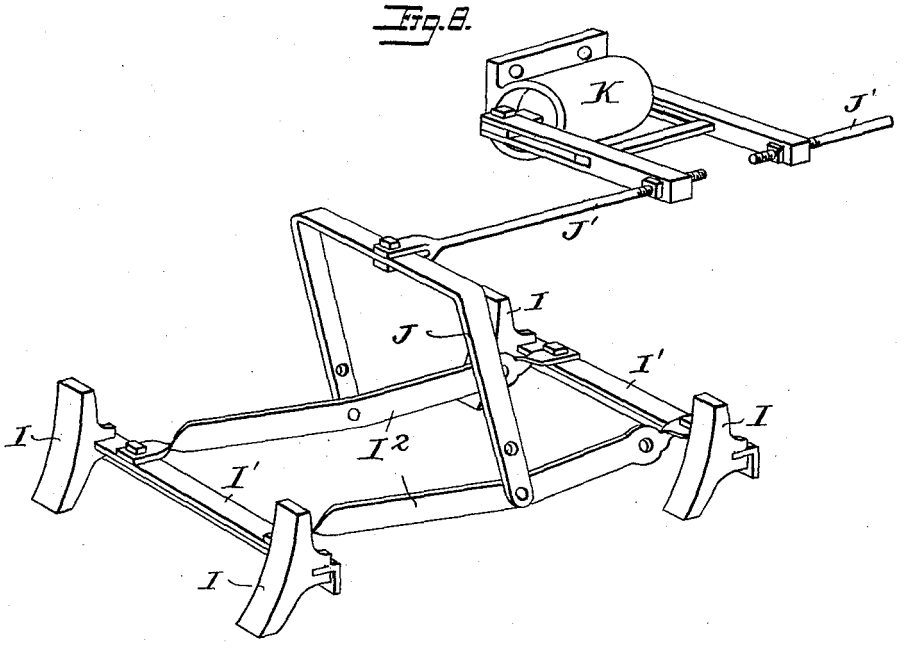


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES L. HEISLER, OF DUNKIRK, NEW YORK.

LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 482,828, dated September 20, 1892.

Application filed May 25, 1891. Serial No. 394,020. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. HEISLER, a citizen of the United States, residing at Dunkirk, Chautauqua county, State of New York, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

My invention relates to locomotive-engines, and while it may be applicable to locomotive-engines for use on railroads generally it is intended more particularly for use in connection with tramways where there are more or less curves and liable to be unevenness in the track and where heavy grades are common.

The object of the invention is to provide an improved construction embodying features which render the locomotive specially applicable in overcoming the ordinary difficulties in this class of work; and my invention consists in the features of construction and arrangement, substantially as more particularly hereinafter pointed out.

Referring to the accompanying drawings, Figure 1 is a side view of a locomotive embodying my invention. Fig. 2 is a vertical cross-section at the rear of the cab, parts being in section on a line slightly forward thereof. Fig. 3 is a vertical cross-section in front of the dome, looking rearward. Fig. 4 is a plan view of one of the trucks and attachments. Fig. 5 is a longitudinal section of the truck. Fig. 6 is a vertical section thereof. Fig. 7 is a perspective view showing the back frame of the locomotive and the engine frame, and Fig. 8 is a perspective view showing the arrangement of the brakes.

The locomotive may be variously constructed, according to the necessities of any particular case, and I have shown herein one embodiment which I have found practicable, and in which—

A is the bed-frame, having a boiler A′ secured thereto and together forming the main frame of a locomotive. The boiler may be of any desired type, but preferably what is commonly known as the "Ramsbottom" boiler, in which the fire-box and ash-pan are both located within the shell.

The driving-engines B B′ are preferably located beneath the boiler and in front of the cab of the locomotive and are supported upon an engine-frame B^2, which is attached to the under side of the boiler and connected to the back frame A^2 of the locomotive, as best seen in Fig. 7. These engines are arranged at an angle with relation to each other, as I find this arrangement the most economical, as far as space is concerned, and well adapted to the other parts of the locomotive, it being understood that both engines operate upon a single central longitudinal propelling-shaft C, arranged at the apex of the angle, and having, preferably a single crank to which the pitmen of both engines are connected. It will thus be seen that the driving-engines are well balanced on the locomotive, occupying a small space, and can exert their force directly upon the shaft. The eccentrics b b' of both engines are located on one side of the crank or end of the crank-shaft, and the tumbling-arm b^2 is located on the fixed pivot b^3 just above the apex of the angle of the engines and is connected by a link b^4 with the lever b^5 in the cab, this lever being pivoted on the engine-frame at b^6, and I am enabled thereby to secure a direct action on the tumbling-arm without interfering in any way with the operation of the other parts of the locomotive and can shift the valve motions of the driving-engines without difficulty. This arrangement I find not only economizes space, but offers numerous mechanical advantages in the way of simplifying the construction and arrangement of the parts, which will all be obvious to those skilled in the art.

The locomotive is provided with two truck-frames D D′, each having two axles carrying wheels mounted in any usual and desired manner, and connected to the truck, as by means of the king-bolt a, is the frame A^3, having the curved support a' for the boiler in one instance and in the other instance having the usual bearing a^3 for the rear portion A^2 of the frame, thus providing the locomotive with pivoted trucks at each end. This is a great desideratum in this class of locomotives, enabling the locomotive to accommodate itself to sharper curves and steeper grades than when the trucks are fixed with relation to the frame, as is often the case.

As this locomotive is intended to be driven by a single longitudinal central shaft C, which is rigidly mounted in bearings C′, connected to the engine-frame B^2, some means must be

provided whereby the power may be transmitted from this rigid shaft to the driving-wheels of the truck and at the same time allow them to turn on their pivots in passing curves. The trucks, it will be seen, are independent of each other, and in order that they may be connected to the driving-shaft I make the axles of each truck farthest from the engine the driving-axles of the locomotive. Thus I have shown, as seen more clearly in Figs. 4 and 5, the axle E as being provided with a bevel gear-wheel E′, secured thereto and having meshing therewith a bevel-pinion E^2, mounted on a shaft C^2, and these bevel-gears are preferably inclosed in a casing *e*.

It will be evident that instead of the bevel-gears I may use an ordinary "skew" bevel or worm gear, the parts being arranged substantially as shown in the drawings. This portion C^2 of the shaft is connected by a knuckle F to the portion C^3 of the shaft, which I have termed the "floating portion," and this in turn is connected by means of a knuckle F′ to the fixed portion C of the shaft. These knuckles permit the trucks to turn on their king-bolts and at the same time allow the power of the engines to be readily transmitted to the drive-wheels from the fixed portion of the shaft through the floating portions and thence to the gears on the axles without danger of cramping or breaking the parts, the knuckles allowing the portions of the sectional shaft to accommodate themselves to the particular angle the driving-axles may assume in passing curves and the like with relation to the longitudinal axis of the locomotive. The shafts C^2 have their bearings in the framework inclosing the bevel-gears and are elastically supported from the truck by some suitable means. Thus I have shown a yoke-piece G, secured to the bolster G′ of the truck having a sliding block *g*, embracing the shaft, and this block is supported upon springs *g′*, provided with adjusting mechanism whereby the tension of the springs can be regulated. This feature of elastically supporting the shaft I find to be of importance in that it not only allows motion of this portion of the shaft to accommodate itself to the turning of the truck in passing curves, but prevents the transmission of jars to the gear-teeth by any sudden reversal of the engine or otherwise. By thus arranging the driving-wheels at the extremities outside of the trucks and mounting the shaft-sections in the manner stated I am enabled to get a much shorter total wheel-base for the locomotive, thus saving the length of the frame and consequent material and cost of construction and also enabling the locomotive to make curves much more easily. It will also be seen that a minimum of telescopic motion is given to the longitudinal shaft connections, and consequently the least possible resistance to the movement of the truck, obviating the tendency on the part of the flanges of the wheels to creep or wear the rails. The knuckles F on the truck being located near the gears and the pivotal center of the truck and the knuckle F′ being arranged on the short fixed portion of the shaft, the floating portion C^3 of the shaft can be relatively very long, thus making the angle of displacement in passing curves and the like exceedingly small, which is an important feature in this class of devices. Further than this, it will be seen that in case of accident or derailment the danger of destroying the knuckles is greatly lessened by this arrangement and location.

Another feature of my invention consists in the arrangement of the truss-rods whereby the parts are rigidly maintained in position. Thus it will be seen that the truss-rod H is connected to the ends of the frame A and passes over the bolster-beam a^3 at one end and over a bearing a^6 and thence downward under a truss-rod H′, which is secured to the frame of the driving-engines, and this truss-rod is provided with the usual tightening device, and it will be seen that it can be adjusted so as to bear directly upon the engines and aid in supporting their weight and maintaining the frame in its normal condition.

Another important feature of my invention consists in the arrangement of the brake devices, and this feature is applicable to other devices, although it is especially applicable to a locomotive embodying the other features of my invention. The brakes-shoes I are preferably arranged to bear upon the inner side of all the wheels, and they are mounted upon the bars I′, and these bars are joined near their ends by the rods I^2. Pivotally mounted upon some portion of the frame of the truck, as the bar or angle-iron D^3, is a U-shaped lever J, the lower end of which are connected to the rods I^2. Centrally connected to the upper portion of the U-shaped lever is the tension-rod J′, and this is connected in the usual manner to the brake-cylinder K, which is in this instance located under the side of the rail of the cab. The tension-rod of the brake-cylinder passes through the engine-frame above the apex of the angle and of the tumbling-frame, as clearly seen in Figs. 2 and 3, out of the way of the other operating parts of the locomotive. The U-shaped lever is also clear from all the driving mechanism of the trucks, and, being located near the center of the trucks, no motion can be transmitted to the brake system, because of the swinging of the trucks when passing a curve, and when motion is transmitted through the medium of the brake-cylinder it is by a direct pull upon the center of the U-shaped levers and this motion is transmitted directly to the brake-shoes. It will be seen that this arrangement furnishes a powerful brake, which can be quickly and readily applied and which does not interfere in any way with the operation of the other parts of the locomotive and is not liable to be accidentally operated under any condition of the trucks.

From the above construction it will be seen that I produce a locomotive having the capability of accommodating itself to the inequalities of the road and of climbing steep grades and passing around curves of exceedingly small radius without danger of accident or a practical lessening of the power of the engine. The floating sections of the driving-shaft, together with the arrangement of the driving mechanism on the extreme axles, are important features in this construction, as before set forth, while the mounting of the driving-engines in the manner described is another important feature. The bed of the locomotive can be made comparatively light and at the same time exceedingly stiff and rigid, and the engine-frame with its saddle fitting the boiler and its body being securely united to the back frame and the addition of the strut to the engine-frame and its direct support by the truss all conduce to the proper and accurate support of the driving-engines. Being arranged at an angle slightly less than ninety degrees, space is economized, they being allowed to hug the sides of the boiler and at the same time they are properly balanced and in a position to exert their power upon the driving-shaft in an economical manner.

While I have described and illustrated what I consider to be the best embodiment of my invention, it will be understood that the details of construction and arrangement can be varied by those skilled in the art without departing from the general principles thereof, and it is further evident that parts of my invention may be used together or separately and in combination with other equivalent parts.

What I claim is—

1. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination, with the boiler, of an engine-frame located, essentially, beneath the boiler and secured thereto, engines mounted thereon and arranged with their center lines at an angle to each other, and the boiler within the angle and passing the plane of the angle with its axis perpendicular to said plane, substantially as described.

2. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination of two engines arranged at an angle to each other and connected to the crank-shaft and having the eccentrics of both engines located at one side of the crank, substantially as described.

3. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination of the engines arranged at an angle to each other and connected to the shaft and tumbling-shaft common to both engines, arranged within the angle formed by the engines, substantially as described.

4. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination, with the engines arranged at an angle to each other and connected to the shaft, of the eccentrics connected to the shaft at one side of the crank and the tumbling-shaft common to both engines, arranged within the angle formed by the engines, substantially as described.

5. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination, with the engines arranged at an angle to each other and connected to the longitudinal centrally-located crank-shaft, of struts secured to the engine-frames and truss-rods bearing on the struts and connected to the frame of the locomotive, substantially as described.

6. In a locomotive mounted upon two pivoted trucks, the combination of the driving-engines for propelling the locomotive, a central driving-shaft which is independent of the inner driving-axles, but geared to the extreme or outside driving-axles, and connections between the outside driving-axles and the inner driving-axles, substantially as described.

7. In a locomotive-engine, the combination, with the main frame supporting the driving-engines, of two pivoted trucks supporting the same, gears connected with the outside axles of the trucks, a shaft-section connected to said gears and mounted on the truck, and connections between said shaft-sections and the driving-engines, substantially as described.

8. In a locomotive-engine, the combination, with the main frame and driving-engines mounted thereon, of the main shaft-section supported thereby, pivoted trucks supporting the engine, gear connections for the outside axles of the truck, a shaft-section mounted on the truck, and a floating shaft-section connecting the fixed section of the shaft with the section on the truck, substantially as described.

9. The combination, with the main frame and driving-engines carried thereby, of a fixed section of the main shaft connected thereto, a pivoted truck having gears connected with the outside axle, a shaft-section mounted on the truck, a floating shaft-section interposed between the fixed shaft-section and the section on the truck, and knuckle-joints connecting the shaft-sections, substantially as described.

10. In a locomotive-engine, the combination, with the pivoted truck, of a section of the driving-shaft mounted on the truck and connected by gearing to the outside axle, and a spring support mounted on the truck for supporting said shaft-section, substantially as described.

11. In a locomotive having a pivoted truck, the combination, with the outside axle, of gears connected thereto, a section of the main driving-shaft connecting said gears, a yoke-

piece connected to the bolster, and spring-supported bearings in said yoke-piece for the shaft-section, substantially as described.

12. In a locomotive, the combination, with the main frame, the driving-engines mounted thereon, and a short fixed section of the main driving-shaft secured thereto, of two trucks pivotally connected to and supporting the frame, gears connected to the outside axles of the trucks, a short shaft-section mounted on each truck and connected to the axle, a relatively-long floating shaft-section between each truck-section and the main fixed section of the shaft, and knuckle-joints connecting the shaft-sections, substantially as described.

13. In a locomotive-engine, the combination, with the truck, of a brake device consisting, essentially, of brake-shoes, rods connecting said brake-shoes, a U-shaped lever connected to said rods, and connections between said U-shaped lever and the brake-cylinder, substantially as described.

14. In a locomotive-engine, the combination, with the main frame, of a driving-engine supported thereon, the pivoted trucks supporting the same, the brake-shoes arranged on the inner sides of the wheel, a U-shaped lever mounted on the truck and connected to the brake-shoes, and a brake-cylinder mounted on the engine and connected to the lever, substantially as described.

15. In a locomotive-engine, the combination, with the main frame, of the driving-engines mounted thereon, a longitudinal driving-shaft, trucks supporting the engine, shaft-sections mounted on the trucks and connected with the extreme axles, a floating shaft-section between the truck and the driving-engine, a brake mechanism mounted on the trucks, each having a U-shaped lever, tension-rods connected to the levers and passing above the apex of the engines, a brake-cylinder located on the frame, and connections between the brake-cylinder and tension-rods, substantially as described.

16. In a locomotive-engine mounted upon trucks and having a centrally-located longitudinal shaft connecting the trucks, the combination of the boiler having a cylindrical shell inclosing the fire-box and ash-pan, located above the longitudinal central shaft and the engines arranged at an angle to each other and connected to the said shaft, substantially as described.

17. In a locomotive-engine having a longitudinal centrally-located shaft, a truck having a substantially U-shaped brake-lever, the lower ends of which are connected to the brake device, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES L. HEISLER.

Witnesses:

ELTON D. WARNER,

J. K. PATTERSON, Jr.