(No Model.) 2 Sheets—Sheet 1.

L. R. FAUGHT.

CAR WHEEL.

No. 327,150. Patented Sept. 29, 1885.

Fig: 1.

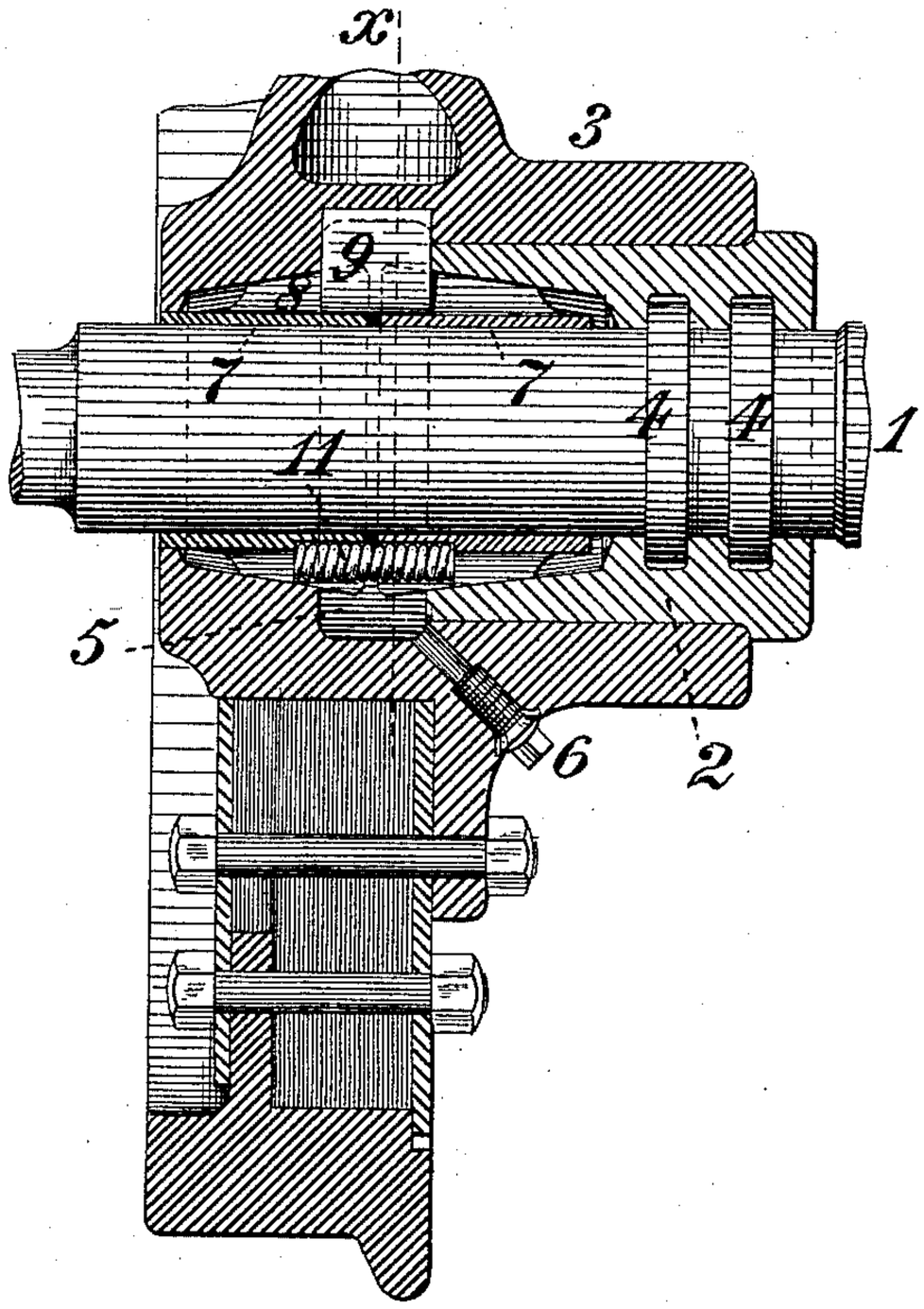


Fig: 2.

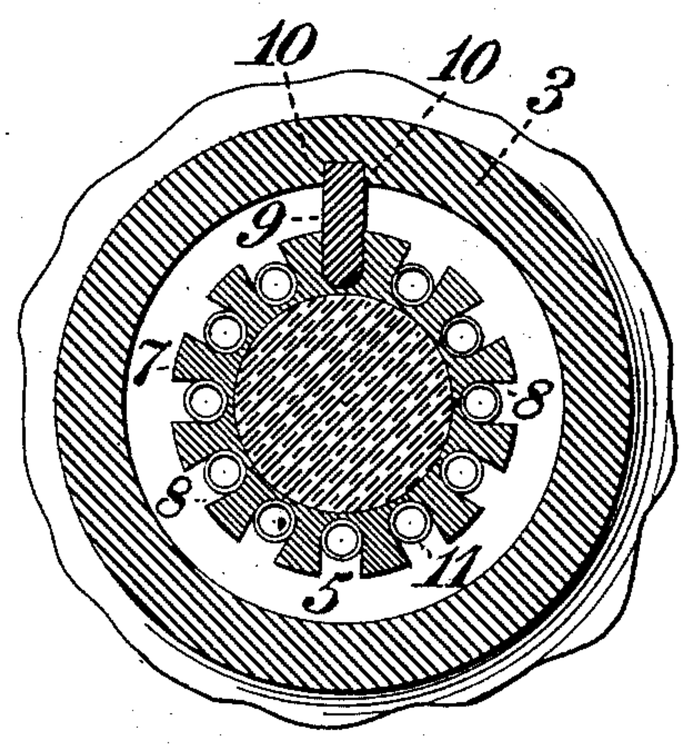


Fig: 3.

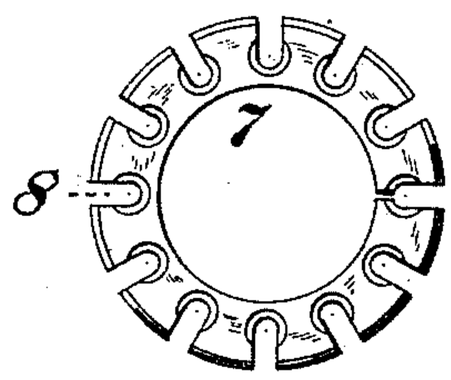
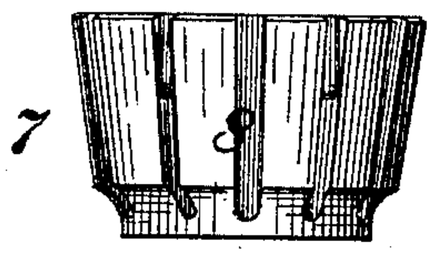


Fig: 4.



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(No Model.) 2 Sheets—Sheet 2.

L. R. FAUGHT.

CAR WHEEL.

No. 327,150. Patented Sept. 29, 1885.

Fig: 6.

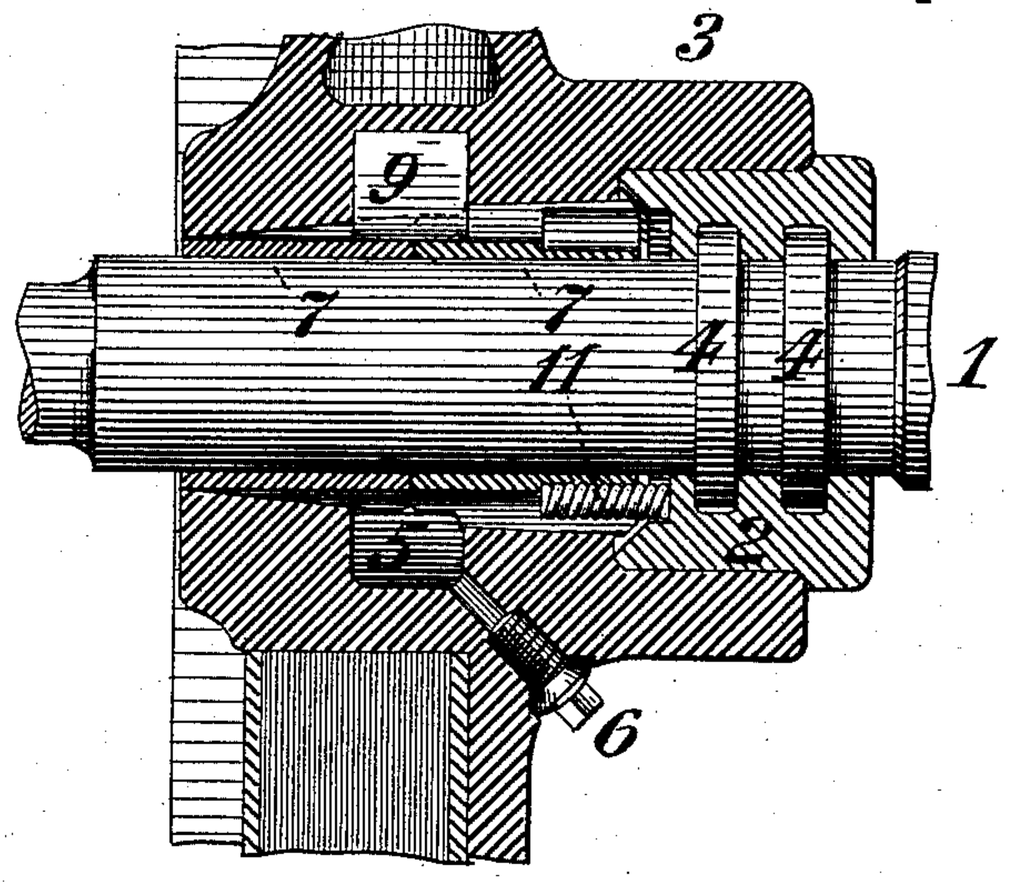
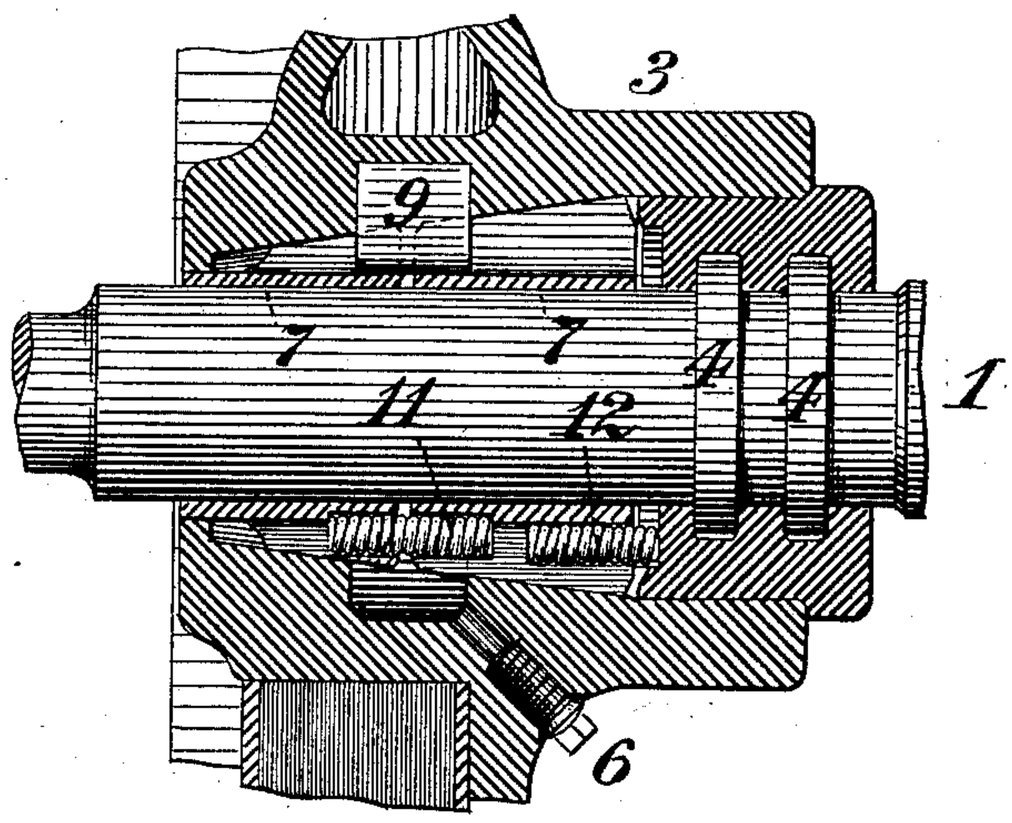


Fig: 5.



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UNITED STATES PATENT OFFICE.

LUTHER R. FAUGHT, OF PHILADELPHIA, PENNSYLVANIA.

CAR-WHEEL.

SPECIFICATION forming part of Letters Patent No. 327,150, dated September 29, 1885.

Application filed June 17, 1885. (No model.)

To all whom it may concern:

Be it known that I, LUTHER R. FAUGHT, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Car-Wheels, of which improvements the following is a specification.

The object of my invention is to effect a reduction in the tractive force required for the movement of railroad rolling-stock, as well as to diminish the tendency to strain and breakage of wheels and axles, and the undue wear of wheels and rails resultant upon the use of wheels which are mounted upon axles in the manner heretofore ordinarily practiced.

To this end my invention, generally stated, consists in the combination of a railroad-axle and a wheel fitted thereon with the capacity of rotation either with or independently of the axle, as its traverse over the rail may, in accordance with the direction of the track as to straightness or curvature, respectively, be equal to or different from that of the opposite wheel of its axle. The improvements claimed are hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal central section through a car-wheel, with its axle in elevation, illustrating the application of my invention; Fig. 2, a transverse section through the same at the line *x x* of Fig. 1; Figs. 3 and 4, end and side views, respectively, of one of the frictional sleeves, detached; and Figs. 5 and 6, longitudinal central sections through the hubs of wheels, illustrating modifications of my invention.

The wheels of railroad rolling-stock, as heretofore and at present employed, were and are of two general classes—to wit, those which are secured in pairs rigidly upon their axles, and which consequently rotate coincidently therewith and with each other when in operation, and those known as "loose wheels," in the use of which one wheel of each pair is fixed upon the axle, while the other is mounted freely and turns circumferentially on a seat thereon, thereby allowing independent rotation of the wheels under circumstances inducing the same. The recognized objection which is apparent in practice in the use of fixed wheels is the undue resistance to traction and the wear of wheels and rails resultant upon the slipping of one wheel upon the rail in order to compensate for the greater distance which it is compelled to travel relatively to the opposite wheel in passing over the outer rails of curves, and the torsional strains thereby induced which tend to weaken and break the axles or wheels, or both. Loose wheels are objectionable, in the particular that the freedom of independent movement which enables them to satisfactorily operate on curves is unnecessary and undesirable on tangents or straight portions of the line, and the freedom of lateral movement of the car which they admit of induces an unsteady movement and undue jars and stress upon the wheel-flanges.

My improvements are designed to obviate the objections above referred to by providing what may be termed a "yielding" wheel, in lieu of one which is either permanently fixed or permanently loose, so that said wheel may be held to and rotate with its axle and companion wheel under conditions in which the traverse of the two wheels is practically equal, and be permitted to rotate independently as the tension exerted under different conditions may act upon it.

My improvements are applicable to wheels of any of the usual constructions, and in the upper half of Fig. 1 are illustrated in an ordinary double-plate cast-iron wheel, while the lower half of the same figure shows a wheel of the "Allen" type, having a body of paper interposed between its hub and rim. The hub 3 of the wheel is bored out cylindrically at and adjacent to its inner end to receive a cylindrical bushing, 2, from the end of which within the hub to or near the outer end of the hub the bore is inwardly tapered or inclined. One or more collars, 4, are formed upon the axle 1, and fit in corresponding annular grooves in the bushing 2, which is divided diametrically into two sections to enable it to be fitted over said collars, by which it and the wheel, which is forced tightly upon it, are retained in position longitudinally upon the axle. An oil chamber or receptacle, 5, is cored in the hub adjoining the inner end of the bushing, and lubricating material is supplied thereto through one or more feed-openings closed by suitable tight plugs, 6. If three of said openings be provided, oil may be supplied as de-

sired, whenever the wheel is stationary, irrespective of the position in which it may chance to stop, as one of said openings will always be above the center.

So far as described it will be seen that the wheel would comply with the conditions of an ordinary loose wheel, being free to rotate upon the axle, while held by the collars 4 and bushing 2 as against longitudinal movement therein. Under my invention, however, I provide a frictional connection, now to be described, by means of which the wheel is caused to rotate normally with the axle in the manner of a fixed wheel, but, under the action of tension greater than the adhesion of the frictional surfaces by which it is held circumferentially upon the axle, is permitted to rotate independently of the latter during such periods when, in passing over curved portions of the track, its traverse is greater or less than the wheel which is mounted on the opposite end of the axle, such resistance to its independent rotation being constantly exerted as limits the same to the degree requisite to compensate for the difference of traverse of the two wheels. To this end I provide a pair of flexible and compressible sleeves, 7, which are bored out cylindrically to fit upon the axle 1, and are tapered or inclined upon their outer surfaces. One of the sleeves 7 fits within the inclined portion of the bore of the hub 3, and the other in a corresponding but oppositely-inclined bore in the bushing 2 at the end thereof nearest the outer face of the hub 3. The sleeves 7 are rendered flexible by being split or divided longitudinally, as well as by being relieved externally by a series of longitudinal peripheral recesses, 8, and are held as against rotation independently of the wheel by one or more locking-keys, 9, each engaging a recess between shoulders 10 on the hub, and fitting in one of the recesses 8 of each of the sleeves 7. Said recesses form the seats or receptacles of a series of springs, 11, the tension of which acts to compress and force the sleeves 7 tightly against their inner bearings on the axle 1, and their outer bearings in the hub 3 and connected bushing 2, so as to establish and maintain a frictional contact, the degree of which is determined by the number and tension of the springs between the wheel and axle, which frictional contact effects normally the coincident rotation of the wheel and axle, and which, when overcome by a force tending to cause independent rotation of the wheel and axle, will permit such rotation during the exertion of such force, while constantly opposing thereto a resistance which prevents absolute looseness or freedom of independent rotation, and limits the same to the degree and duration of the inducing force.

The constructions shown in Figs. 5 and 6 differ from that above described in the particular that the sleeves 7 are tapered in the same instead of in opposite directions, and the outer bearings of both sleeves are in the hub in lieu of having the bearing of the inner sleeve formed within the bushing 2, as in the former case. In Fig. 5 the inner and consequently the thicker of the sleeves 7 is provided with a supplemental series of springs, 12, which provide for independent movements of the two sleeves to compensate for wear which tends to be greater upon the outer sleeve, inasmuch as the same, being directly over the rail and the tread of the wheel, is subject to the greater strain, and therefore will wear more rapidly than the inner. As the tension of the springs 10 acts against that of the supplemental springs 12, the latter must be of increased number or tension, or both, in order to exert the requisite compressive action upon the inner sleeve, 7. In the modification shown in Fig. 6 a single series of springs only is employed, the same acting upon the inner sleeve, and through the latter upon the outer sleeve. In such construction independent action of the sleeves is not exerted, as in the former cases; but a substantially similar result is attained by making the outer sleeve of materially sharper taper than the inner, so that the advance of the former will be more rapid in proportion to the increased wear which it sustains than that of the latter.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of a railroad-axle, a wheel fitted loosely thereon, and a frictional coupling device interposed between the wheel and its seat or bearing on the axle, these members being combined for joint operation to admit of either the coincident or the independent rotation of the wheel and axle, substantially as set forth.

2. The combination of a railroad-axle, a wheel having a conically-bored hub, a flexible and compressible tapered sleeve fitting around the axle and within the bore of the hub, and a spring or springs bearing against the sleeve and acting to force the same into close contact with the axle and hub, substantially as set forth.

3. The combination of a railroad-axle, a wheel having a conically-bored hub, a flexible and compressible tapered sleeve fitting around the axle and within the bore of the hub, a spring or springs bearing against the sleeve and acting to force the same into close contact with the axle and hub, and a locking-key engaging recesses in the hub and in the sleeve, substantially as set forth.

4. The combination of a railroad-axle having one or more collars upon its wheel-seat, a longitudinally-divided bushing having annular recesses fitting said collars, a wheel fixed upon said bushing and having a conically-bored hub, two flexible and compressible tapered sleeves fitting around the axle, and fitting, respectively, within the conical bore of the hub and within a conical bore in the bushing, a series of springs bearing against the sleeves and acting to force the same into close contact with the axle and with the hub and

bushing, and a locking-key engaging a recess in the hub and recesses in the sleeve, substantially as set forth.

5. The combination of a railroad-axle, a wheel having a conically-bored hub, two flexible and compressible tapered sleeves fitting around the axle and within the bore of the hub, a series of springs interposed between said sleeves and acting to force one thereof into close contact with the axle and hub, and a supplemental series of springs bearing against the other sleeve and acting similarly but independently thereon, substantially as set forth.

6. A flexible sleeve for effecting the connection of a wheel to an axle by frictional contact, said sleeve having a cylindrical bore fitting the axle, and a conical or tapered periphery provided with a series of longitudinal grooves or recesses, and being longitudinally split or divided, substantially as and for the purpose set forth.

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