(No Model.) 3 Sheets—Sheet 1.

F. W. WEBB.

AXLE BOX.

No. 265,724. Patented Oct. 10, 1882.

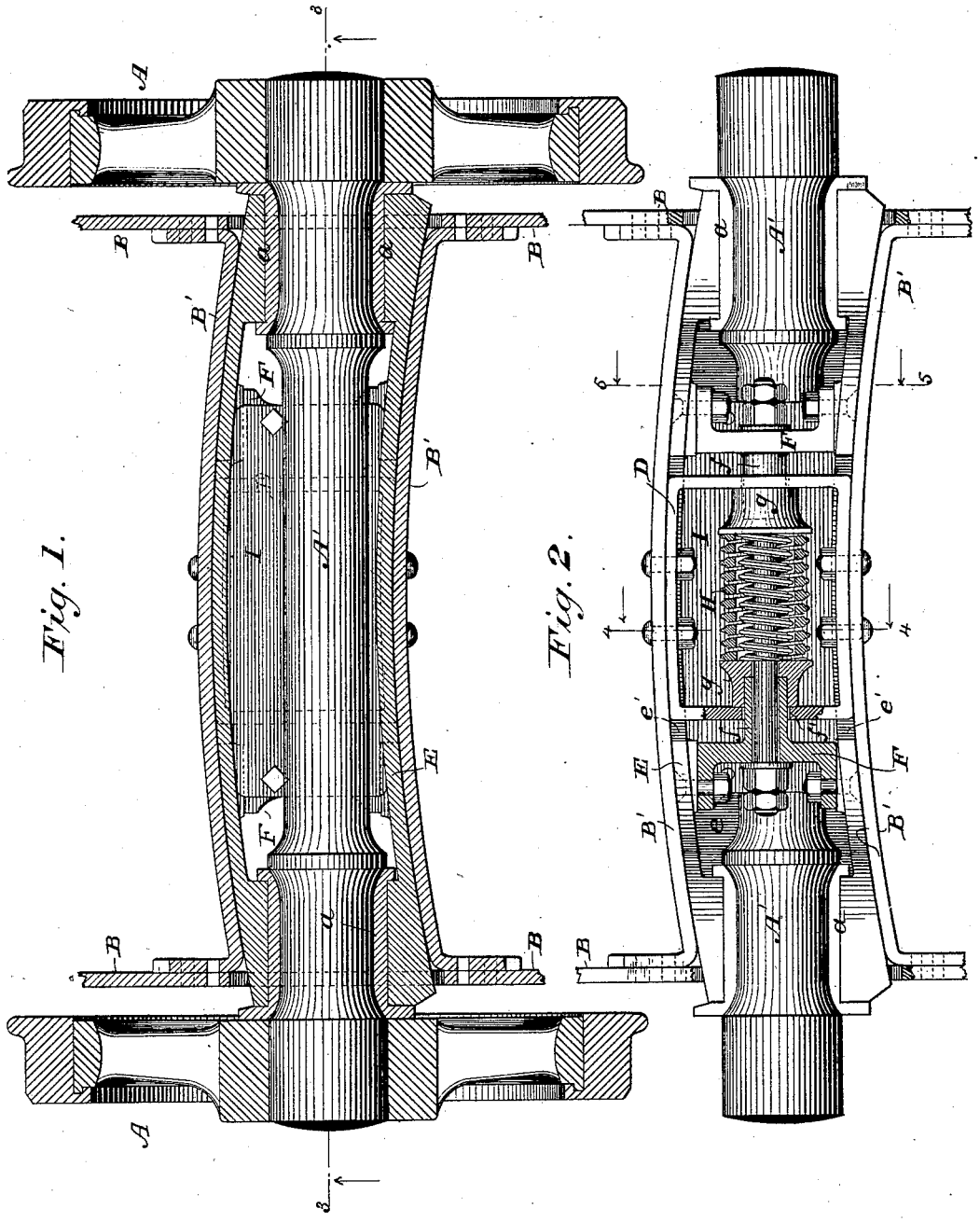

Fig. 1.

Fig. 2.

WITNESSES

Wm A. Skinkle

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INVENTOR

Francis W. Webb

By his Attorneys.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

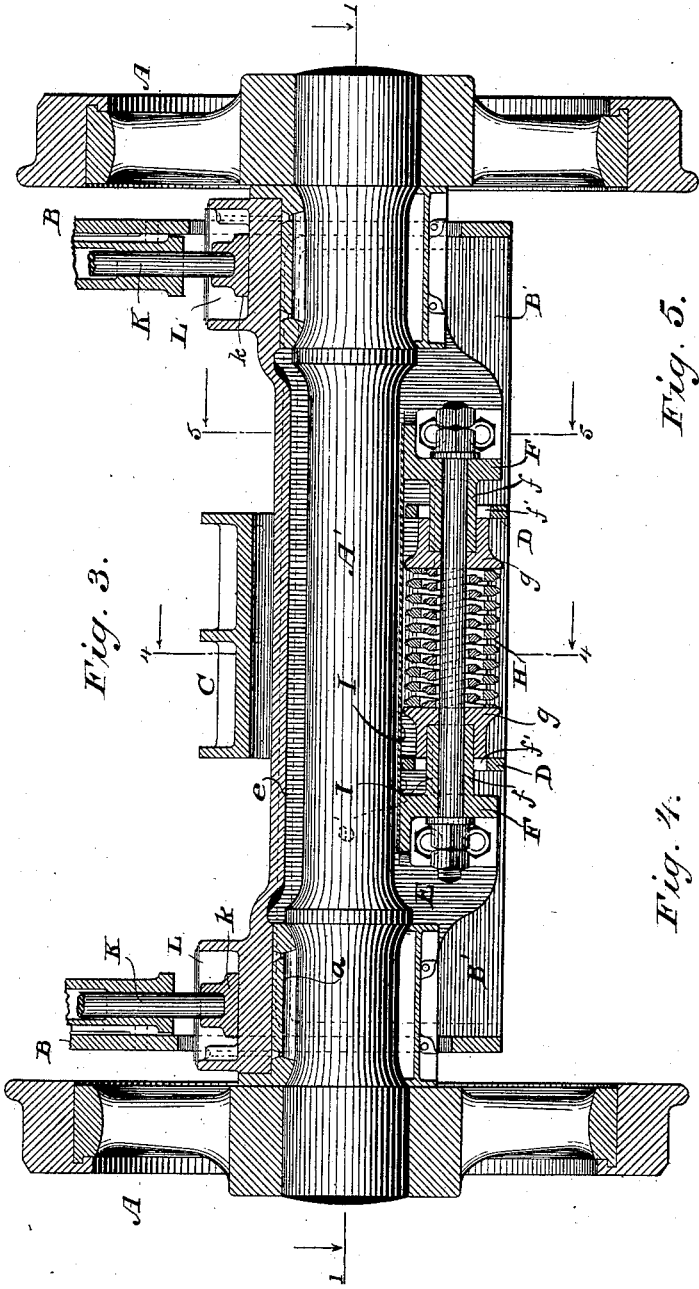


Fig. 5.

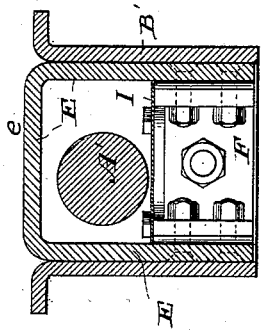
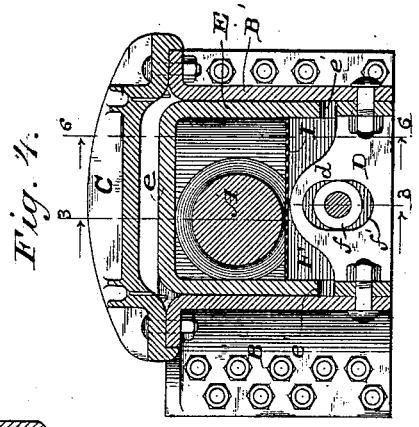


Fig. 4.



WITNESSES

Wm A. Skinkle

Wm J. Tanner

INVENTOR

Francis W. Webb.

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(No Model.)

3 Sheets—Sheet 3.

F. W. WEBB.

AXLE BOX.

No. 265,724. Patented Oct. 10, 1882.

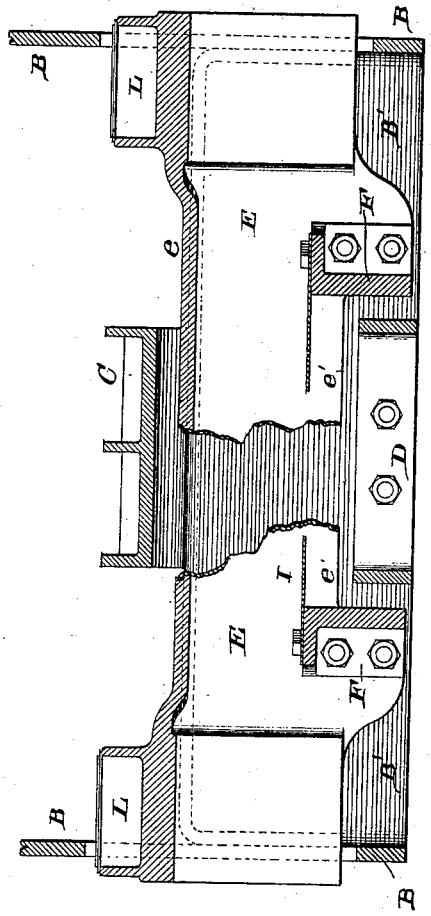

Fig. 6.

WITNESSES

Wm A. Skinkle

Wm J. Tanner

INVENTOR

Francis W. Webb

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Baldwin, Hopkins, & Peyton

UNITED STATES PATENT OFFICE.

FRANCIS W. WEBB, OF CREWE, COUNTY OF CHESTER, ENGLAND.

AXLE-BOX.

SPECIFICATION forming part of Letters Patent No. 265,724, dated October 10, 1882.

Application filed July 29, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS WILLIAM WEBB, a subject of the Queen of Great Britain, residing at Crewe, in the county of Chester, England, have invented certain new and useful Improvements in Radial Axle-Boxes for Locomotives and other Vehicles, of which the following is a specification.

The object of the invention is to permit a lateral motion of the axle of a locomotive or other vehicle and a corresponding lateral swing of the frame to facilitate working around curves in the track. When a locomotive or other vehicle is entering a curve the first effect, as is well understood, will be for the axle to tend to move laterally to accommodate the change in direction, and upon leaving the curve the locomotive-frame will tend to move on the axle-box to accommodate the change in motion. The axle and frame in their lateral movements in either direction operate to compress a nest of springs placed in the axle-box midway, or thereabout, between the wheels, and these springs impart a tension and elasticity to the parts and tend always to return them to their normal central position. I employ a nest of springs, so that in case of breakage of one of them there will still be another or others to receive the thrust of the lateral movements. Under the organization of my invention above indicated engines can work around curves without any shock, jar, or strain upon the frame or running-gear.

I will now describe my improvements in detail, referring to the accompanying drawings, in which—

Figure 1 is a horizontal sectional view on the line 1 1 of Fig. 3, looking in the direction of the arrows. Fig. 2 is a plan view, partly in section, looking at the under side of my improved axle-box. Fig. 3 is a vertical section on the line 3 3 of Figs. 1 and 4, looking in the direction of the arrows. Fig. 4 is a transverse section on the line 4 4 of Figs. 2 and 3, looking in the direction of the arrows; Fig. 5, a transverse section on the line 5 5 of Figs. 2 and 3, looking in the direction of the arrows; and Fig. 6 is a longitudinal sectional detail view on the line 6 6 of Fig. 4, looking in the direction of the arrows.

My improvements are designed to be applied to the front or hind or trailing carrying-wheels of a locomotive or other vehicle. In the drawings they are shown applied to the front wheels of a locomotive and the lateral motion of the axle-box is in the curved path, of which the center is at a point in rear of the axle and about in the center of the usual group of four or more main carrying-wheels. Of course the arc of motion may be described from any suitable point.

The wheels A A are mounted upon the axle A′ in any usual and ordinary manner. The frame of the locomotive (represented by the letter B) is rigidly bolted to the front and rear plates or walls, B′ B′, of the outer boxing or guide. These walls are united centrally across the top by a straddling arch or bridge, C, which is firmly bolted to each wall, and gives the necessary strength and rigidity to the parts. As shown in the drawings, the skeleton axle-boxing formed by the walls or plates B′ B′ and the bridge C is open at top and bottom, and in horizontal section shows a curved shape, the centers from which the similar arcs or lines of the walls are struck being in rear of the axle, as above mentioned. This boxing or guide, which is rigid with the locomotive-frame, is to receive a correspondingly-shaped axle-box, which moves laterally therein, and on which the frame and skeleton boxing B′ in turn swing laterally, as will be hereinafter described. Midway between the wheels a spring-frame, D, is rigidly bolted to the front and rear plates, B′ B′, of the outer box, near their lower edges. The ends of this frame are preferably curved or arched, as shown at *d*, Fig. 4.

The axle A′ has its bearings in suitable journals, *a a*, which are carried in the laterally-moving internal boxing, E, which fits snugly in the boxing B′ B′, as clearly illustrated. This internal boxing, E, is preferably cast, and is rectangular in general cross-section, as illustrated in Figs. 4 and 5. It is open at the bottom, but closed at the top, its upper solid face *e* being preferably formed in one piece with the side plates or sections. Its side walls are, however, cut out at *e′*, so as to straddle the spring-frame D and permit the necessary lateral motion of the parts without coming in

contact with it. This construction is clearly illustrated in the bottom view, Fig. 2, and in Figs. 4 and 6.

Two cross-heads, F F, are rigidly bolted to the laterally-moving internal boxing, E, opposite each end of the spring-frame D. (See Figs. 2, 3, and 6.) These cross-heads are provided with bosses or hubs *f f*, which project through the elongated openings *f' f'* in each end of the spring-frame and bear against internal annular shoulders on washers or socketed thrust-heads *g*.

The nest of springs H (two coiled springs being shown) is placed between the ends of the heads *g g*, and the springs and washers are held in place by a rod or bolt which passes through them and the cross-heads F, and is secured by suitable nuts. It will be noted that the axle A' passes through the upper portion of the axle-box, and that the springs, cross-heads, &c., are placed below the axle, a plate, I, being placed between them and bolted to the cross-heads as a guard for dirt, &c.

The frame of the locomotive, as above described, is securely bolted to the outer boxing or guides, B' B'. It is also supported upon the top of the internal box, E, at each end by strut-rods K, having bearing-shoes *k*, which bear and work in the sockets or grease-boxes L on the ends of the box, as shown clearly in Fig. 3.

Under the above organization it will be obvious that when a locomotive strikes a curve in the track the axle will be thrown laterally to accommodate the change in direction. The internal boxing, E, which carries the axle will therefore slide laterally within the outer boxing, B'. One of the bosses *f* on the cross-heads F, according as the axle is thrown to the right or left, will compress the nest of springs within the spring-frame D, which is rigidly secured to the boxing B'. In this movement the bearing-shoes *k* on the frame-struts K will slide in the sockets L on the frame.

It will be obvious that the frame may also swing laterally independently of the axle and its boxing E. In the latter case the outer boxing, B', will slide on the inner boxing, and the shoes on the frame-struts will slide in their sockets to accommodate the movement.

Under my improved construction the locomotive possesses an elasticity and flexibility which greatly facilitate its working around curves and prevents shocks and jars to the engine and running-gear.

The details of my organization may be varied by those skilled in the art without departing from the principle of my invention. Thus the springs might be carried by the laterally-moving axle-box, and the thrust bosses or heads might be secured upon the outer boxing or frame, B'. Such modifications of structure will readily present themselves, and do not involve substantial departures from my construction.

The fact that the axle-box moves laterally in the curved path described enables the wheels to follow the curvature of the track with greater ease and with less liability to strain.

What I claim as my invention is—

1. The combination, substantially as set forth, of the outer boxing or frame, B', rigidly secured to the main frame, the inner laterally-moving boxing carrying the axle, the elastic cushion carried by the outer frame, and the thrust bosses or heads carried by the inner laterally-moving box.

2. The combination, substantially as set forth, of an axle boxing or frame rigidly secured to the main frame, a laterally-moving boxing carrying the axle, and a spring or elastic cushion which receives the lateral thrust of the axle-box in either direction.

3. The combination, substantially as set forth, of an axle boxing or frame rigidly secured to the main frame, a laterally-movable axle-box carrying the axle, a spring or elastic cushion which receives the side thrust of the moving box in either direction, and the strut-rods which support the frame upon the top of the laterally-moving boxing.

4. The combination, substantially as set forth, of the outer skeleton boxing or frame rigidly bolted to the main frame, the inner laterally-moving box carrying the axle, the nest of springs or elastic cushion carried by the outer frame or boxing, the thrust cross-heads carried by the laterally-moving boxing, and the frame-struts which support the locomotive-frame upon the laterally-moving boxing.

5. The combination, with the locomotive or vehicle frame, of the outer boxing secured thereto, the inner laterally-moving box carrying the axle, and the struts or rods which support the weight of the frame directly upon the inner axle-box, substantially as set forth.

6. The combination, substantially as set forth, of the outer boxing or frame rigidly bolted to the main frame and shaped in the arc of a circle in horizontal section, the correspondingly-shaped axle-box moving laterally within the outer casing, and an elastic cushion which receives the thrust of any sidewise movement of the parts.

In testimony whereof I have hereunto subscribed my name.

FRANCIS WILLIAM WEBB.

Witnesses:

JOHN B. WILSON,

JOHN W. SPARKS,

Both of 16 *St. Ann's Square, Manchester.*