No. 745,848. PATENTED DEC. 1, 1903.

W. W. HOPKINS.

CAR BRAKE.

APPLICATION FILED MAY 26, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

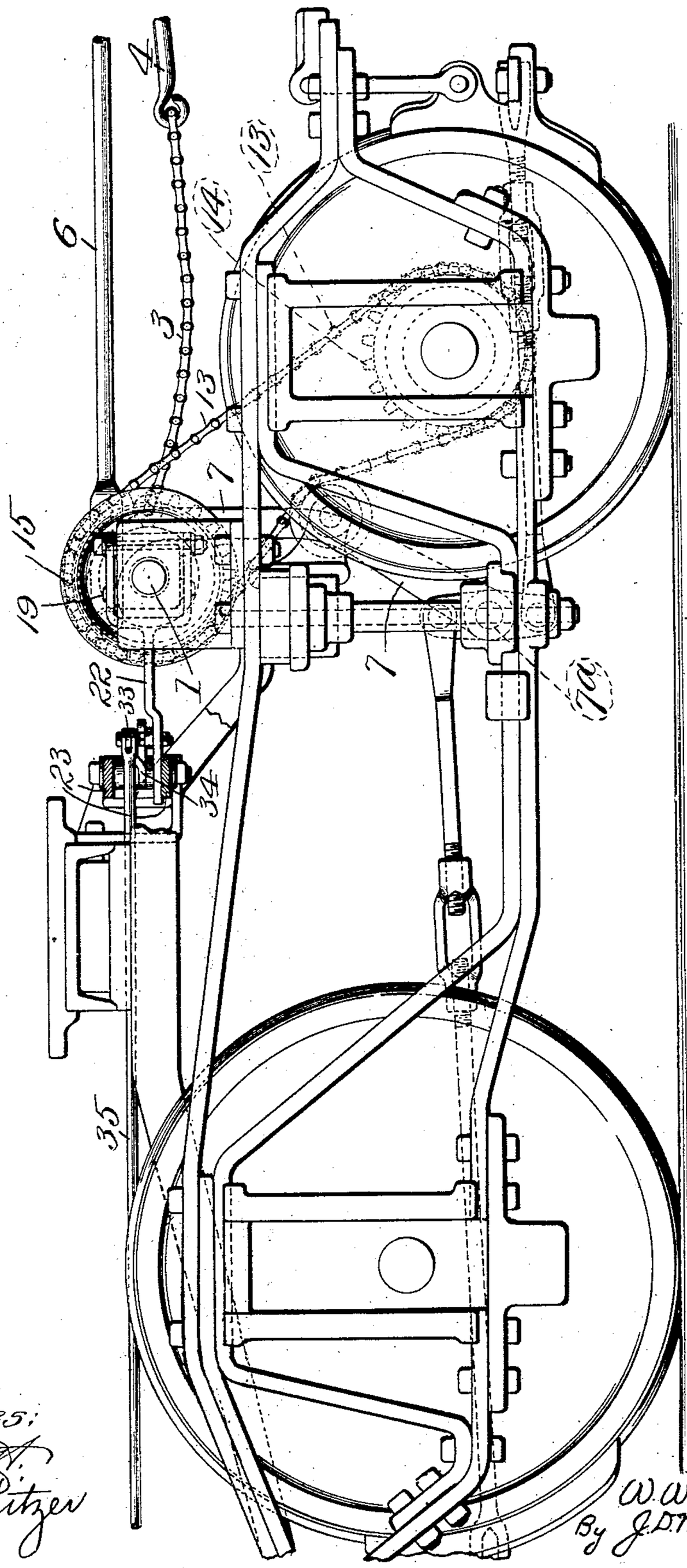

Fig. 1.

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Wm. H. Scott.
Sloan Pitzer

Inventor:
W. W. Hopkins.
By J. D. Rippey, Atty

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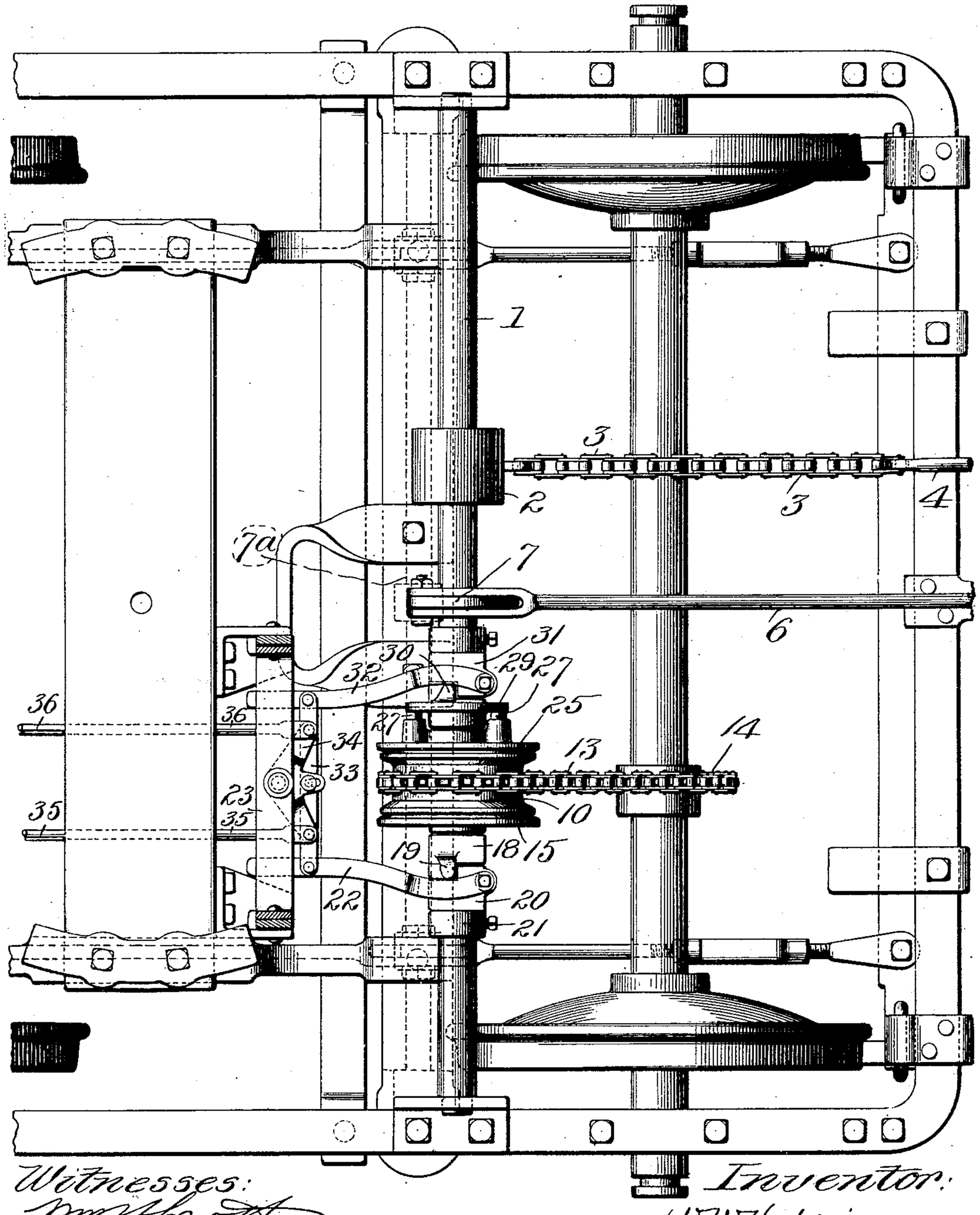
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
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NO MODEL. 4 SHEETS—SHEET 3.

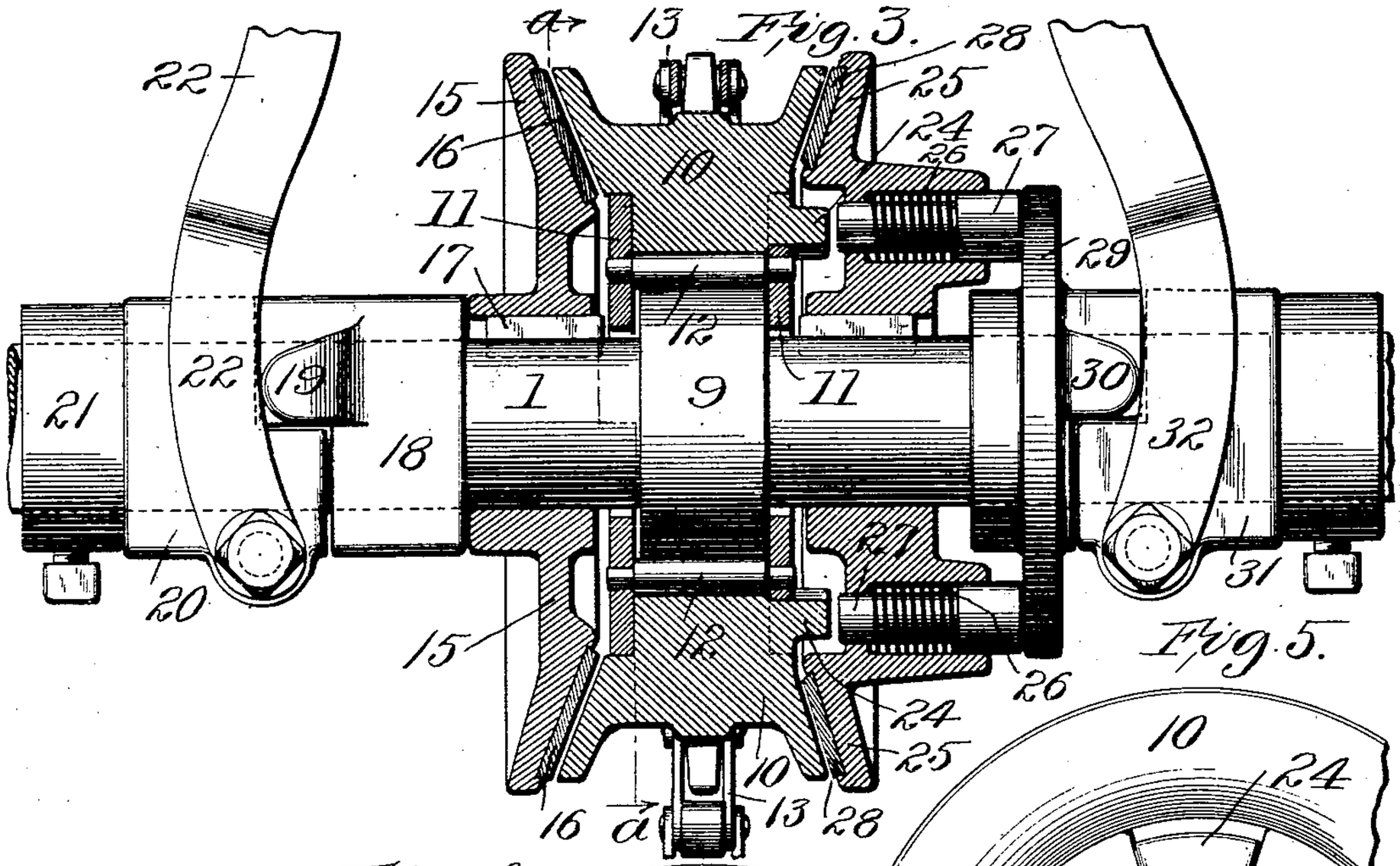


Fig. 4.

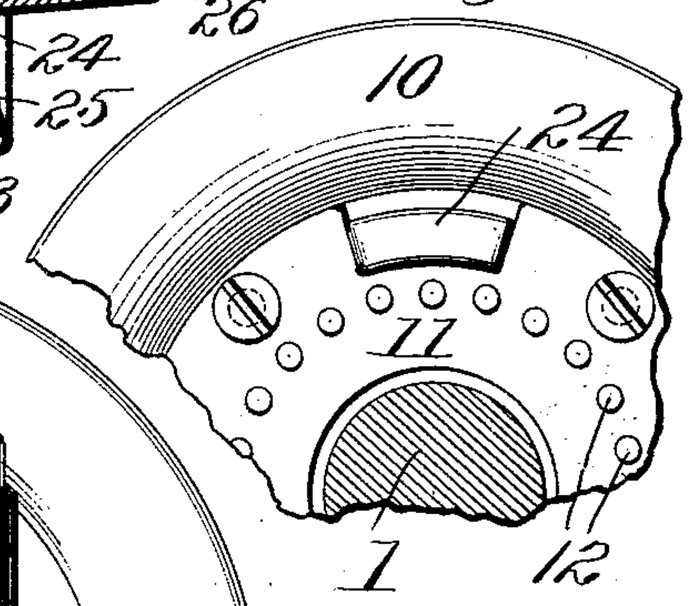


Fig. 5.

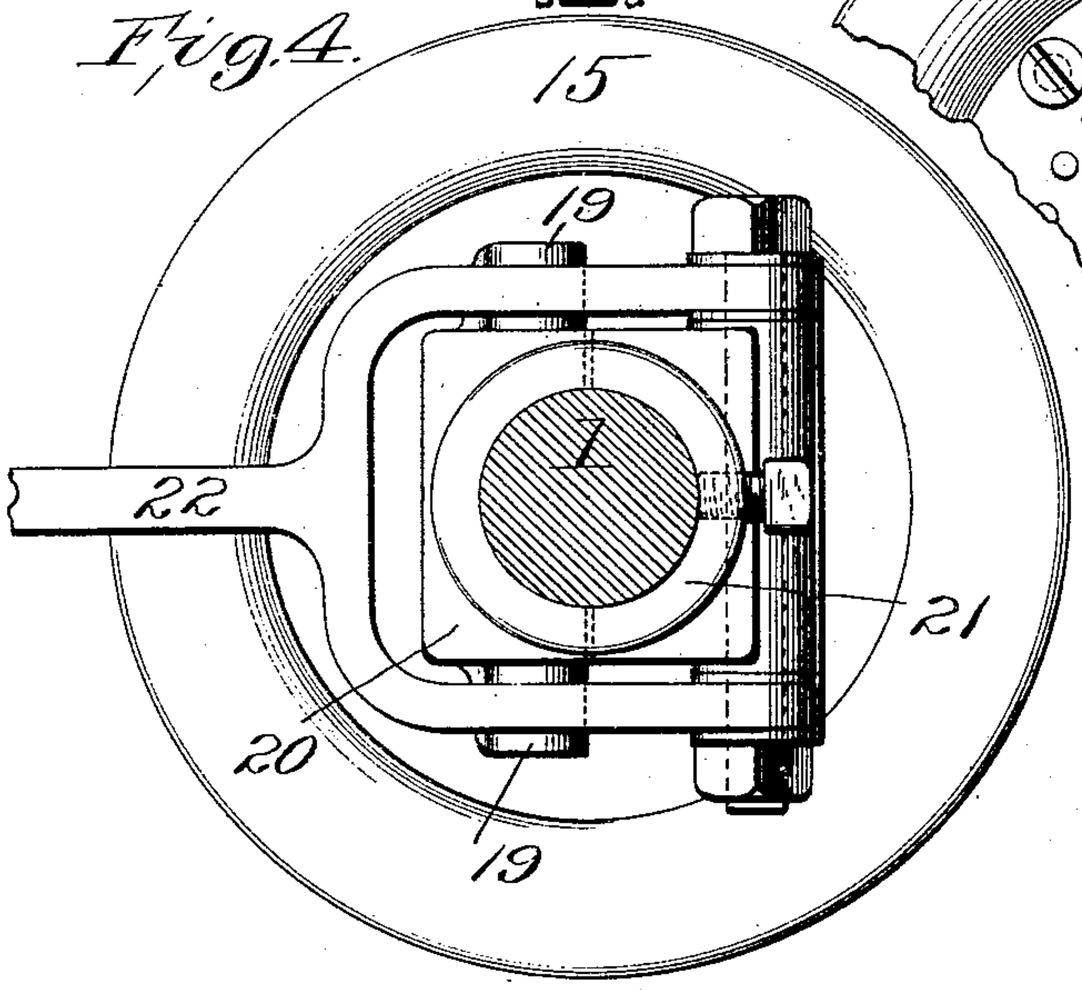
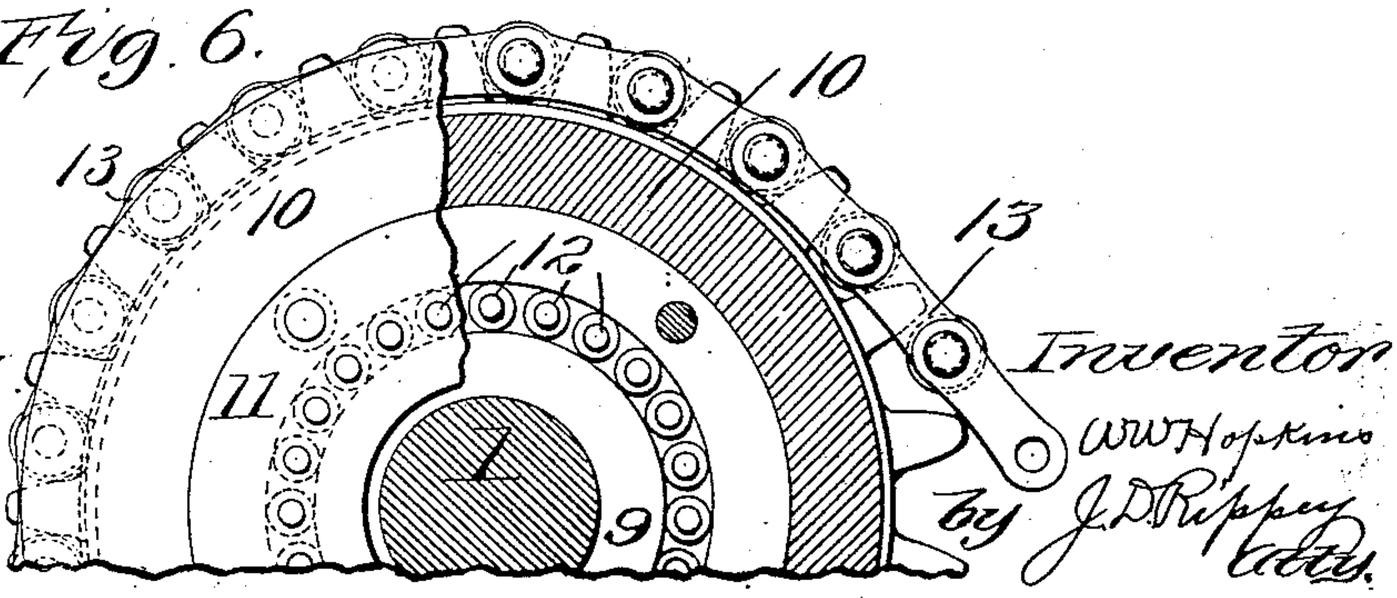


Fig. 6.



Witnesses:
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APPLICATION FILED MAY 26, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 7.

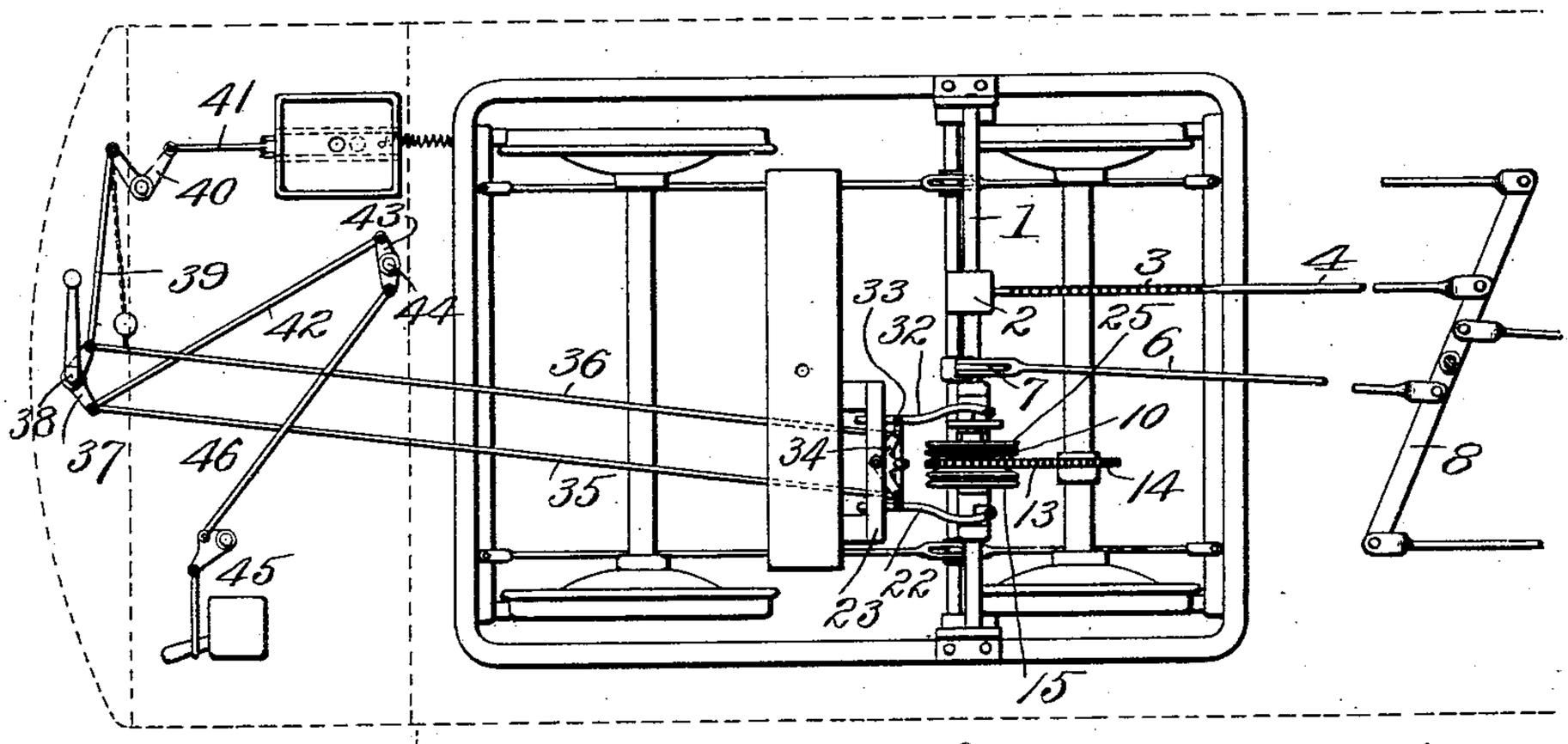

Fig. 8.

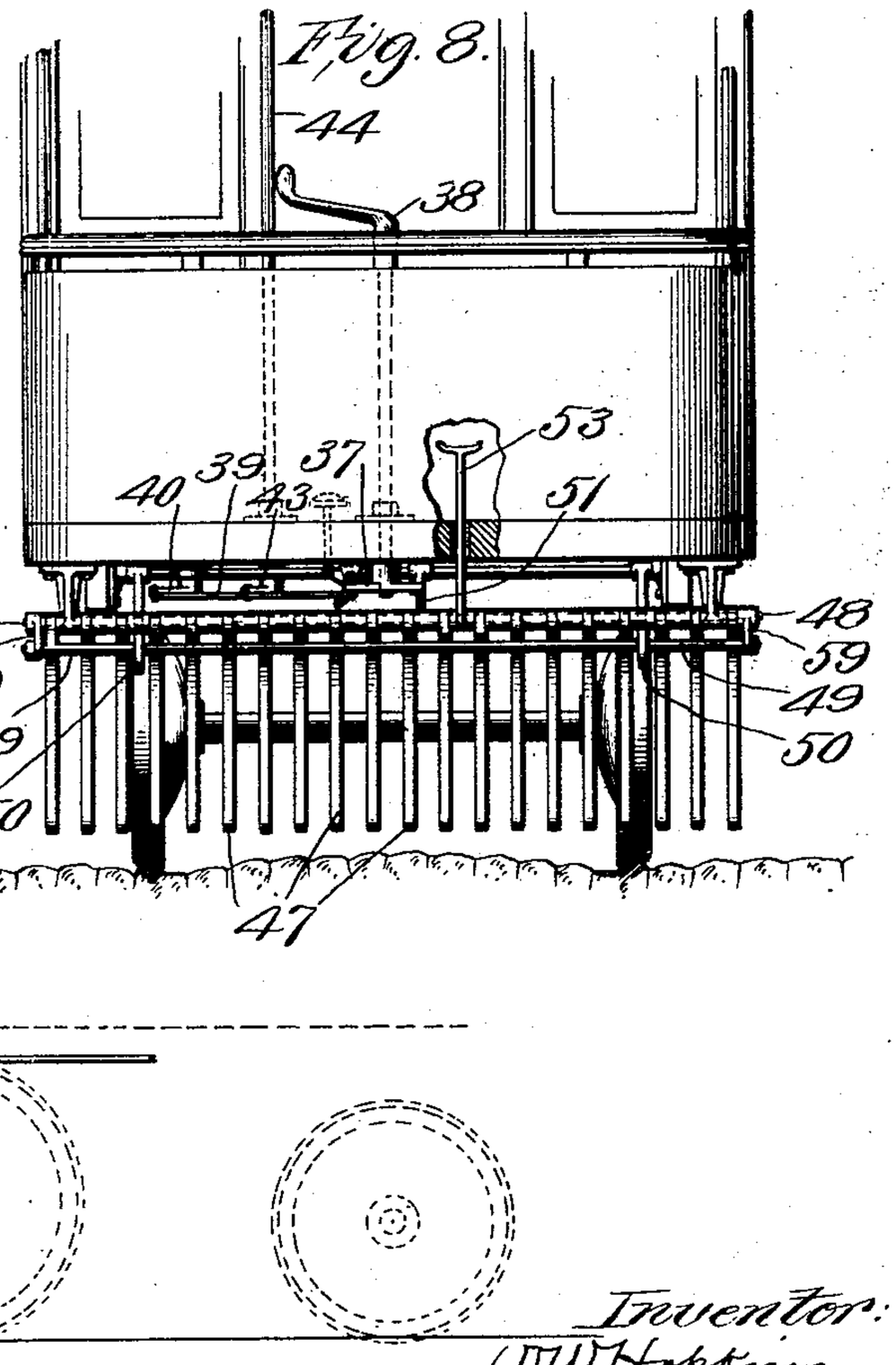

Fig. 9.

Witnesses:
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No. 745,848. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM W. HOPKINS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO WILSON P. H. TURNER, OF NORMANDY, MISSOURI.

CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 745,848, dated December 1, 1903.

Application filed May 26, 1902. Serial No. 108,985. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. HOPKINS, a citizen of the United States, residing at St. Louis, Missouri, have invented new and useful Improvements in Car-Brakes, of which the following is a specification.

This invention relates to car-brakes; and it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

The object of my invention is to produce an emergency and service brake in combination for street and railway cars so that either will be at the immediate command of the motorman or car operator as his needs demand and when so used for either purpose will be of quick and reliable action and overcome the momentum of the car in the shortest possible time and distance when so required.

Another object of my invention is to produce a power-brake of the class known as "friction-brakes" that will be the least disposed to disorder by the wearing away of its frictional bearings and will also require less frequent adjustments.

Another object of my invention is to produce a power-brake of the class known as "friction-brakes" that will admit of the easy introduction of fiber rings or other suitable friction plates, rings, or substances at its points of frictional bearing and that will need no further or additional adjusting methods or parts to take up the wearing loss in order to keep it safely and practically operative.

Another object of my invention is to produce a power-brake of the class known as "friction-brakes" that will have a distinctively emergency feature, but so related to the general-service feature as to have a common handle or lever at the command of the car operator.

Another object of my invention is to produce a power-brake of that class known as "friction-brakes" having a distinctively emergency feature that will admit of the simultaneous opening of the sand-box, the dropping of the fender, and a power shut-off in connection therewith all by the one movement of the handle or lever at the command of the car operator, thereby averting danger by the non-confusion of the car operator when so many things are to be done quickly and in the presence of danger.

Another object of my invention is to produce an emergency-brake and service-brake of that class known as "friction-brakes" in one mechanism and so related as to have a common source of power, a common rotatable shaft for braking purposes, and a common means of connection to the brake system of any car to which it is applied, as well as a common handle or lever for operating the same.

Another object of my invention is to simplify the construction of power-brakes of the class known as "friction-brakes" to increase their reliability of action and their powers of endurance in constant service.

Figure 1 is a side view of a car-truck on which my improved brake is mounted. Fig. 2 is a plan view. Fig. 3 is a sectional view of the friction members. Fig. 4 is a side view of the same. Fig. 5 shows one of the lugs or projections on the central friction member forming part of the emergency attachment. Fig. 6 is a sectional view on the line *a a* of Fig. 3. Fig. 7 is plan view showing the devices for opening the sand-box and breaking the current simultaneously with the operation of the emergency-brake. Fig. 8 is a front view of the car, also showing an improved fender. Fig. 9 shows the same parts in side elevation.

My improved brake is designed both for service and emergency purposes and can be used for either purpose at any time. By turning my brake-handle in one direction the emergency members are set, the sand-box opened, the fender lowered, and the current cut off, thereby bringing the car to a stop in the shortest possible distance and time. The movement of the brake-handle in the opposite direction applies the brakes more gradually, and thereby fulfils the functions of a service-brake.

Essentially the brake consists of a shaft 1, supported transversely in the truck-frame parallel with the axle. On the shaft 1 is fixed a pulley 2, from which leads a chain 3 to the brake-rod 4, so that whenever the said

shaft is rotated the chain will wind around the pulley 2, and thereby set the brakes, the suddenness of which operation is determined by the rapidity with which the chain is wound on the pulley. All the brakes on the car are set. The rod 6, having one end connected to an arm 7 on the rock-shaft 7^a and the opposite end connected to the brake-lever 8, applies the brakes whenever the shaft 1 is rotated and the chain 3 is wound thereon.

9 indicates an enlargement or collar on the shaft 1, upon which a sprocket-wheel 10 is mounted. The wheel 10 is held on the collar or enlargement 9 by the plates 11, one of which is attached to each side of the said wheel. A series of antifriction-rollers 12 is carried by the plates 11 within the wheel 10 and rotate upon the collar or enlargement 9 without rotating the shaft 1, thereby preventing the said wheel from becoming worn by its constant rotation when the car is in motion. These rollers also render a lubricant for the wheel unnecessary.

A chain 13 passes around the wheel 10 and around another sprocket-wheel, 14, on one of the axles. The latter wheel is rigid upon the axle, so that when the car is traveling it will turn with the axle, and thereby constantly turn the wheel 10, when not otherwise actuated, on the shaft 1. However, when the wheel 10 is set on the shaft 1 the latter will turn and wind up the chain 3, and thereby set the brakes.

The means employed for causing the wheel 10 to rotate the shaft 1 consists of two disks, one for emergency and one for service use. The same operating devices are used to set both disks, the direction of movement determining which disk will be moved. For the service-brake the disk 15 is used, the same being mounted upon the shaft 1 at one side of the wheel 10, as clearly shown in Fig. 3. The inner face of the disk 15 is preferably convex and projects into the concave surface of the wheel 10, which results in outward pressure on the wheel 10 whenever the friction-clutch is applied, and thereby increases the effectiveness of the clutch. A fiber ring 16 is preferably attached to the inner face of the disk 15 and forms the frictional surface, so that this surface can readily be re-formed whenever it becomes worn. The disk 15 is held against rotation of the shaft 1 by a key 17.

A collar 18 is mounted on the shaft 1 against the outer side of the disk 15, and said collar is provided with lugs or projections 19, one on its upper and one on its lower side. A second collar 20 bears against the outer end of the collar 18 and is held against outward movement by a set-collar 21, adjustably mounted. A bifurcated lever 22 is pivoted on the upper and lower sides of the collar 20 at its rear end, and its front end rests in a guide frame and support 23. This lever bears against the lugs 19 and when operated force the collar 18 against the friction-disk 15 and the latter against the wheel 10, thereby setting the clutch and causing the shaft 1 to be rotated, which sets the brakes, as above shown. The brakes can be set almost instantly or gradually, determined by the force with which the clutch is set.

It will be apparent that the manner in which the lever 22 is pivoted to the collar 20 at its rear end and its front end being held in guides, as described, will prevent the collar 20 from rotation upon the shaft 1. The collars 18 and 20 have overlapping extensions at their adjacent ends, so that the collar 18 will also be prevented from rotating upon the shaft, thereby retaining the lugs 19 in position against the upper and lower members of lever 22.

I may also employ fiber rings between collars 21 and 20 and collar 18 and friction-disks 15 and 25.

Normally the collar 21 on shaft 1 is set up so that the collar 20 is in loose contact therewith on the one side, and this in turn in loose contact with the collar 18, and this in turn in loose contact with friction-disk 15, and this in turn in loose contact with the wheel 10, and while in this relation there is no tendency of my mechanism to set the brakes of the car to which it is applied; but when the outer end of lever 22 is moved toward the wheel 10 the contact-surfaces at the points named are pressed together until their frictional contact will rotate disk 15, and thereby the shaft 1, and thus set all the brakes on the car to which it is applied by means of the brake-chain 3, rod 5, and cross-lever 8. The tension to which the brakes on any car on which my mechanism is employed can be set will depend upon the pressure of friction-disk 15 against wheel 10. The opposite side of the wheel 10 is provided with two or more projections 24, but is in other respects similar to the side against which the friction-disk 15 operates. The disk 25 is mounted adjacent to this side of the wheel 10 and is provided with openings 26, in which are located the spring-actuated pins 27, which when forced inward engage with the projections 24, and thereby positively lock the wheel 10 on the shaft 1. A groove is formed in the inner side of the disk 25 and the projections 24 operate therein. A fiber ring 28 is also secured to the inner face of the disk 25 for the same purpose as the ring 18 on the disk 15.

29 denotes a flanged collar adjacent to the outer end of the disk 25, and the flange of this collar bears against the ends of the pins 26, so that the latter will be forced into engagement with the lugs 24 when the collar 29 is operated. Lugs 30 similar to the lugs 19 are formed on the collar 29, while the adjustable collar 31 supports a lever 32, by which the collar 29 can be moved. The lever 32 also has its forward end in the frame 23, and the levers 22 and 32 are connected by a link 33 so that when one lever is operated the other is rendered inoperative. Whenever the front end of lever 32 is moved toward wheel 10,

the inner ends of pins 26 are then pressed into engagement with lugs 24 on wheel 10 and the rotation of the disk 25 and shaft 1 becomes positive and will cease only when the brakes of the car are set up so tightly that the wheels of the car can no longer rotate upon the rails. If, however, it is not desired to slide all of the wheels of the car when my emergency-brake is used, this may be prevented by so adjusting the power and the fulcrum-points on lever 8. In this case shaft 1 will be rotated, as described, until the resistance of the brake tension exceeds the adhesion of the car-wheels on the axle by which the shaft 1 is actuated, after which the said wheels only will slide upon their rails. After pressure has been taken off of pins 26 by releasing lever 32 pins 26 will then be forced to their normal position by their springs, thereby releasing the wheel 10 from shaft 1. In case, however, that the said springs did not return pins to their normal position, being prevented from so doing on account of pressure of lugs on them, then the operator may set the spindle-brake with which every car is equipped, thereby transferring the tension from the emergency-brake to the spindle-brake. Now when this is done springs will then force pins 26 back into their normal position, and thereby release the wheel 10 from shaft 1, and when this is done the spindle-brake may be released, and the brakes on the car are then free.

A bell-crank lever 34 is supported in the frame 23, and said lever is provided with a third arm, which is pivoted to the link 33, while the two main arms are connected to rods 35 and 36, which extend forward and connect with a bell-crank lever 37 on the brake-spindle 38. By referring to Fig. 2 it will be seen that when the rod 35 is drawn forward the lever 32 will be operated, which will force the pins 26 into engagement with the lugs 24, thereby instantly locking the wheel 10 on the shaft 1 and causing the brakes to be applied by winding up the chain 3 on the shaft 1. When the rod 36 is drawn forward, the lever 22 will be operated to set the friction-disk 15 and make a more gradual application of the brakes.

It will appear from the above that the wheel 10 and the disk 15 form a friction-clutch suitable for a service-brake, while the lock on the opposite side of the wheel 10 is for emergency purposes and in the presence of danger is designed to stop the car in the shortest time and distance possible.

In connection with the emergency feature of my brake I provide for automatically opening the sand-box whenever the emergency members are brought into use. This means consists of the rod 39, connecting the bell-crank 37 with the bell-crank 40, the latter being connected to the slide or valve of the sand-box by a rod 41. The result is that when the rod 35 is drawn forward the valve of the sand-box will be opened and the rails sanded to assist in overcoming the momentum of the car. I also provide means for shutting off the electric current when the emergency feature of the brake is used. This means consists of the rod 42, connecting the lever 37 with a lever 43 on a rod 44, which is connected with the switch 45 by a rod 46. The result is that when the emergency-brake is used the rod 44 is rotated and the switch 45 is opened, thereby shutting off the electric current.

In connection with my brake I also provide an improved fender and a trip therefor. The fender consists of a series of independent arms 47, which project under the end of the car and are curved, as shown in Fig. 9. These arms are connected at their front ends to a rod 48, and they are normally upheld by a transverse rod 49, which rests upon the hooks 50, thereby holding the lower ends of the arms off of the track. The hooks 50 are tripped when the emergency-brake is used by the connection 51 leading therefrom to the bell-crank 37. This allows the arms 47 to drop to the track and prevent bodies of any appreciable size from passing under the car. Said arms are independently movable on the rod 48, so that the raising of one will not disturb the others. The lower ends are bent, as indicated by 52, to prevent them from engaging in crevices, &c. They may be raised into position again by the lever 53, which is connected to the links 59, which support the rod 49.

This brake is therefore a combined service and emergency brake of the friction type and can be used for either purpose at any time without previous adjustment. By the service-brake the car can be stopped in the usual way; but by the emergency-brake, the automatic shutting off of the power therewith, and application of sand to the rails the car can be more quickly and effectually stopped. At the same time the fender is lowered, thereby preventing any object from passing under the car or car-wheels before being stopped. The entire brake system common to any car can be operated by either feature of my brake.

I claim—

1. A car-brake consisting of a shaft, a wheel mounted loosely thereon and rotated by the car-axle, a combined lock and friction disk adjacent to one side of said wheel, a friction-disk at the opposite side of said disk, levers for engaging said members with the wheel to rotate the shaft, and a connection between said shaft and the brake mechanism, so that the brakes will be set whenever the shaft is rotated.

2. In a car-brake the combination of a shaft, a wheel thereon rotated by the car-axle, a lock for locking the wheel upon the shaft so that the latter will be rotated, a friction-clutch whereby the wheel may also be held to rotate the shaft, means for applying the brakes whenever the shaft is rotated, and means for sanding the rails when the locking

devices are operated, substantially as specified.

3. In a brake mechanism for electric cars, the combination of a shaft, a wheel thereon rotated by the car-axle, a lock for holding the wheel upon the shaft so that the latter will be rotated, means for applying the brakes when the shaft is rotated, a friction-clutch whereby the wheel may also be held to rotate the shaft, means for sanding the rails when the lock is operated, and means for shutting off the electric current at the same time, substantially as specified.

4. A brake consisting of a shaft, a wheel thereon rotated by the car-axle, a lock for holding the wheel upon the shaft so that the latter will be rotated; a separate friction-clutch for engaging said wheel to rotate the shaft; means for applying the brakes when the shaft is rotated, and means for sanding the rails, shutting off the power and lowering the fender—simultaneously with the application of the brakes by said lock, substantially as specified.

5. A brake consisting of a shaft, a wheel mounted loosely thereon and rotated by the car-axle, two independently-movable disks for locking the wheel upon the shaft, a collar for moving each of said disks into contact with the wheel to rotate the shaft, and means for applying the brakes of the car when the shaft is rotated, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

WILLIAM W. HOPKINS.

Witnesses:

HANNAH M. HOSIE,

NORA BARRETT.