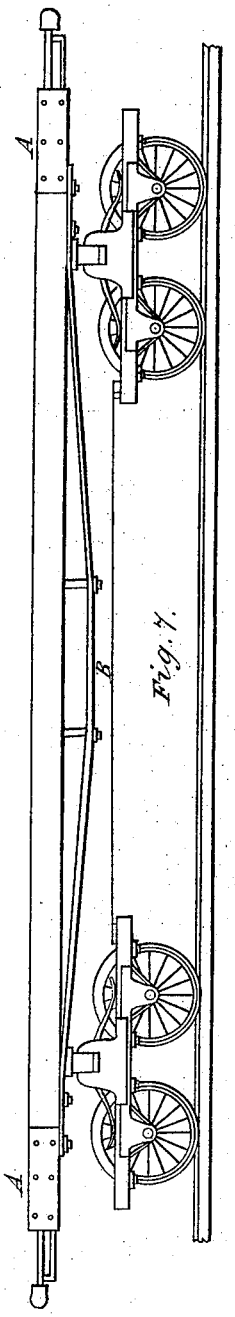
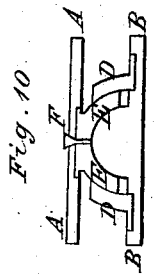
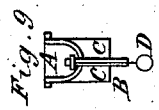
J. P. FAIRLAMB, Sr., & L. C. JUDSON.

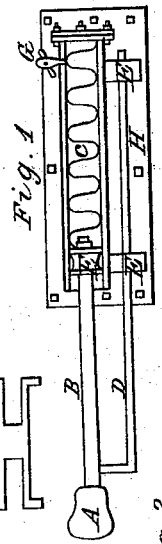
Car Bumper.

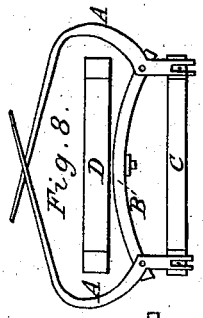
No. 558. Patented Jan. 9, 1838.

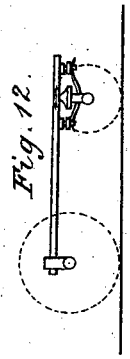


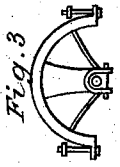


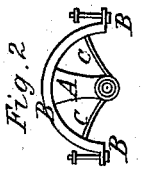


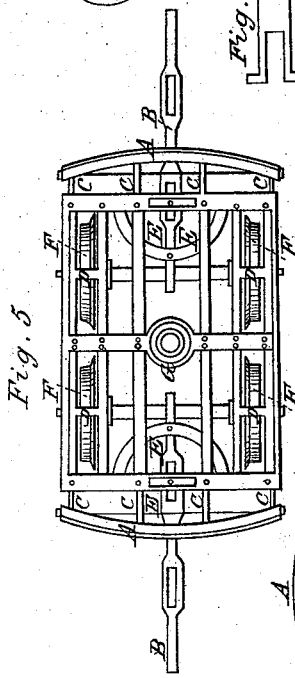


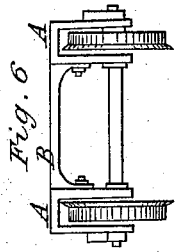


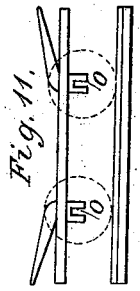












Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

JONAS P. FAIRLAMB, SR., AND L. C. JUDSON, OF PHILADELPHIA, PA.

IMPROVEMENT IN LOCOMOTIVES AND RAILROAD-CARS WHICH ARE APPLICABLE TO OTHER PURPOSES

Specification forming part of Letters Patent No. **558**, dated January 9, 1838.

To all whom it may concern:

Be it known that we, JONAS P. FAIRLAMB, Sr., of the city of Philadelphia and Commonwealth of Pennsylvania, civil engineer, and L. CARROLL JUDSON, of the same place, attorney and counsellor at law, have invented a new and useful improvement to be applied to locomotives, railroad-cars, omnibuses, stage-coaches, and all other vehicles with four or more wheels, and to other purposes, hereinafter described and particularly specified.

To guard against damage arising from locomotives, cars, and other bodies coming in sudden contact, we provide one or more cylinder-bunts, of such size, length, and caliber as circumstances may require or the builder prefer. This bunt we construct by forming a hollow cylinder, after the manner of a cannon, with suitable flanges to fasten it firmly to the place for which it is designed. Through the top, at the back end, near the solid part, we make one or more apertures, communicating with the hollow part of the cylinder, for the ingress and egress of air, which we regulate by inserting stop-cocks, to be opened and closed at pleasure. In this cylinder we introduce a strong spiral spring of a size to fit the caliber, in which smaller spiral springs may be introduced, if desired. This spring, being of a length to correspond with the piston to be introduced, we put back to the solid end of the cylinder. We then construct a piston of a size and length to correspond with the caliber of the cylinder for which it is designed and the vacuum of the caliber when the spiral spring is compressed. The back end of this piston, entering the caliber of the cylinder, we pack so close as to prevent the escape of air when forced in. On the front end, or on the front side of the piece supporting the piston or pistons, we construct a pad or bunt of india-rubber or other soft substance. The piston or pistons may be supported by a sliding rod, with one end hooked and inserted in the forward end near the bunt and passing through flanges upon the cylinder; or, especially when there is more than one, they may be supported by a frame sliding upon a tongue and groove. Upon the front of this sliding frame we construct a solid circular cross-piece of sufficient width and thickness to receive the ends of the piston or pistons only part way through, on the front of which we affix the elastic substance forming the front of the bunt. When not in use the pistons may be drawn by the aid of a cord attached to the forward end and connected with a ratchet-wheel at the back end of the cylinder into the cylinder, out of the way. Thus arranged, as the piston is suddenly forced into the cylinder always filled with air, the resistance of the spiral spring and atmosphere combined will be immense, and the concussion graduated when locomotives, cars, or any two bodies come in contact having these cylinder-bunts attached. Our main dependence for graduating and lessening the concussion is upon the power and elasticity of the atmospheric air when operated upon by the pistons. We apply these cylinder-bunts in all situations and to all bodies liable to come in contact where it is necessary to graduate the concussion, and more especially to locomotives, railroad-cars, and steamboat-wharves. When used for the purposes last named we recommend the sliding frame, with a circular cross-piece in front. Water may be used instead of air, in which case we use large brass wire for the spiral spring and make larger apertures.

To prevent any possibility of danger to limb or life from the breaking of axles of locomotives or railroad-cars, we provide wheels of any desired shape or size, with hubs extending two or more inches on each side of the wheel, which we turn perfectly round and smooth, leaving a shoulder near the wheel, which hubs become and serve as journals when an axle breaks. We also provide for each wheel two safety-guards or a double safety-guard of sufficient strength to support the necessary weight. These we construct of iron or other strong material of a semicircular shape, corresponding with the upper half of the wheel, with pedestals or arms extending from the center of the under side of the semicircle downward near to the hubs of the wheels, with or without lateral braces to each arm, and a connecting-brace from one to the other guards of each wheel, as the builder may prefer and desire. At the lower end of the inner guard-arm we form a fork with a semicircular vacuum corresponding with the periphery of the upper half of the hub at its end, the prongs extending down each side and below the end of the hub and as near as possible to it without coming in contact only when an axle breaks. If deemed necessary, a circular clasp or a piece with a circular bearing corresponding with the under periphery of the end of the hub may be

put upon the lower end of the prongs, as near up to the hub as possible without coming in contact, and secured by a key or otherwise. On the lower ends of the outer arms we form circular apertures corresponding with and to fit upon the end of the hubs as near as possible without coming in contact only when an axle breaks. When deemed necessary, the bearings of these arms may be wider than the thickness of the arms from them up to the semicircle. These safety-guards we attach firmly to the frame of the locomotive or car on each side of the wheels, as near to them as practicable without coming in contact, by bolts or other strong fastenings. The top of each pair we secure by a cross-piece attached securely to each guard by a dovetail mortise to receive and hold each end of this cross-piece, or by other strong fastenings, thereby forming a strong and complete safety-guard clamp upon each wheel, holding it firmly to its true position without the aid of an axle. Thus arranged, the arms of these safety-guard clamps, resting over and around the ends of the hubs, and as near their shoulders and peripheries as possible without coming in contact, unless something gives way, are always in a position to receive the wheels the moment an axle breaks, and the locomotive or car proceeds with perfect safety and with no more friction than that of a common wagon, and without the possibility of a wheel being removed from its place or position. These safety-guard clamps may be applied to coaches, omnibuses, and wagons by connecting the opposite pairs by an axle resting upon the main axle, with uprights at each end on the inside of the wheels of a suitable shape to form a cradle for the reception of the body, or the springs may rest upon the guard-axles. Near the lower end of each arm of the safety-guard clamps we attach a small vessel containing oil, to supply them when brought into action. The oil we bring into use by introducing a tube and valve extending from the inside of the bottom of the oil-vessel and nearly to and over the center of the journals of the hubs. Through this tube, and attached to the valve, we pass a small piston, extending down to the journal of the hub, which opens the valve the moment the arm of the safety-guard clamp falls upon and acts on the journal, admitting the oil to flow down upon it.

To guide locomotives with six or more wheels and cars with eight wheels from one track of railroad to another without the troublesome aid of switches, we attach a lever on each side, or one in the center at the forward end to act upon the forward end of the truck-frame, with the fulcrum resting against the upper or body frame, with the handle end of the lever extending up or over the outside of the body-frame to a length giving the requisite power and to use with facility. By pressing against the lever attached to the side or end corresponding with the direction you wish to go the wheels will be guided into the desired track with perfect ease. The same object may be effected with short or four-wheel cars by introducing vibrating axles, which are far superior to stiff ones, it being an easy matter to so construct them as to run a railway in the shape of a figure **8** without any friction of the flanges of the wheels against the rails of the road. With vibrating axles we simplify this process by applying the levers in front, so as to operate upon each end of the axle next to the wheel, throwing it back upon the side you wish to turn, thus guiding the car at pleasure into a lateral railroad.

To guide a train of cars from one track of railroad to another without the precarious aid of switches, we attach spring guides or levers upon the center of the cars, of a sufficient length and strength to connect and direct the course of the one after the other, every two cars being connected by a spring-lever. Each of these levers has two fulcrums upon centers, one center fast to each car, and its ends extending beyond the fulcrums a sufficient distance to be fastened to the frame of the car by a bolt or otherwise, so as to change the vibrating end by changing the bolt from car to car, so that the vibration shall be at the leading car. The ends of these spring-levers, by the aid of an oblong mortise, by changing the bolt alternately, have a longitudinal sliding motion on the center attached to the leading car. By this arrangement, connected with the side or end levers, a locomotive and train of cars may be guided to any lateral track of railway, and, being connected and steadied by the spring-levers, will pass without that racking motion experienced in passing by the aid of switches.

In the construction of locomotives with six or more wheels, cars with eight wheels to run on railroads, and carriages or vehicles with four or more wheels to run on other roads, instead of relying upon horizontal circular plates with circular tongues, or upon king or body bolts to effect vibration, we provide a double universal joint, which accomplishes this important object in a more perfect, safe, and substantial manner. In the construction of this joint we provide two plates of a size, thickness, and shape best calculated to suit the transom, bed-piece, &c., where they are to be used. On the upper side and at the center of the under plate we form a half-globe or half-ball of a size to correspond with that of the plate. At a suitable distance from the base of this half-ball we form a circular groove or recess to receive the base of either two segments or halves of a dome, or an entire dome, excepting an opening at top, as the builder may prefer, inclosing and securing a smaller cap or dome, which covers and vibrates upon the half globe or ball. This outer dome is secured to the bottom plate by suitable flanges, and has an opening at top, as if the vertex was cut square off. Within this outer dome, and resting upon and covering the half-ball, we place a lesser and entire dome, corre-

sponding with and vibrating upon the half-globe, leaving sufficient room at its base for complete and all necessary vibration. This lesser dome is connected with the upper plate, either by suitable flanges and fastenings or by being made solid with it, which may be done if made of any kind of cast metal quite as easy as to make each separately. This connection between the lesser dome and upper plate passes through the aperture at the vertex of the larger dome, which aperture must be sufficiently large to admit all necessary vibration. If the upper plate and lesser dome are cast solid together, the larger or outer dome, if not made in segments, may be cast over the lesser dome, and the chill in cooling will leave sufficient room for vibration. The center of the plates connected with this joint is common to the center of vibration. Their outer surface we make to correspond with any surface to which they are to be attached. By making the upper plate large, circular, and slightly concave it will form a complete bed for the boiler of a locomotive, and will be found much better and safer than the bolt now used. Through the upper plate, and connected with the half-ball, we form an aperture for the reception of oil. With this combination we have a double universal joint, vibrating freely in every direction, preserving the equilibrium of the body resting upon it, not liable to derangement, and, if made thick and strong, will last to wear out several cars or carriages, and is not liable to be broken.

If desired to have the forward wheels detached in case a carriage is upset, the bottom plate, resting upon the forward axle, may have square flanges projecting down into mortises in the bed-piece or on each side and in the bed-piece, with small bolts that would give way the moment the carriage turns over with more certainty than the king-bolt.

To render the vibration still more complete, and to overcome friction, we provide semicircular plates, side springs, or circular ring-plates, moving upon friction-rollers, which may be placed in a cross-piece under the coupling-pole, attached to and at right angles with the axle and other parts with which the plates, springs, or rings come in contact on common carriages and on a parallel piece on cars. Another desideratum effected by this universal joint is the facility with which long cars may be turned from the main truck to a lateral railway either at right angles or in any desired direction, and of transversing them by the aid of a single revolving section. This is done by placing the forward set of wheels upon a revolving section of railway connected with the branch railway and turning them to it. They are then pushed forward and the other set of wheels brought up, which may pursue the main track, and thus change the ends of the car, or may follow on the lateral railway and be run to any desired location. By the aid of this joint and a revolving section at each end branch railways may be made straight, instead of curved, and consequently will occupy less ground than curves and need not the aid of switches.

The above-described improvement, in its various parts, we construct of metallic and such other strong substances as the use, location, and circumstances may require and the builder prefer, of a size, shape, and strength to suit the purpose for which each part is intended to be used, either separately or in connection and combination.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The construction and combination of the cylinder-bunt, as combined with locomotives, cars, &c., in the manner described.

2. The construction of the safety-guard clamps and their combination with the wheels, in the manner described.

3. The construction and combination of the modes of guiding locomotives and cars from one track of railroad to another without the aid of switches, in manner as described.

4. The construction and combination of the universal joint, in manner as set forth and described.

We claim each part of this improvement, whether used separately or in combination of parts or of the whole, in manner as described by us.

Witness our hands this 20th day of December, Anno Domini 1837.

JONAS P. FAIRLAMB, SENR.
L. C. JUDSON.

Witnesses:
I. A. JUDSON,
L. GOODRICH.