No. 706,672. Patented Aug. 12, 1902.

R. E. LOCKWOOD.

CAR BRAKE.

(Application filed Apr. 3, 1902.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

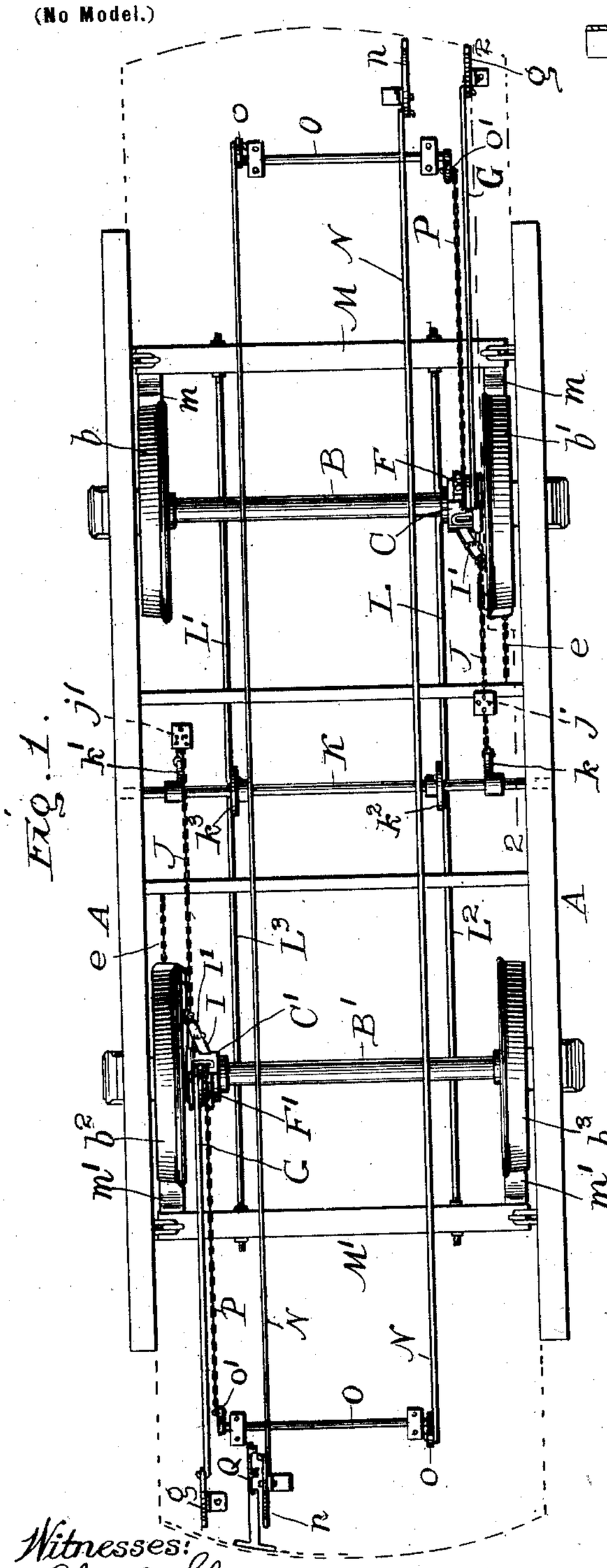
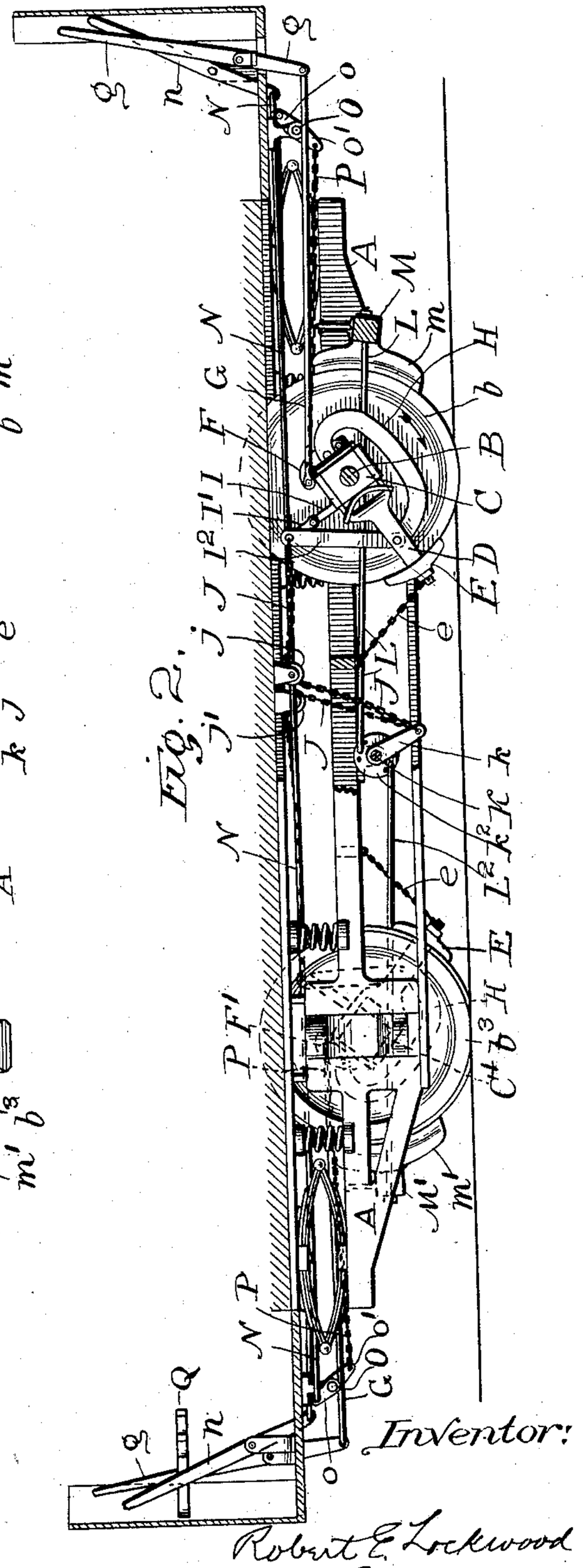


Fig. 2.



Witnesses:
Chas. O. Shervey
Russell Wiles

Inventor:
Robert E. Lockwood
by A. Bitner, Atty.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

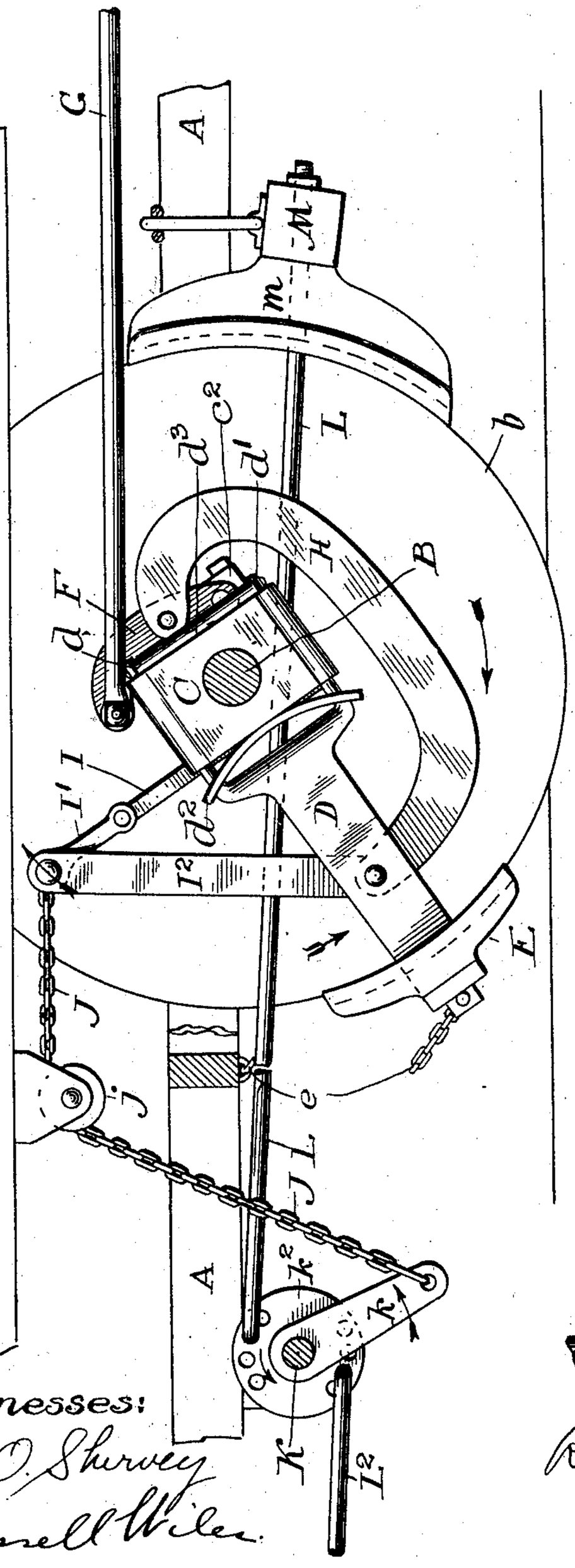
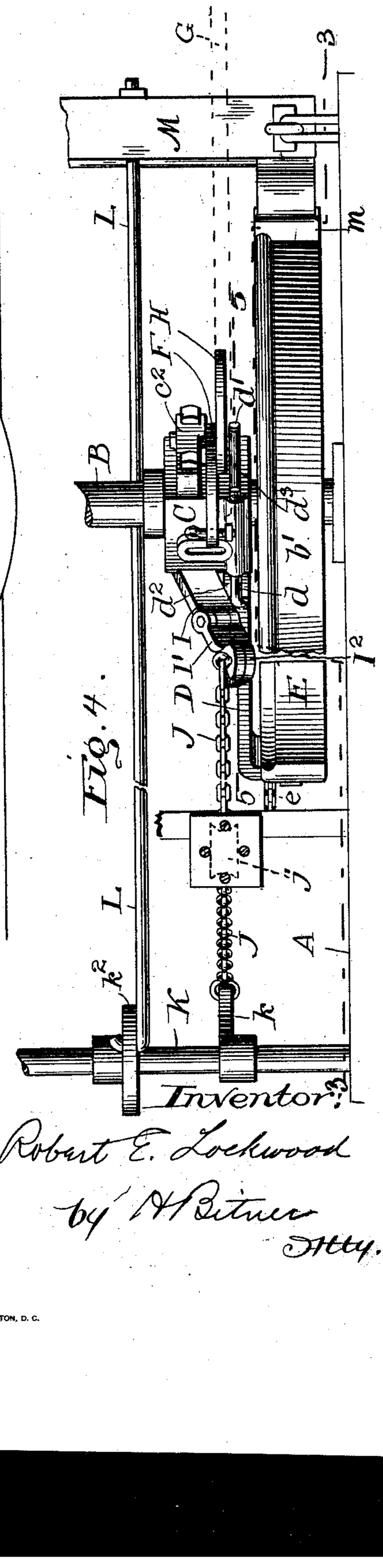


Fig. 4.



Witnesses:
Chas. O. Shurvey
Russell Wiles.

Inventor:
Robert E. Lockwood
by H. Bruce
Atty.

No. 706,672. Patented Aug. 12, 1902.

R. E. LOCKWOOD.

CAR BRAKE.

(Application filed Apr. 3, 1902.)

(No Model.) 3 Sheets—Sheet 3.

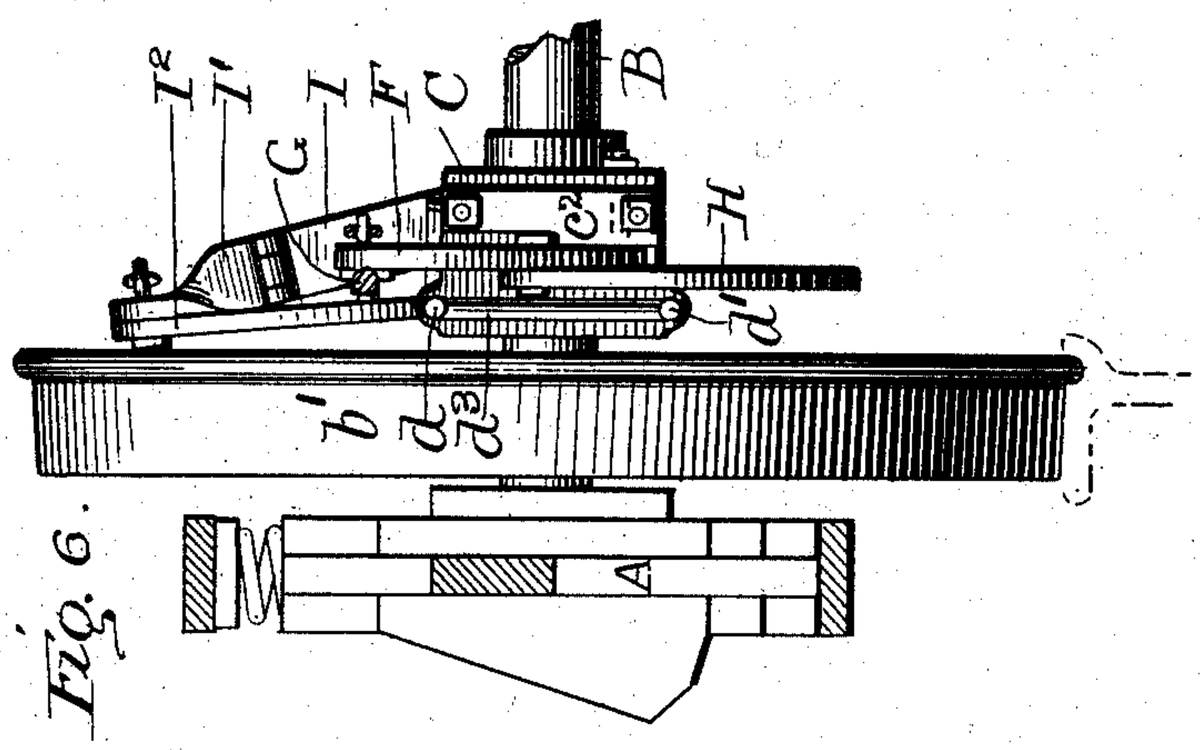


Fig. 6.

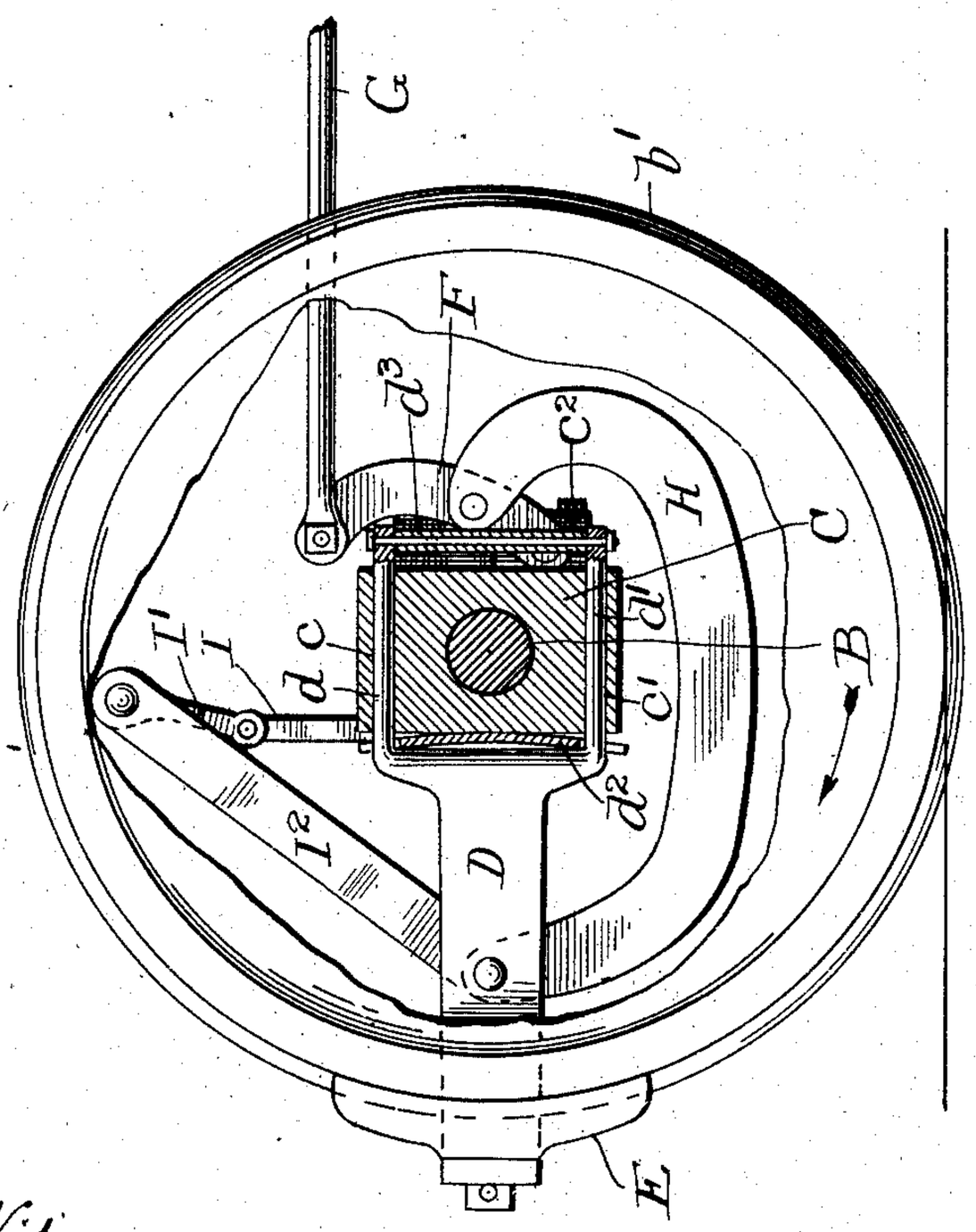


Fig. 5.

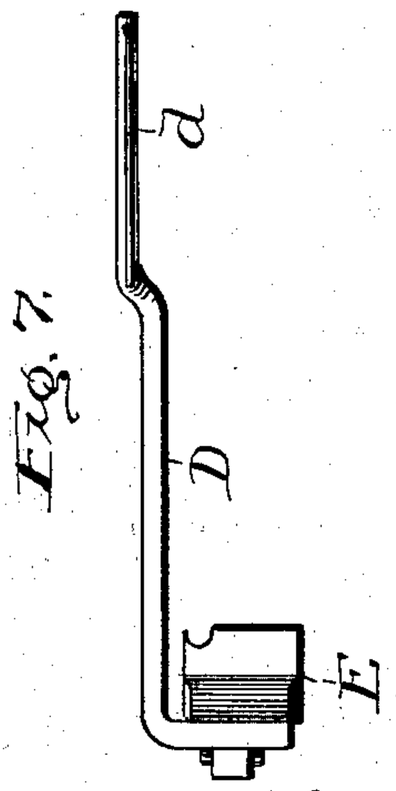


Fig. 7.

Witnesses:
Chas. C. Shervey
Russell Wiles.

Inventor:
Robert E. Lockwood
by H. Bitner
Atty.

UNITED STATES PATENT OFFICE.

ROBERT E. LOCKWOOD, OF CHICAGO, ILLINOIS.

CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 706,672, dated August 12, 1902.

Application filed April 3, 1902. Serial No. 101,158. (No model.)

To all whom it may concern:

Be it known that I, ROBERT E. LOCKWOOD, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Brakes, of which the following is a specification.

My invention relates to improvements in friction-brakes; and its object is to produce a brake of this type which shall work more effectively than the brakes hitherto made, which shall work equally well in all weather, which shall have a positive release, so as not to lock, and which shall be simple and comparatively cheap to construct.

To these and certain minor ends my invention consists in certain novel features of construction which are clearly illustrated in the accompanying drawings and described in this specification.

In the drawings, Figure 1 is a skeleton plan of a truck having my improved brake. Fig. 2 is a view, partly in side elevation and partly in vertical section, the right-hand end of the figure being broken away in the line 2 2 of Fig. 1. Fig. 3 is a detail section in the broken line 3 3 of Fig. 4, showing the friction-shoe in a position loose upon the car-wheel. Fig. 4 is a top plan of one wheel and the brake-setting mechanism. Fig. 5 is a view of one wheel and the friction-shoe, the middle of the wheel being broken away to show a section in the line 5 5 of Fig. 4. Fig. 6 is a front elevation of one of the wheels of the truck, showing the brake-setting mechanism; and Fig. 7 is an elevation of the friction-shoe and the part connected therewith looking in the direction of the arrow in Fig. 3.

Referring to the drawings, A is the frame of the truck proper.

B B′ are the axles of the truck, suitably journaled upon the frame A of the truck. Each of the axles has rigidly connected to it two wheels, the wheels upon the axle B being designated by b b' and the wheels upon the axle B′ being designated by b^2 b^3. Upon each of the axles B B′ are placed blocks C C′, adjacent to the wheels b' b^2, respectively. This, it will be seen, places one of these blocks C C′ immediately inside of the right-hand front wheel whichever way the car may be moving. These blocks run loose upon the axles and form supports for the friction-shoes.

The brake-setting mechanisms at the two ends of the car are of course similar, and from this point on the brake mechanism upon the axle B will be described, as this mechanism is shown in detail in the drawings. It will be understood that the mechanism upon the axle B′ is like it. The block C is pierced by two holes c c', (see Fig. 5,) and through these holes extend the ends d d' of a forked arm D. (See Fig. 5.) The arm D is capable of longitudinal movement with respect to the block C, its forked ends d d' sliding easily through the holes c c'. Upon the end of the member D is placed a friction-shoe E, which can be brought into contact with the periphery of the wheel b' by forward motion of the arm D. The shoe E is normally held off the wheel by a bow-spring d^2, confined between the block C and the arm D. Backward motion of the shoe and the member D is limited by a bolt d^3, extending through the forked members d d' on the opposite side of the block E from the shoe. Upon the block C is a bracket c^2, to which is pivoted a curved lever F of the second order, connected at its end to a rod G, extending to a hand-lever g (see Fig. 2) on the front of the car. Between the ends of the lever F is pivoted a yoke H, which extends under the block C and is there pivotally connected at its opposite end to the arm D. It will be seen that movement of the rod G toward the front of the car will draw the lever F forward, and this force will be transmitted through the yoke H to the arm D, drawing it also forward and bringing the friction-shoe E into contact with the wheel b'. I prefer to use the yoke H for the reason that it is heavy and forms a positive connection between the lever F and the arm D, and, further, because it forms a simple means of connection and one not easily got out of order either by improper treatment or by working under adverse conditions. Upon the top of the block C is a bracket I, (see Figs. 3 and 4,) having hinged to it a piece I′, extending in the same general direction as the bracket I. From the end of the piece I′ to a point approximately in the center of the arm D runs a connecting-rod I^2, the four pieces D I I′ I^2

forming, roughly, a triangle. To the apex of this triangle, where the piece I′ meets the connecting-rod I², is connected a chain J, extending backward over a pulley *j* and down to a lever *k*, the function of which will presently be explained.

The operation of so much of the device as has already been described is substantially as follows: The block C, the arm D, and the friction-shoe E run loose upon the axle and wheel, respectively, as has been hitherto set forth, and owing to the weight of the friction-shoe E the parts normally lie in the position shown in Figs. 1 and 3, downward motion of the shoe being limited by a chain *e*, attached to it. Assuming now that the car is going forward—*i. e.*, toward the right in the drawings—the wheel *b′* is rotating in the direction shown by the arrows in Figs. 3 and 5. If now the hand-lever *g* is drawn backward, thereby drawing the rod G, together with the lever F, forward, the friction-shoe E will come in contact with the periphery of the wheel *b′*. Inasmuch as the wheel is revolving rapidly in the direction shown by the arrow, the moment the frictional contact is brought about between the wheel and the shoe the shoe will swing up, following the wheel to the position shown in Fig. 5 or perhaps farther. This will of course pull upon the chain J and on the lever *k*, drawing it upward in the direction shown by the arrow in Fig. 3. When the lever *g* is released, the rod G will move backward and the lever E will force the shoe backward, it being positively released from the wheel both by motion of the lever and by the force of the spring d^2.

Transversely journaled in the middle of the truck is a shaft K, (see Figs. 1, 2, and 4,) to which are connected the levers *k k′*, the lever *k* being connected, as heretofore explained, to the friction-shoe mechanism on the axle B and the lever *k′* being connected to the similar mechanism on the axle B′. The arrangement of the pulley *j′*, corresponding to the pulley *j*, heretofore described, is such that the friction-shoe mechanism upon the axle B′ will rotate the shaft K in the same direction as will the friction-shoe mechanism on the axle B. This will be clearly understood from Fig. 2. Immediately inside of the levers *k k′* are wheels k^2 k^3, the construction of which is clearly shown in Fig. 3. To the upper portions of these wheels are connected rods L L′, running to a brake-beam M, swung from the frame of the car, upon which beam are shoes *m m*, bearing upon the wheels *b b′*. From the lower portions of these two wheels k^2 k^3 run similar rods L^2 L^3, running to a corresponding brake-beam M′, having at its end shoes *m′ m′*, impinging upon the wheels b^2 b^3. It will be seen that this arrangement is such that when the levers *k k′* are drawn up, as heretofore explained, the wheels k^2 k^3 will be rotated in the direction shown by the arrows in Fig. 3, the rods L L′ will be drawn farther to the left, and the rods L^2 L^3 will be drawn farther to the right, thereby setting the brakes upon both the front and rear wheels. A number of holes are provided in the wheels k^2 k^3, so that connecting-rods L L′ L^2 L^3 may be adjusted as desired. When the pull upon the chain J is released, the weight of the levers *k k′* is such that the wheels k^2 k^3 and the shaft K are rotated in the opposite direction to that shown by the arrows, thereby positively releasing the brake-shoes from the wheels. This construction is particularly desirable, inasmuch as it holds the shoes off the wheel and avoids rattle and also considerable friction.

Upon grades it is frequently necessary to apply brakes to the car to prevent backward motion thereof, and it will be seen that this could not be done in this system as so far explained, for the reason that forward rotation of the wheels is necessary to set the brakes, and backward rotation will have no effect whatever upon them. To this end I have provided an auxiliary lever *n* upon the front of the car, this lever being connected at its lower end to a connecting-rod N, running almost the whole length of the car and pivoted at its rear end to an extending arm *o* of a crank-shaft O, which is journaled in brackets upon the bottom of the platform. Upon the opposite end of the crank-shaft O is a similar arm *o′*, extending in the opposite direction from the arm *o*, and this arm *o′* is connected by a chain P to the lever F′, corresponding to the lever F upon the brake mechanism upon the axle B. It will be seen that motion of the lever *n* will draw forward the connecting-rod N, and thereby draw backward the chain P, setting the friction-shoe upon the wheel b^2, and this will prevent any backward motion of the car upon the grade. A similar mechanism is provided upon the rear end of the car, connected to the end of the lever F. Upon one of the ends of this car I have shown a ratchet mechanism, (indicated by Q,) in which the lever *n* can be locked when desired to keep the brake set.

To the best of my knowledge my brake is the only one now in use of the type wherein a friction mechanism brings the friction-shoe into contact with the wheel which could be set to keep a reasonable amount of friction upon the wheels. The advantage of my form lies in the fact that if the lever *g* is drawn up a certain distance the shoe E will swing a short distance upward, as heretofore explained. This of course swings the end of the lever F toward the front end of the car and tends thereby to release the shoe, the distance between the lever F and the lever *g* being decreased. The shoe will then drop a certain distance, and thereby tighten up again, so that the brake-shoes proper will swing gradually back and forth into and out of contact with the wheels. In other words, the brake-lever *g* can be set at a certain point, and the brakes will adjust themselves so as to keep a limited friction upon the wheels. This can-

not be done with any brake now in use, as the friction mechanism has no tendency to release itself as it tightens up. In the ordinary friction-brake an oscillating motion of the hand-lever has to be kept up continuously by the driver to get anything approaching an even pressure upon the wheels. My brake, however, accomplishes this same oscillation automatically, as heretofore explained. Another advantage of my brake is that the friction-shoe is thrown positively off of the wheel and the brake-shoes are thrown positively off of the wheels immediately upon releasing the brake, and there is no chance or tendency for the friction-shoe to catch upon rough places in the wheels and so lock the brakes when it is not desired. The leverage procured in this brake is such that the brakes are set very firmly indeed, and, as heretofore explained, this can be regulated as desired.

I realize that considerable variations can be made in the details of this construction, and I therefore do not intend to limit myself to the specific form of construction herein shown.

I claim as new and desire to secure by Letters Patent—

1. In a device of the class described, the combination with a rotatable car wheel and axle, of a block running loose upon said axle, a friction-shoe connected thereto, means for bringing said friction-shoe into contact with the periphery of said wheel, and means whereby the rotation of said block may set a brake-shoe; substantially as described.

2. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a friction-shoe connected to said block, a lever pivotally connected to said block, means of connection between said lever and said friction-shoe, means for actuating said lever to bring said shoe into contact with the periphery of said wheel, and means whereby rotation of said block may set a brake-shoe; substantially as described.

3. In a device of the class described, the combination with a rotatable wheel and axle, and block running loose upon said axle, of a friction-shoe connected to said block, means for bringing said shoe into engagement with the periphery of said wheel, means whereby the rotation of said block may set a brake, and means for holding said friction-shoe normally out of engagement with said shoe; substantially as described.

4. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a member longitudinally movable with respect to said block, a friction-shoe upon the end of said member, means for moving said member with respect to said block to bring said friction-shoe into engagement with the periphery of said wheel and means whereby the rotation of said block may set a brake-shoe; substantially as described.

5. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a member longitudinally movable with respect thereto, a friction-shoe upon the end of said member, a lever pivoted upon said block, means of connection between said lever and said member, means for actuating said lever to bring said friction-shoe into engagement with the periphery of said wheel, and means whereby the rotation of said block may set a brake-shoe; substantially as described.

6. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a member longitudinally movable with respect to said block, a friction-shoe upon the end of said member, a lever pivoted upon said block, a yoked link pivoted between the ends of said lever and running to said member, means for actuating said lever to bring said friction-shoe into engagement with the periphery of said wheel and means whereby the rotation of said block may set a brake-shoe; substantially as described.

7. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said forked member farthest removed from said block, means for moving said forked member with respect to said block to bring said shoe into engagement with said wheel and means whereby the rotation of said block may set a brake-shoe; substantially as described.

8. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said forked member, means for actuating said member to bring said shoe into engagement with the periphery of said wheel, means for holding said shoe normally out of engagement with said wheel and means whereby the rotation of said block may set a brake-shoe; substantially as described.

9. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said member farthest removed from said block, means for actuating said forked member to bring said shoe into engagement with said wheel, a bow-spring confined between said block and said forked member and adapted to hold said friction-shoe normally out of engagement with said wheel, and means whereby the rotation of said block may set a suitable brake-shoe; substantially as described.

10. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a

forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said member, a lever pivoted to said block, means of connection between said lever and said forked member, means for actuating said lever to bring said shoe into engagement with the periphery of said wheel and means whereby the rotation of said block may set a brake; substantially as described.

11. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a lever of the second order pivoted to said block, means of engagement between said lever and said forked member, means for actuating said lever to bring said friction-shoe into engagement with the periphery of said wheel, and means whereby the rotation of said block may set a brake-shoe; substantially as described.

12. In a device of the class described, the combination with a rotatable wheel and axle, of a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said forked member farthest removed from said block, a lever of the second order pivoted upon said block, a yoked link pivotally connected to said forked member and to said lever between its ends, means for actuating said lever to bring said friction-shoe into engagement with the periphery of said wheel, and means whereby the rotation of said block may set a brake-shoe; substantially as described.

13. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said forked member, a lever of the second order pivoted to said block, a yoked link pivotally connected to said forked member and to said lever, between its ends, a connecting-rod pivoted to the end of said lever, means for actuating said connecting-rod to draw said friction-shoe into engagement with the periphery of said wheel, means for holding said friction-shoe normally out of engagement with said wheel, and means whereby rotation of said block may set a brake; substantially as described.

14. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said member, means for longitudinally moving said forked member to throw said shoe into engagement with the periphery of said wheel, means for holding said forked member normally in a position wherein said friction-shoe is out of engagement with said wheel and means for limiting the longitudinal movement of said forked member; substantially as described.

15. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a forked member longitudinally movable with respect to said block, a friction-shoe upon the end of said member, means for moving said longitudinal member to bring said shoe into engagement with the periphery of said wheel, means for holding said member normally in a position wherein said shoe is out of engagement with said wheel, a bolt running through the tines of said forked member, and adapted to limit its motion in one direction, and means whereby the rotation of said block may set a brake-shoe; substantially as described.

16. In a device of the class described, the combination with a rotatable wheel and axle, of a block running loose upon said axle, a member longitudinally movable with respect to said block, a friction-shoe upon the end of said member farthest removed from said block, means for actuating said member to bring said shoe into engagement with the periphery of said wheel, a suitable brake-setting mechanism, and suitable means of connection between said block and longitudinally-movable member and said brake-setting mechanism, whereby the rotation of said block may actuate said brake-setting mechanism; substantially as described.

17. In a device of the class described, the combination with a rotatable wheel and axle, a block running loose upon said axle, a member longitudinally movable with respect to said block, a brake-shoe upon the end of said member, and means for actuating said member to bring said brake-shoe into engagement with the periphery of said wheel, of a member rigidly connected to said block at right angles to said longitudinally-movable member, a piece pivotally connected to said longitudinally-movable member between said friction-shoe and said block, a third piece connecting the extremity of this piece with the extremity of the member rigidly connected to said block, a chain connected to the junction of these members, and a suitable brake-setting mechanism adapted to be actuated by said chain; substantially as described.

18. In a device of the class described the combination with a truck, of a shaft transversely journaled thereon, wheels upon said shaft, brake-beams upon the front and rear of said truck, connecting-rods running from the peripheries of said wheels to said brake-beams, radial levers connected to said shaft, chains connected to said levers, suitable friction mechanisms upon said truck, connected to said chains, whereby the motion of said friction mechanism may actuate said brake-beams; substantially as described.

19. In a device of the class described, the combination with a car and two axles having wheels connected thereto, of a friction-shoe swung upon each of said axles, a lever upon each end of the car, means of connec-

tion between each of said levers and the friction-shoe upon the axle nearer to it, a second lever upon each end of the car, a connecting-rod running from said lever to the opposite end of the car, a crank-shaft journaled upon the opposite end of the car and means of connection between said crank-shaft and the friction-shoe upon the other end of the car whereby the motion of said second lever may operate the friction-shoe upon the axle farthest from it; substantially as described.

In witness whereof I have hereunto set my hand at Chicago, in the county of Cook and State of Illinois, this 31st day of March, A. D. 1902.

ROBERT E. LOCKWOOD.

Witnesses:

E. E. FROHN,

H. P. HAUSCHILDT.