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.