(No Model.) 2 Sheets—Sheet 1.

S. G. HOWE.

CAR BRAKE.

No. 572,802. Patented Dec. 8, 1896.

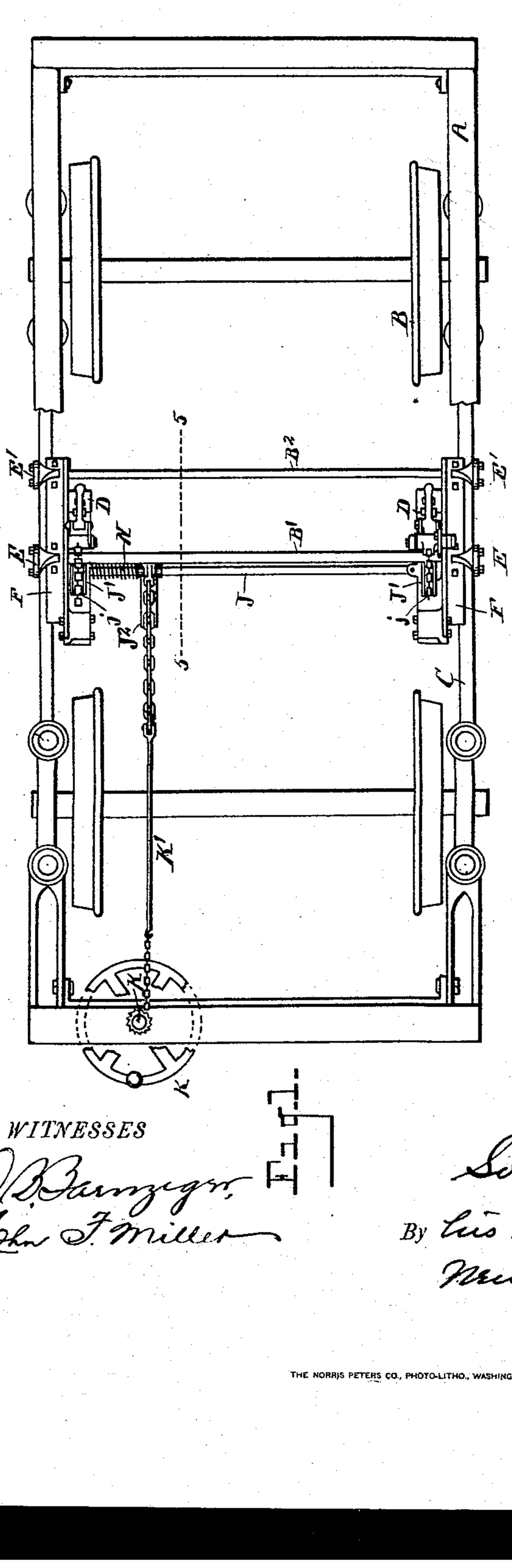

FIG. 1.

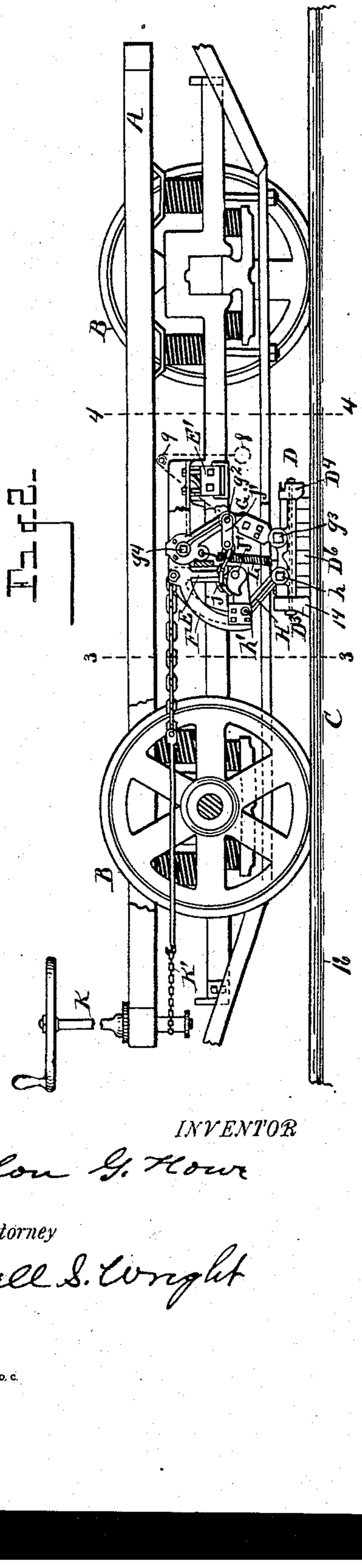

FIG. 2.

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(No Model.) 2 Sheets—Sheet 2.

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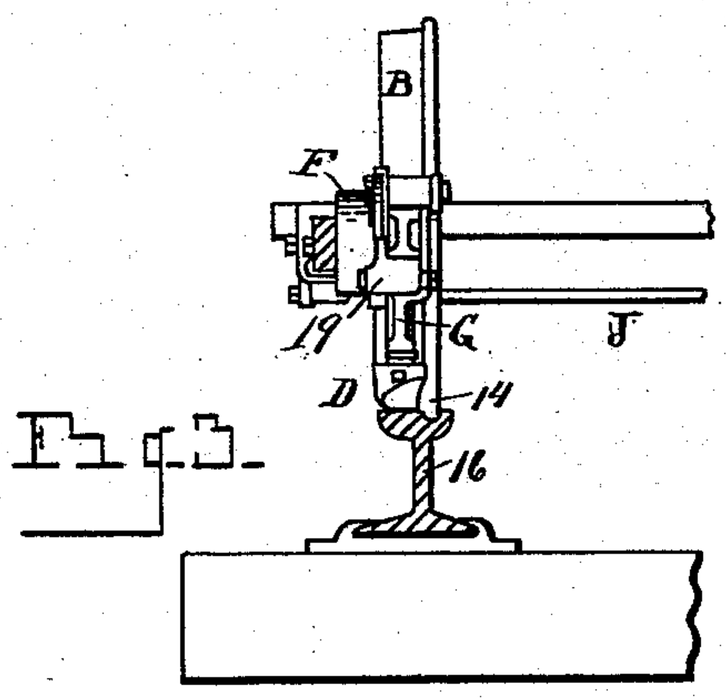

Fig. 3.

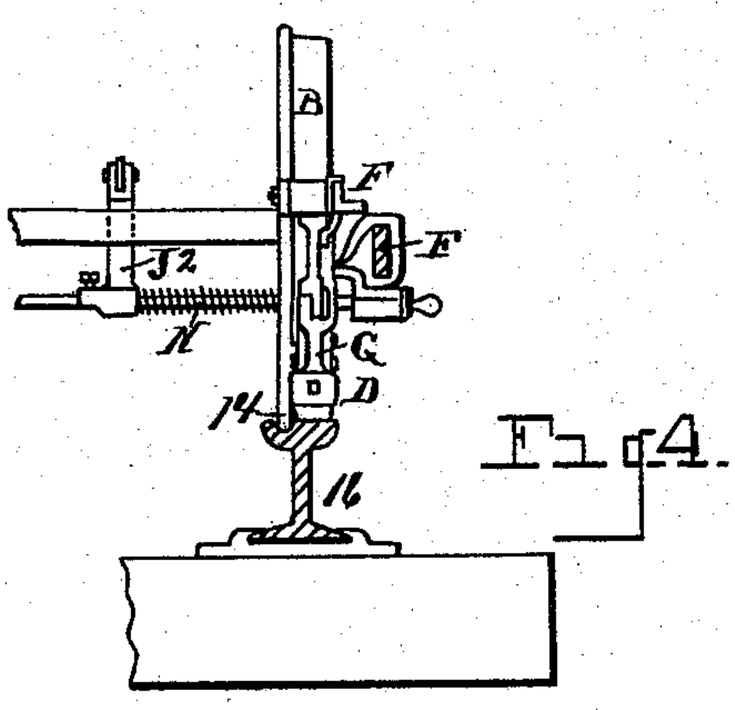

Fig. 4.

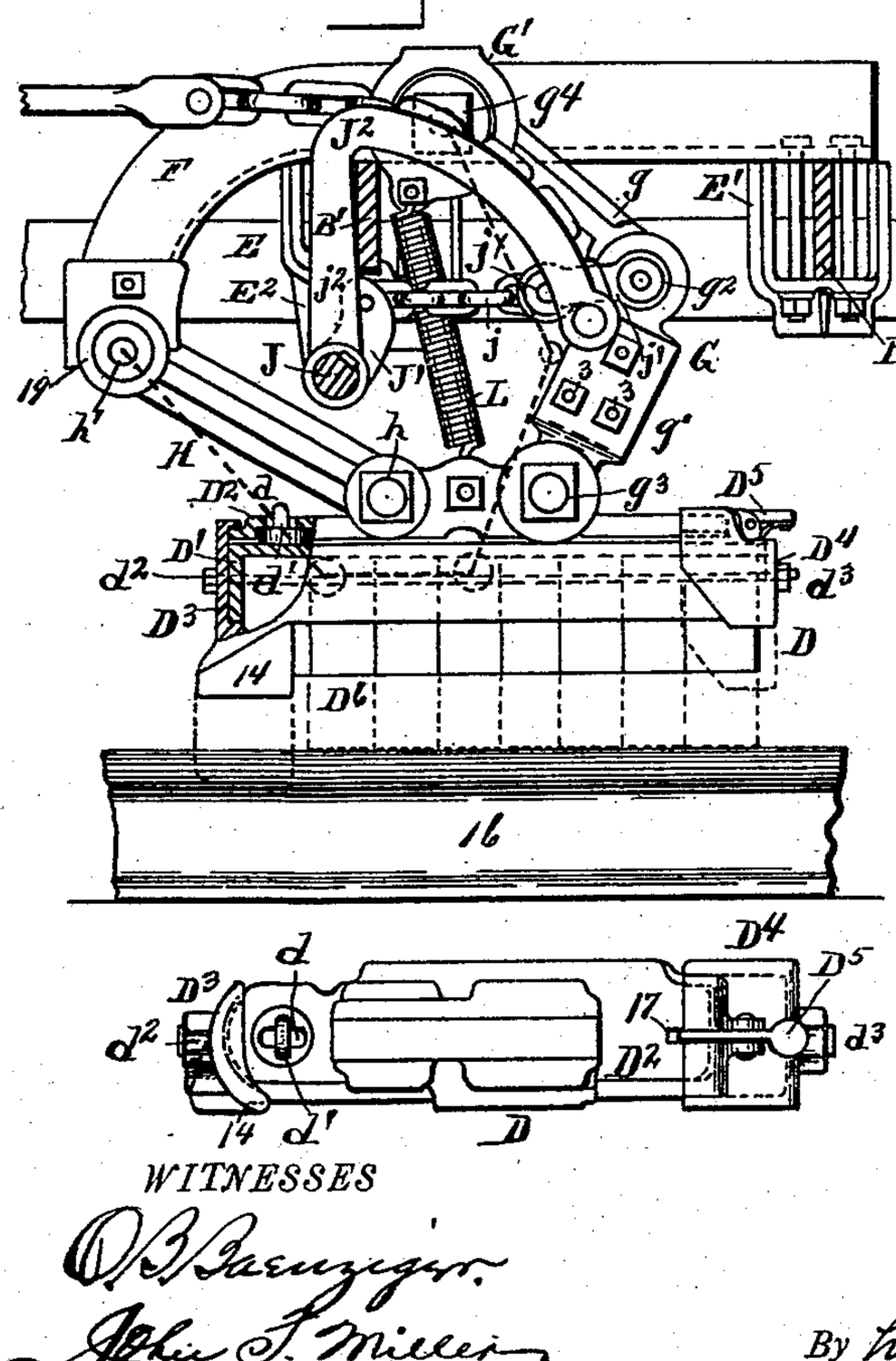

Fig. 5.

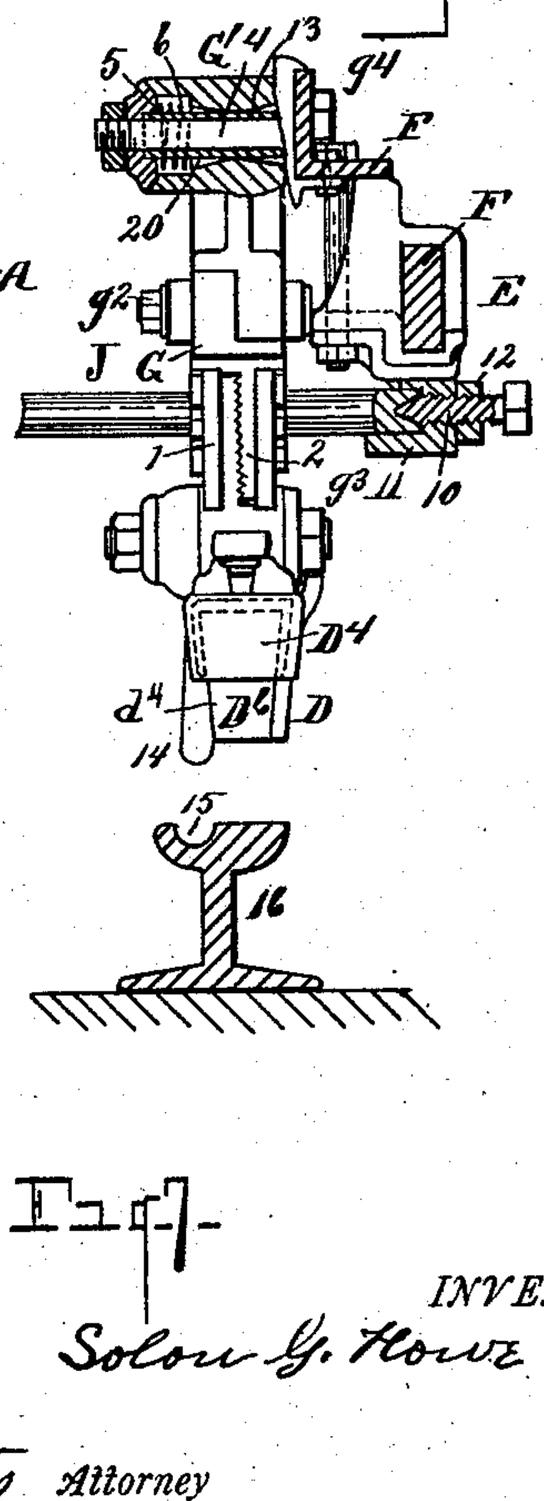

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

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CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 572,802, dated December 8, 1896.

Application filed April 11, 1896. Serial No. 587,083. (No model.)

To all whom it may concern:

Be it known that I, SOLON G. HOWE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Car-Brakes; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its objects certain new and useful improvements in a safety track car-brake of superior construction and efficiency; and it consists of the construction, combination, and arrangement of devices and appliances hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan of a car-truck, showing my invention applied thereto. Fig. 2 is a side elevation thereof, showing parts in section and other parts broken away. Fig. 3 is a vertical section on the line 3 3, Fig. 2, looking toward the brake. Fig. 4 is a vertical section on the line 4 4, Fig. 2, looking toward the brake. Fig. 5 is a view in section on the line 5 5, Fig. 1. Fig. 6 is a rear end elevation of a portion of the brake mechanism, showing parts in vertical section. Fig. 7 is a plan view of one of the brake-shoes and holder.

My improved car-brake is designed more especially for use upon street-railway cars, and acts upon the rails instead of upon the truck-wheels. Under existing conditions several requirements are demanded in a brake for this purpose, among which are—

First. To provide a brake that will control a car of modern construction easily and quickly. With cars of modern construction made much larger and heavier and running at a greater speed than has heretofore been common a brake adapted to effect a short steady stop is of great importance. This is impossible with a brake-shoe operating on the wheels of the truck, since with a wet or slippery track the brakeman may easily skid the wheels under this greater weight and momentum of the car, causing the car to slide if the track is not sanded and making flat wheels in case the track is sanded. It has therefore become necessary and desirable to apply the power of the brake to the track or rails in order to properly control the car.

Second. It is also of obvious importance to provide a brake that will secure the largest frictional results and yet wear the track or rail as little as possible.

To effect these desirable and important results, I design to construct my improved brake-shoe so as to secure the necessary friction, largely at least, by wood having the grain thereof acting endwise upon the rail.

In order to get a quick and powerful action by my improved brake, my invention contemplates also the employment of a knuckle-jointed shoe-lever actuated by an eccentric on a rock-shaft, to which is also attached an oscillatory lever so arranged as to bring the pulling strain on said lever at essentially right angles to the eccentric when operating the brake-shoe on the track.

To these ends, A represents any suitable framework of a car-truck.

B represents the trucks.

C represents the rails or track.

D represents a brake-shoe acting upon the corresponding rail or track, which may be within the scope of my invention made in any suitable manner, but preferably as hereinafter set forth.

B′ B^2 denote cross-bars of the frame, to which are fastened at each end hanger-blocks E E′. These hanger-blocks are preferably engaged to the main side and center cross-bars of the frame in order to distribute the strain as evenly as possible on the truck-frame. To these hanger-blocks I attach on each side of the car an angle-iron bar F.

G denotes a knuckle-jointed brake-shoe lever, consisting of arms g g', jointedly connected at their adjacent ends, as indicated at g^2. The lower arm g' has a jointed connection with the brake-shoe, as indicated at g^3. The upper arm of the knuckle-lever has a jointed connection with the adjacent angle-bar F, as indicated at g^4, said angle-bars being provided with suitable hinge or joint boxes, (indicated at G′.)

H indicates a drag-bar having a jointed connection with the brake-shoe, as indicated at

h, and with the lower end of the angle-iron bar, as indicated at h'.

J indicates a rock-shaft secured in brackets or lugs E^2, depending from the front set of hanger-blocks E. The rock-shaft is provided near each end with an eccentric J'. These eccentrics are connected with the knuckle-lever by corresponding chains j or other suitable means, an arm j' being preferably connected with the arm of the knuckle-lever with which the chain is connected. The chains are connected with the outer portions of the eccentrics, so that as the rock-shaft is rotated in the proper direction the corresponding chains will bear upon the upper edge of the eccentric, as indicated in Figs. 1 and 2, Fig. 2 showing the brake applied to the track, while Fig. 5 shows the brake-shoe in full lines in elevated position and in dotted lines in contact with the track.

K denotes a brake-shaft provided with a chain or cable K' to be wound thereupon, said chain or cable being connected at its opposite end with the rock-shaft J. I construct the rock-shaft with an oscillatory lever-arm J^2, with the outer extremity of which the chain or cable K' is connected. Said oscillatory lever-arm is preferably so constructed and arranged as to bring the pulling strain, as already described, on the knuckle-lever at right angles to said eccentric when applying the brake-shoe to the track. This oscillatory arm J^2 is preferably constructed with its inner portion j^2 projecting at right angles from the rock-shaft, the outer portion of said lever-arm being curved on the arc of a circle toward the lower arm of the knuckle-lever G, the chain K' riding upon the curved portion of the arm. The lower arm g' of the knuckle-lever G is preferably made shorter than the upper arm g. By this arrangement it will be seen that the eccentrics of the rock-shaft in the act of setting the brake-shoe act on the short arm of the knuckle-lever, whereby I am enabled to get a quick application of the brake and a quick release thereof. The drag-bars H prevent a back action upon the knuckle-bar levers when the shoe is applied to the track. To lift the shoe from the track, I have shown a spring L adapted to this end, each brake-shoe being provided with such a spring, or any other suitable means may be employed to retract the brake-shoe when power is released therefrom.

The brake-shoe is preferably constructed with a shoe-holder case D' and with a shoe-holding plate D^2, to which the knuckle-lever and the drag-bar are attached. D^3 and D^4 are toe and heel caps passing over the ends of said shoe-holder, as shown, and over the extremities of the plate D^2. Said plate is provided with an elongated orifice d, and the case D' is provided with a T-headed lug d', engaging in said orifice. This orifice and lug are so arranged that the lug may be passed through the orifice at right angles to the normal position of the shoe-holder case, when said case may be swung around into place and secured in proper position by a spring-latch, (indicated at D^5.) The overlapping of the caps at the toe and heel of the shoe provide an additional security, said caps being held in place by a bolt d^2, passed through the caps, the extremities of the shoe-holder, case and the blocks held in place in said case. The shoe-holder case D' consists, essentially, of a metal box, open on its under side, said box preferably having one beveled side, as shown at d^4, Fig. 6. One end of said case is open to permit the sliding in and out thereof of the friction-blocks (indicated at D^6) secured in the case by the bolt d^2, passing through the toe-cap (if one is employed) and through the closed end of the shoe-holder case and through the proper orifice in said blocks and also through the heel-cap, said heel-cap being arranged so as to slide over the open end of the shoe-case, said heel-cap constructed and arranged so as to follow up the friction-blocks to compensate for any side wear or shrinkage. By means of the nut d^3 on the end of the bolt d^2 the friction-blocks can be properly compressed into the shoe-case and retained therein. To compensate for uneven wear on the shoes in case it should occur, I prefer to construct the lower portion g' of the knuckle-lever in two parts, (indicated in Fig. 6 at the numerals 1 and 2,) having an adjustable engagement the one with the other, so that the lower arm g' as a whole may be lengthened or shortened, as may be desired, the two parts 1 and 2 of the portion g' being secured in a desired position of adjustment by means of bolts 3, passed therethrough. I prefer that the adjacent faces of said parts 1 and 2 should be corrugated, as shown in Fig. 6. Said parts, however, may be adjusted in any other desired manner within the scope of my invention.

To permit the proper action of the brake-shoe on switches and curves, I construct the upper and lower joints of the knuckle-lever so as to have a spring action, one such joint being shown at g^4, Fig. 6, the construction of the joint at g^3 being similar. In said figure the hinge-pin 4 is provided with a spring 5, acting in a chamber 6, said spring bearing on the side of the knuckle-lever at its jointed end, so as to keep said lever in a perpendicular position when the brake is suspended above the track and allow it to yield on switches and curves. The chamber 6 is formed within a case 7 about the joint.

In Fig. 2 I have shown at the numeral 8 a weight arranged over a pulley at 9 to retract the brake when the power is released. This weight may be employed instead of a spring, if preferred.

The rock-shaft J may be automatically returned to normal position by any suitable means, as by a spring N. (Shown in Fig. 1.) The rock-shaft is kept from rattling and any lost motion is taken up by means of a set-screw 10, having a threaded connection in a

lug 11, depending from the adjacent hanger-block. A jam-nut 12 holds the set-screw firmly in place.

The construction and arrangement herein-before described permit the brake-shoe to take the sweep of curves and switches in a very ready and convenient manner.

The lever-arms g and g' are formed with tapering orifices for the reception of the corresponding hinge-pin, as shown at 13 in Fig. 6, said orifices being tapered from the center outward, so as to give a desired amount of lateral play to said arms when necessary. The drag-arms H each have a like tapered orifice at both ends to allow for lateral motion.

The toe-cap D^3 of each of the brake-shoes is preferably constructed with a depending flange 14 to fit into the groove 15 of the rail, (indicated at 16,) said flange 14 forming a guide for the brake-shoe when engaged in the groove of the rail. Said flange also serves to clear the track or rail from stones or other obstacles in the way of the action of the brake, and also clears the groove when the brake is applied. To this end the front face of the flange 14 may be beveled, as indicated, for example, in Fig. 5, to more readily throw an obstruction from the track.

The blocks (indicated at D^6) can be made of any suitable material. Blocks of wood set on end afford a very superior friction in the arrangement of the brake-shoe with the rail. Should such blocks be found to wear unduly, wooden blocks might be interspersed with blocks of metal to secure more lasting qualities to the brake-shoe. Should it be desirable to renew any of the blocks, the brake-shoe can readily be turned at right angles to the shoe-holder plate by simply disengaging the latch D^5, which is fulcrumed on the heel-cap, its forward end projecting into an orifice 17 in the back end of the shoe-holder plate. On the lower end of the angle-iron F is a hinge-case 19, in which the forward end of the drag-bar is attached to the hinge-pin.

I design to provide all excessive wearing joints with sleeves (indicated, for example, at 20 in Fig. 6) over the hinge-pins, said sleeves being easily and cheaply renewable, if desired.

By connecting the drag-bar and the knuckle-lever with the shoe on opposite sides of the longitudinal center of the shoe, as shown, I am enabled to get a lifting action upon the center of the shoe by the spring L, and am enabled also to get a bearing action of the shoe upon the rail toward both ends thereof.

By having a flexible connection of the eccentrics J' with the knuckle-levers, as by the chains shown and described, there is greater freedom of action, as in passing about a curve, while also I am enabled to get the greatest amount of power with the least possible strain. With a rigid connecting arm or rod it will be obvious that the eccentrics J' could not be thrown down past the center of the rock-shaft, as the rod would strike said shaft, but with a flexible connection riding upon the eccentric I am enabled to throw the outer extremity of the eccentric down past said center, by means of which I can apply the pulling strain over the shortest diameter of the eccentric, which gives me increased power at the point of applying friction.

What I claim as my invention is—

1. In a car-brake, the combination of a brake-shoe, a knuckle-lever engaged therewith, a rock-shaft provided with an eccentric, and a flexible connection connecting the outer end of said eccentric with said lever, substantially as and for the purpose described.

2. In a car-brake, the combination of a brake-shoe, a knuckle-lever, a rock-shaft provided with a lever-arm J^2 and with eccentrics J', flexible connections connecting the outer portions of said eccentrics with said lever, and means connected with said lever-arm to actuate the rock-shaft, said flexible connections riding upon the upper edge of the corresponding eccentric adjacent thereto in the application of the brake, substantially as and for the purpose described.

3. In a car-brake, the combination of a brake-shoe, a knuckle-lever having one of its arms adjustable, and a rock-shaft to actuate said lever, substantially as and for the purpose described.

4. In a car-brake, the combination of a brake-shoe, a knuckle-lever connected therewith and with the frame of the car-truck, a drag-bar connected with said frame and with the brake-shoe, means to actuate the knuckle-lever, and a lifting device to retract the shoe, said drag-bar and knuckle-lever connected with said shoe on opposite sides of the longitudinal center of the shoe, and said lifting device connected with the shoe intermediate the drag-bar and knuckle-lever, substantially as and for the purpose described.

5. In a car-brake, the combination of a brake-shoe, a knuckle-lever to actuate the brake-shoe, a rock-shaft provided with an eccentric, a flexible connection connecting the outer portion of the eccentric with the knuckle-lever, a lever-arm J^2 connected with said rock-shaft, and means connected with the outer end of said lever-arm to actuate the rock-shaft, said arm J^2 arranged to bring the pulling strain on the knuckle-lever at essentially right angles to the longest diameter of the eccentric in applying the brake, substantially as and for the purpose described.

6. In a car-brake, the combination of a brake-shoe, a knuckle-lever to actuate the brake-shoe, means to actuate the knuckle-lever, said knuckle-lever adapted to have a lateral movement, substantially as and for the purpose described.

7. In a car-brake, the combination of a brake-shoe, a knuckle-lever to actuate the shoe, and means to keep the knuckle-lever in a perpendicular position when suspended

over the track, and to allow said lever to yield when riding upon a curve or switch, substantially as and for the purpose described.

8. In a car-brake, the combination of a brake-shoe, a knuckle to actuate the shoe, a support for the upper end of the lever, a hinge-case at the upper and lower joints of said lever, and springs within said case bearing on the side of the adjacent arms of said lever, substantially as and for the purpose described.

9. In a car-brake, a brake-shoe constructed with a shoe-holder case, and a shoe-holder plate, said case being detachably connected by an oscillatory engagement with said plate, substantially as and for the purpose described.

10. In a car-brake, the combination of a brake-shoe, and a knuckle-lever to actuate the shoe, said brake-shoe constructed with a shoe-holding plate, with which the knuckle-lever has a jointed connection, and with a shoe-holder case, said case being detachably connected by an oscillatory engagement with said plate, substantially as and for the purpose described.

11. In a car-brake, a brake-shoe constructed with a shoe-holder case, a shoe-holding plate, a removable and adjustable heel-cap, and with a removable toe-cap, substantially as and for the purpose described.

12. In a car-brake, a brake-shoe constructed with a shoe-holder case, a shoe-holder plate, and with toe and heel caps, said toe-cap constructed with a depending flange to fit into the groove of the rail, substantially as set forth.

13. A brake-shoe having in combination a shoe-holding case, blocks engaged in said case, and a shoe-holding plate, said case having an oscillatory engagement with said plate, substantially as and for the purpose described.

14. In a brake-shoe, the combination of a shoe-holding plate, a shoe-holder case, having an oscillatory engagement therewith, a heel-cap and a spring-latch engaging the heel-cap with said plate, substantially as and for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

SOLON G. HOWE.

Witnesses:
N. S. WRIGHT,
O. B. BAENZIGER.