

(No Model.)

2 Sheets—Sheet 1.

H. C. HOPKINS & R. E. LINHAM.
AUTOMATIC CAR BRAKE.

No. 346,204.

Patented July 27, 1886.

FIG. I.

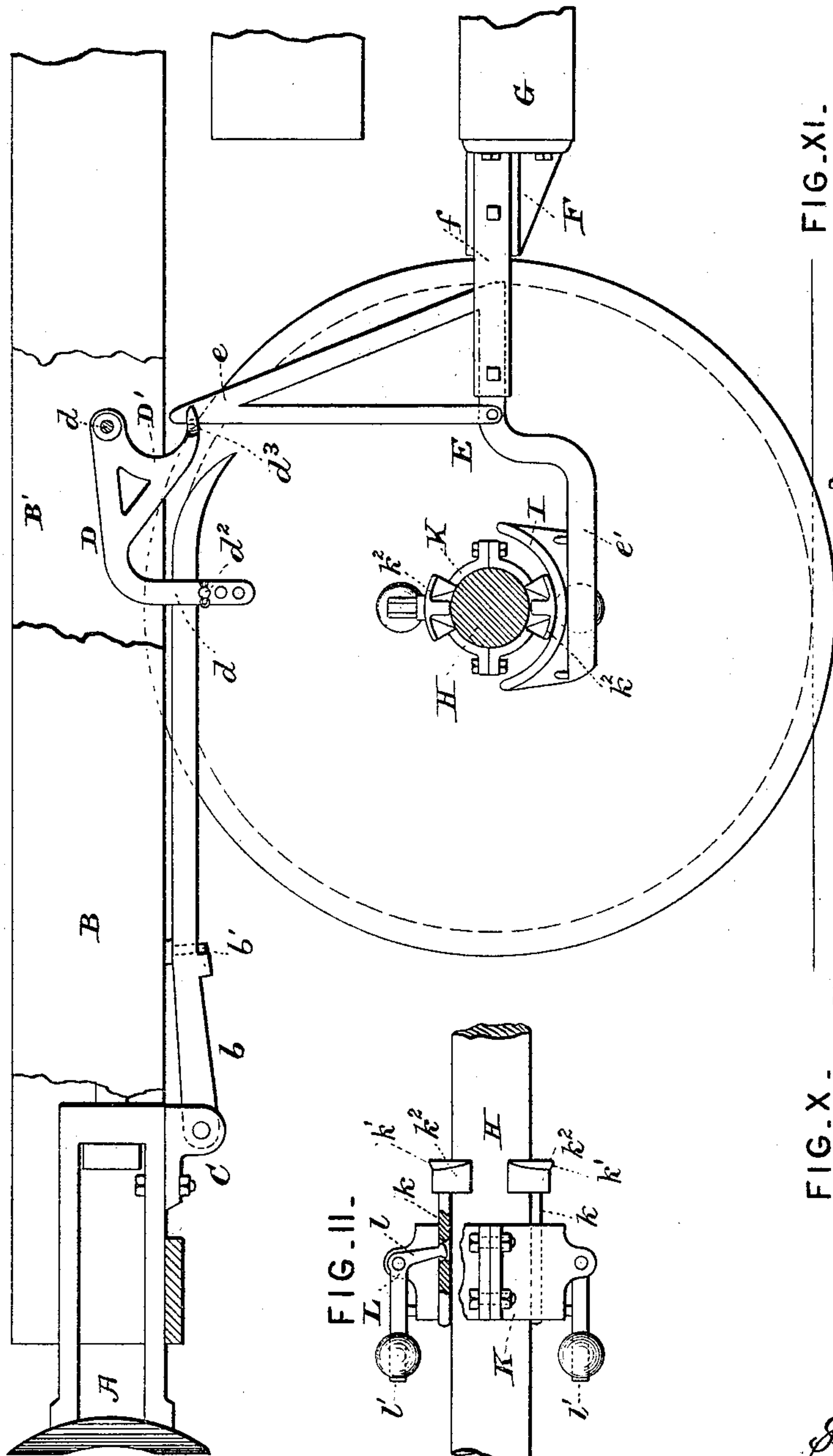


FIG. II.

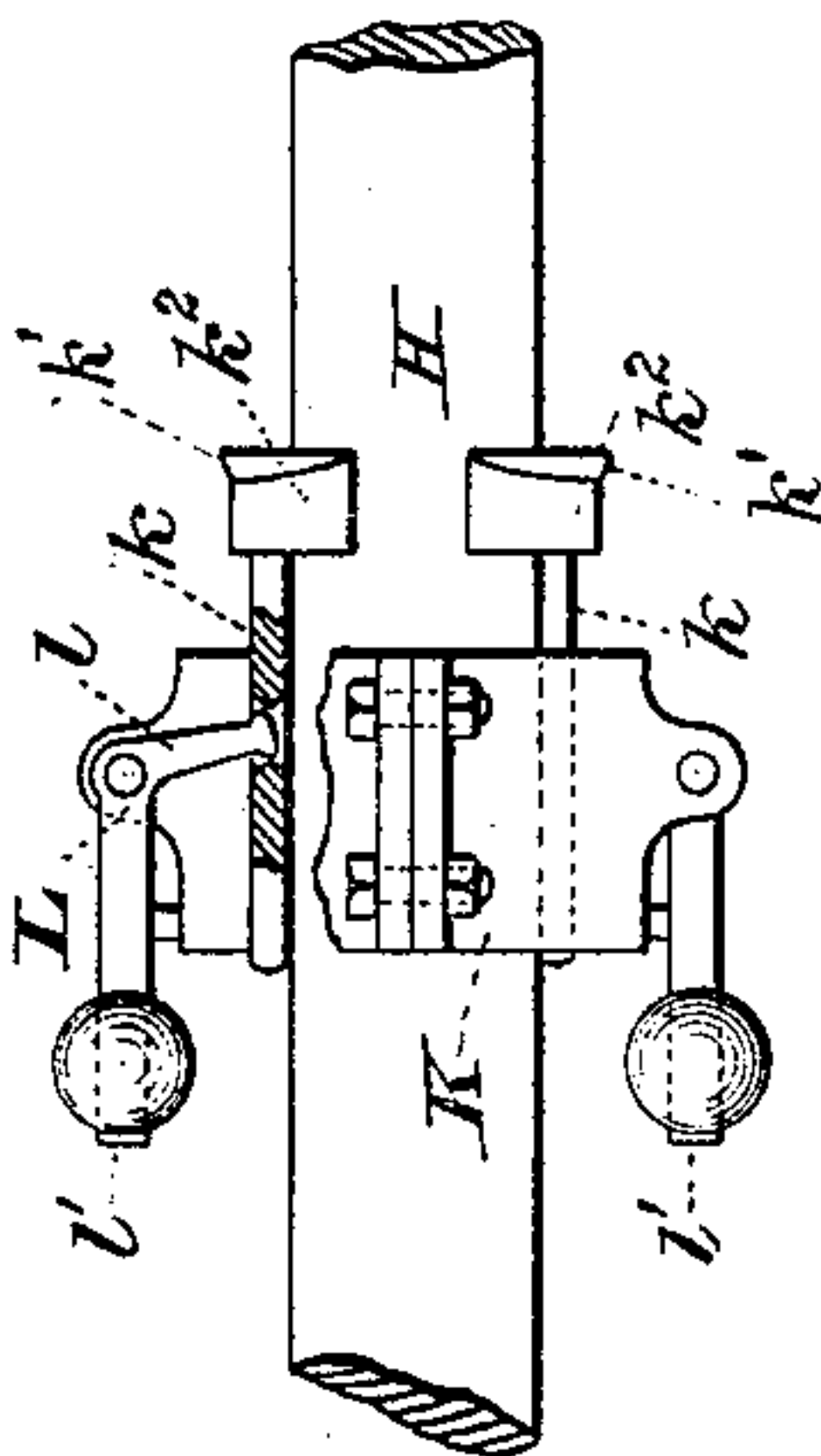
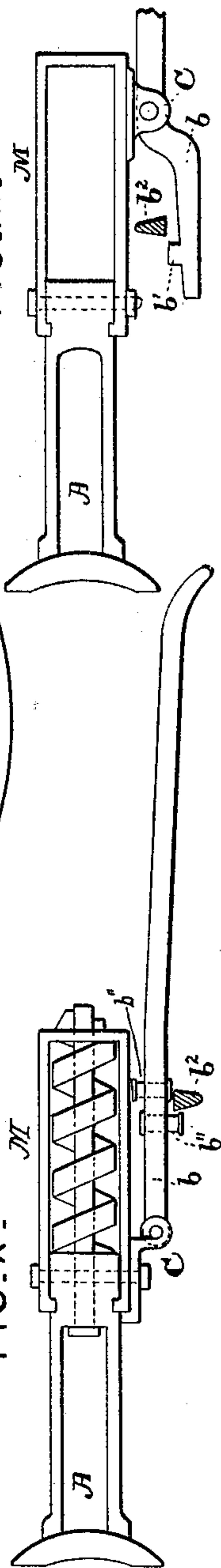


FIG. XI.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 346,204, dated July 27, 1886.

Application filed May 19, 1886. Serial No. 202,665. (No model.)

To all whom it may concern:

Be it known that we, HENRY C. HOPKINS, of Lancaster, Lancaster county, Pennsylvania, and ROBERT E. LINHAM, of Mansfield, county of Richland, and State of Ohio, have invented a new and useful Improvement in Automatic Car-Brakes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making
10 part of this specification.

Our invention relates to certain improvements on what is known as the "Rote Automatic Brake," and more especially the form thereof described in the application of Charles V. Rote for Letters Patent of the United States, filed April 8, 1886, Serial No. 198,246; and it consists in certain details of construction and arrangement of parts, hereinafter fully described, whereby the mechanism is
15 20 materially simplified and its operation rendered more certain, as will appear.

In the accompanying drawings, Figure I shows our improved brake mechanism in side elevation, with so much of the car frame and truck as is necessary to show the relation of the mechanism thereto. Fig. II is a front elevation, partly in section, of one of the brake-governors with a portion of the axle to which it is applied. Fig. III is a side view, similar
25 30 to Fig. I, showing a modification in the construction and arrangement of some of the parts. Fig. IV is a front view of the governor shown in Fig. III. Fig. V is an end view of the yoke or stirrup for coupling the brake
35 40 mechanism to the draw-bar; Figs. VI and VII, detail views of parts of the governor, and Figs. VIII and IX, front and side views of a governor, of the form shown in Figs. I and II, showing a manner of coupling the parts
45 for causing them to act in unison. Figs. X and XI show modifications in the manner of connecting the draw-bar and the sliding bar, hereinafter described.

A indicates the draw bar or buffer arranged to slide in a suitable framing or casing in the car-platform frame, preferably between the two centrally-arranged longitudinal timbers, B B', thereof, and against the resistance of a buffer-spring, a, connected therewith in any

usual or preferred manner. The bar A is provided with a pendent bifurcated bracket, C, between the ears of which is pivoted the outer end of a rod or bar, b, which at its inner end rests and slides in a pendent loop or bifurcated arm, d, of an angular or bell-crank lever, D, pivoted at d', between the timbers B and B'. The loop or fork d has a series of perforations, through any one of which a pin, d², may be passed for holding the inner end of the bar b at the required height. The bar b has a spur or projection, b', designed to engage and act upon the brake-lever (not shown) in a manner similar to that described in the application of Charles V. Rote, referred to, when the bar b is in proper position for that purpose. The lever D has a second pendent arm, D', provided on its lower end with an inwardly-projecting stirrup or U-shaped projection, d³, in or between the arms of which the upper end of the upright arm e of an elbow-lever, E, rests, as indicated, this arrangement permitting the lever D to rise and fall with the car-frame. The lever E is pivoted, at or near its elbow, between the parallel bars f, forming an extension of a bracket, F, secured to a fixed transverse bar, G, of the truck-frame. The horizontal arm e' of the lever E is bent downward and passes underneath the truck-axle H either horizontally, as shown in Fig. I, or in curved form, with its concave face or edge facing the axle, as shown in Fig. III, as may be preferred, and may either form in itself the shoe through which the governor acts on the lever E or the shoe I may be formed separately in one piece, as indicated in Fig. I, or in two (or more) pieces, as shown in Fig. VII, and rigidly bolted to said arm. The shoe is made, preferably, in two or more pieces in the angle-iron form indicated in the sectional view, Fig. VII, and curved as shown, the parts thereof when united to the arm e' approximating a half circle or annulus.

In the preferred form of governor shown in Fig. II, two or more bars or tongues, k k, are adapted to slide on the axle, lengthwise thereof in grooves or ways in a divided collar, K, the parts of which, through suitable flanges, are bolted together, firmly clamping the axle

between them, as indicated. The outer ends of these bars or tongues adjacent to the shoe I are expanded in width or have laterally-projecting wings indicated at k^2 , and are curved on their outer faces in an arc of a circle, of which the axle is the center, and the portion which slides within the collar K has a central slot formed in it through which a pendent arm, l , on a weighted elbow-lever, L, engages the sliding bar k for actuating it. The lever L is pivoted in suitable lugs or ears on the collar K, and the arm l' thereof is weighted sufficiently to cause it to be thrown outward away from the axle by centrifugal action when the car is moving at speed, and by such action of the weighted arm the arm l and with it the slide k is drawn inward, and the expanded end k^2 passes by the shoe I at the side thereof without acting upon it; but when the axle is at rest or is moving sufficiently slowly to permit it, the weighted arm l' falls inward toward the axle in passing over it into the position shown in Fig. II, thereby thrusting the expanded ends or wings k^2 outward or away from the collar K, into the vertical plane of the shoe I, causing them to act upon and depress said shoe I and with it the horizontal arm e' of the lever E, to which said shoe is attached. A bead or projection, k' , on the outer end of the slide prevents the latter when engaged with the shoe from being withdrawn therefrom by the weight of the arm l' when the latter is underneath the axle. By this action the arm e of the lever E will be vibrated forward and acting through the stirrup d^3 on the arm D' of the lever D, the arm d of said lever D and with it the bar b will be lifted for causing its spur b' to pass by the brake-lever without acting upon it. By this arrangement it will be readily understood that whenever the car is at rest or moving slowly, the spur b' can be vibrated freely back and forth with the draw-bar, without acting upon the brake-lever; but when the car is moving at speed, the governor ceases to act on the bar b , and the latter by its own gravity drops into position to cause the spur b' to engage and act on the brake-lever for applying the brakes.

In Fig. III a modification is shown in the arrangement of the connections between the shoe I and the bar b .

The arrangement and action of the lever E, to which the shoe I is applied, are substantially the same as in the construction above described; but, instead of the bell-crank lever D, an upright lever, E' , is employed, having at e^2 a fulcrum-pivot adapted to slide in a slot in a bracket, F' , on a yielding bar, G, of the truck-frame. The upper long arm of lever E' has a chain, e^3 , connected with it, which extends over a grooved pulley, e^4 , journaled between the car-frame timbers B and B' , and down to the inner free end of the bar b , as shown, for acting thereon in a manner that will be readily understood. The connection of the cord or chain e^3 with the lever E' , and also with the end of the bar b , may be ad-

justed through perforations in said bar and lever, as required. The sliding-movement fulcrum of lever E permits the movement of the yielding part of the truck-frame to conform to the load upon it.

In Fig. III the bar b , instead of being pivoted to pendent ears on the draw-bar, is pivoted to a bracket formed on or rigidly secured to the lower face of a stirrup or U-shaped yoke, M, the upright arms $m m'$ of which are perforated to receive the buffer-spring rod a' , which passes through them. The spring a and the spring-compressing plates $a^2 a^3$ are arranged on the rod a' between the arms $m m'$, as shown, so that while the bar b is not connected directly to the draw-bar it is moved inward with said bar for applying the brakes, and its movement outward with the bar is insured by the action of the buffer-spring a .

In Figs. IV and VI a different form of governor is shown. Instead of the sliding tongues or bars and the elbow-levers for operating said slides, the governor is composed of a series of pivoted arms, k^3 , each partially counterbalanced by a short arm, k^4 , extending from its heel end and carrying a light weight, k^5 , as indicated; but the arms k^3 are enough heavier than the arms k^4 to cause them to be thrown outward from the axle by centrifugal action into a position approximating a right angle thereto, in which position they will pass by the shoe I, at the side thereof, without acting upon it; but when the axle is moving slowly the weight of the arms k^3 causes them to fall down upon the axle, in which position, being made of sufficient length for the purpose, they reach and act upon the shoe for depressing the arm e' of the lever E the same as in the other construction above described.

In Figs. VIII and IX the expanded ends or wings k^2 of the sliding bars k are extended, and the end of one extension has a notch or fork, k^6 , and the other is provided with a tongue, k^7 , and they are so arranged that the tongue of one wing or expanded end reaches within the forked end of the wing adjacent thereto, and has a limited play or movement between the arms of said fork. The purpose of this construction is to couple loosely the several arms or slides of the governor in such manner as to permit a limited movement of each independently of the other, and at the same time provide that each, before it reaches the end of its throw in either direction, shall act upon and serve to start the adjacent or succeeding arm in the same direction, and so to prevent it from failing to act through friction or other cause, as sometimes happens where each arm acts independently of the others.

In Fig. X the bar b is provided with the sliding pins b'' , which fall by gravity outside of the brake-levers, (indicated in section at b ,) when the bar is drawn out, and thereby serve to prevent any free play or movement inward of the bar b , when the latter is set to act on the brake-lever. These may be used either with or without the fixed spur b' .

In Fig. XI the lever b is pivoted at a point between its ends to the inner end of the stirrup M, or where the draw-bar is sufficiently extended for the purpose, to the inner end thereof, and the stop b' projects upward from and the brake-lever indicated at b^2 extends over the outer end in such manner that the movement of the inner end of the bar b , as described, will cause the spur b' to act upon or pass by the lever b^2 , the same as above described. In the latter case the bar b will act to pull the lever, instead of pushing it. These, however, are obvious modifications of the construction above described.

Under the arrangement above described, but a single shoe or lever to be acted upon directly by the governor is required, and said lever will be vibrated always in the same direction without reference to the direction of movement of the car, or of rotation of the axle carrying the governor.

The weighted governor-arms in practice operate in connection with suitable stops, which limit their outward throw by centrifugal action, and serve to keep them in position to readily fall inward upon the axle by their own gravity whenever the speed of rotation of the axle becomes sufficiently reduced to permit such action. Such stops also serve to keep the movement of the weighted governor-arms within such limits as will prevent the arms from becoming withdrawn from the slots in the slides k .

Having now described our invention, we claim as new—

1. The combination, with the sliding draw bar or buffer and buffer-spring, of the pivoted rod or bar for actuating the brake-lever, and the yoke or stirrup for connecting said pivoted bar with the buffer-spring, substantially as described.

2. The combination of the sliding draw-bar, the pivoted rod or bar connected therewith,

the governor on the axle, the lever acted upon by said governor, and the independently-pivoted bell-crank lever interposed between said governor-actuated lever and the pivoted bar, substantially as and for the purpose described.

3. The bell-crank lever D, provided with the pendent loop or arm upholding the sliding bar for actuating the brake-lever, and with the stirrup engaging an arm of the lever acted upon by the governor-lever, substantially as described.

4. The combination, with the sliding draw bar or buffer, of the pivoted bar for actuating the brake-lever, the governor, the single lever operated thereby, and the independently-pivoted lever and connections between said pivoted bar and governor-lever, substantially as described, adapted to permit the rise and fall of the frame due to the weight of the load thereon without disturbing the proper working relation between said governor and pivoted bar.

5. The governor-arms adapted to operate each independently of the others at the beginning of its throw in either direction, and provided with a coupling for causing it to act upon the adjacent arm near the end of its throw in either direction, thereby insuring the action of all, substantially as described.

6. The combination, with the sliding draw bar or buffer, and the sliding bar b , for actuating the brakes, of the governor, the single elbow-lever acted upon by said governor, and the elbow-lever D, with its loops or stirrups interposed between said governor-lever and the bar b , and permitting the relative sliding movements thereof, substantially as described.

In testimony whereof we have hereunto set our hands.

HENRY C. HOPKINS.
ROBERT E. LINHAM.

Witnesses:

HUNTINGTON BROWN,
CHAS. F. HARDING.