No. 775,834. PATENTED NOV. 22, 1904.

R. C. LOWRY.

ELECTROMAGNETIC BRAKE.

APPLICATION FILED AUG. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

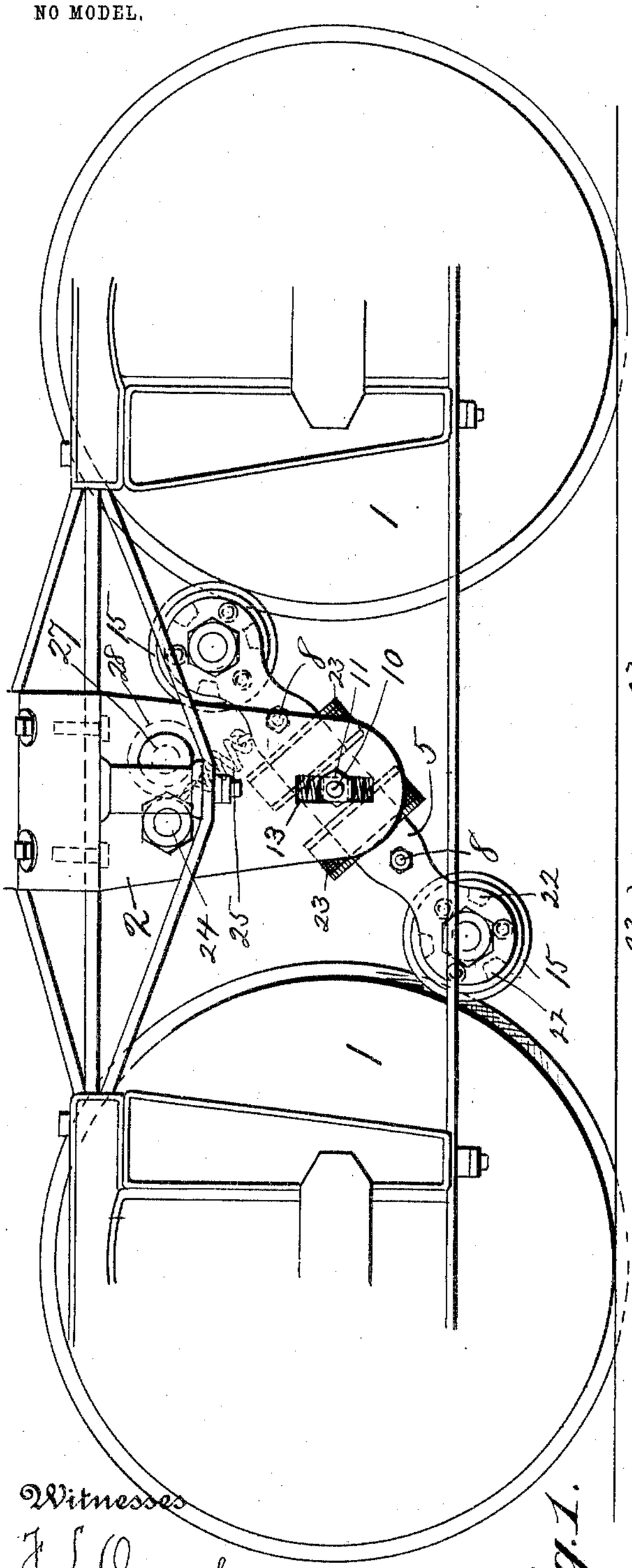

Fig. 1.

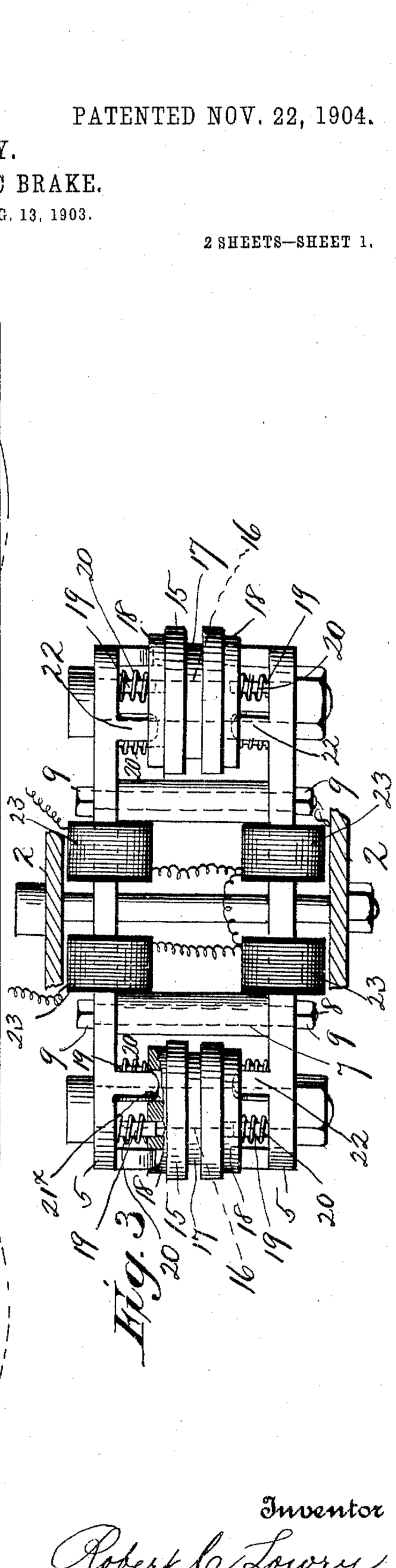

Fig. 3.

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NO MODEL. 2 SHEETS—SHEET 2.

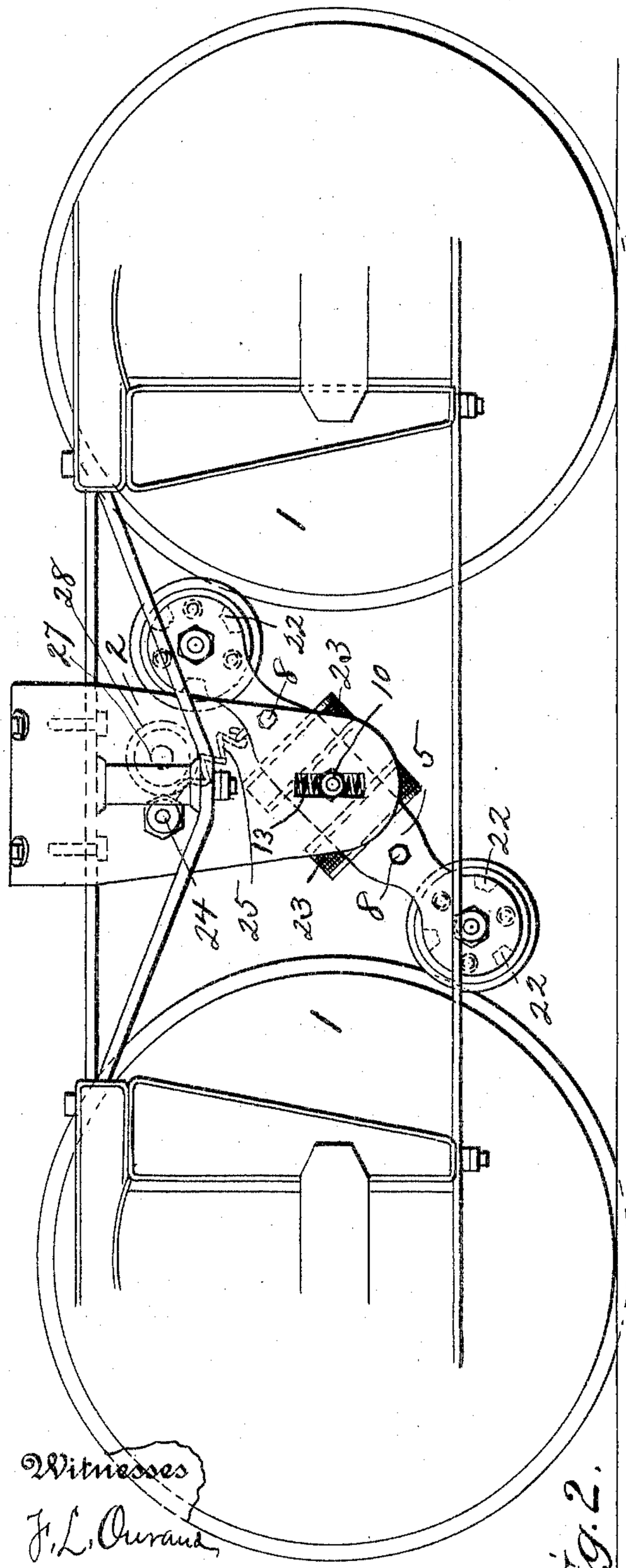

Fig. 2.

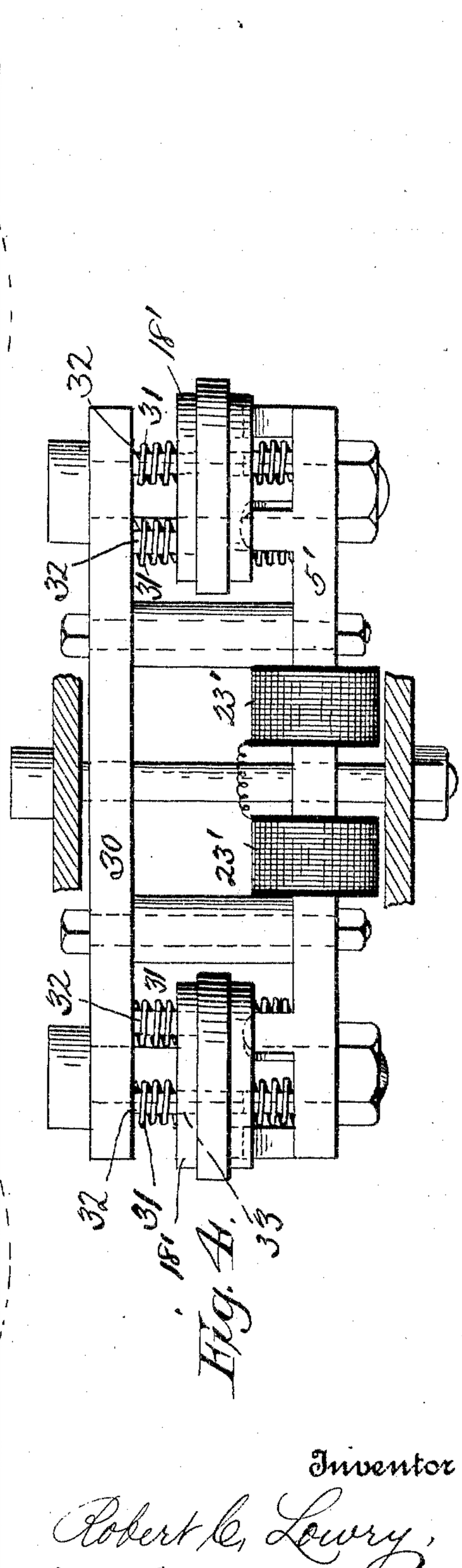

Fig. 4.

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No. 775,834. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

ROBERT C. LOWRY, OF NEW WESTMINSTER, CANADA.

ELECTROMAGNETIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 775,834, dated November 22, 1904.

Application filed August 13, 1903. Serial No. 169,387. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. LOWRY, a subject of the King of Great Britain, residing at New Westminster, in British Columbia, Canada, have invented certain new and useful Improvements in Electromagnetic Brakes, of which the following is a specification.

My invention relates to electric magnetic brakes for railway rolling-stock.

Among the objects of the invention is to provide a simple, compact, and powerful brake which may be applied to the magnetized wheels of rolling-stock.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings.

The invention consists in the novel construction, arrangement, and combination of parts, as hereinafter fully described, illustrated in the drawings, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a car-truck, showing my improved brake device in the position it assumes when the brake is applied. Fig. 2 is a similar view, the parts being in the position they assume when the brake is off. Fig. 3 is a plan view of the parts seen in Fig. 1. Fig. 4 is a plan view of a different arrangement of the device, there being but one coherer-bar.

In the drawings, 1 indicates a pair of magnetized wheels of a car-truck, the wheels being on the same rail. Arranged intermediate the car-wheels on each side of the truck is a suspending device adapted to support the brake mechanism. This suspending device in the present instance comprises cheeks or hangers 2, of non-magnetic metal, which may be supported by any suitable means from the car-body or from some part of the truck.

5 indicates bars of magnetizable metal, such as mild steel. These bars, which I term "coherer-bars," are spaced apart by distance-pieces 7, of non-magnetic metal, and detachably secured together by means of bolts 8, of non-magnetic metal, carrying on their ends clamping-nuts 9.

10 indicates a bolt passing through the hangers 2 and the coherer-bars, whereby the latter will have a pivotal connection with the hangers. In order that the coherer-bars may have a yielding movement vertically in the hangers, whereby said bars will always maintain the same relative position to the car-wheels, notwithstanding the usual up-and-down movement of the car-body or of the trucks when the car is moving over the road, I mount the ends of the bolt in slide-boxes 11, which are adapted for up-and-down movement within slots 13, provided in the hangers. Coiled springs 14 are arranged within the slots and bear upon opposite sides of the slide-boxes, whereby to provide a yielding connection of the slide-boxes with the hangers. Any other form of bars might be used, and I do not wish to be limited to any peculiar form.

The bars 5 are arranged in the oblique position shown, with their opposite ends lying respectively above and below the centers of the car-wheel axles.

15 indicates brake rollers or wheels, two wheels being at each end of the pair of coherer-bars, said wheels being mounted upon short shafts or axles of non-magnetizable metal, which shafts extend transversely of and are mounted in the ends of the coherer-bars. The brake-wheels are of magnetic metal, and they may be so beveled as to adapt them to conform to the coning of the car-wheels. The brake-wheels are revolubly mounted on their supporting-axles to turn freely thereon, and they are separated by disks 17, of non-magnetic metal, said disks acting as washers or distance-pieces. Instead of the disks springs of non-magnetic metal, flat or coiled, may be used to keep the brake-wheels apart.

18 indicates friction wheels or disks of non-magnetic metal mounted upon the shafts or axles 16 of the brake-wheels at the sides of the latter, as shown.

The coherer-bars are provided with inwardly-extending pins or studs 19, of non-magnetic metal, and upon each of these studs is mounted a coiled spring 20, of non-magnetic metal. One end of each of the springs bears against a coherer-bar, while the opposite end bears against a friction-disk. Each

of the friction-disks 18 is provided with holes into which the ends of the pins or studs 19 project and through which said pins may pass.

The function of the springs 20 is to press the friction-disks against one side of each brake-wheel. The coherer-bars are also provided with inwardly-extending projections or teeth of magnetic metal 22, which pass through the slots $21^{\times}$ in the friction-disks 18. In the drawings three teeth are shown at each end of each coherer-bar.

Mounted upon and surrounding the coherer-bars to either side of the pivotal bolt 10 are demagnetizing-coils 23, arranged electrically in series, as shown. These are coils of insulated copper wire wound continuously, and their ends are in practice to be connected through a suitable controller with a source of electricity. Neither the controller nor electric source is shown, as it is not necessary for the purpose of illustrating my invention, it being sufficient to state that a current of electricity has to be turned into these coils to demagnetize the coherer-bars when it is desired to throw and hold the brakes out of action. The coils 23 will be so wound and the electric current will be directed through the insulated wire of which they are composed, so as to cause the ends of the coherer-bars to be of like magnetic polarity to the periphery of car-wheel adjacent to such ends. In order to hold the brake-wheels out of contact with the periphery of the car-wheels when the brake is out of action, I provide a transverse bolt 24, carried by the hangers, and to it is secured one end of a coiled spring 25, whose opposite end is attached to one of the distance-pieces separating the coherer-bars. The said spring is of sufficient strength to hold the coherer-bars in a position with the brake-wheels out of contact with the wheels of the car. 27 indicates a transverse bolt carried by the hangers and provided with a rubber covering 28, which acts as a cushion for the brake-wheels at one end of the coherer-bars to rest against when the brake is in an unapplied position and under the influence of the coiled spring 25.

The inner ends of the projections or teeth 22 are shown semicylindrical in shape, and this shape I prefer, though the same may be varied, and I do not wish to be limited to any particular shape. To apply the brake, all current is cut out of the demagnetizing-coils, and the car-wheels being magnetized and of different polarities the brake-wheels will be drawn into contact with the car-wheels, and when thus in contact the brake-wheels will be magnetically urged toward the coherer-bars in an endeavor to complete the magnetic circuit through or by way of said coherer-bars and will thus press against the friction-disks, movement of which is opposed by the coiled springs, and as the revolution of the brake-wheel is thus impeded motion in the car-wheels is retarded. Ultimately as the strength of the magnetism in the car-wheels is increased the brake-wheels will come in contact with the teeth 22 of the coherer-bar, when the desired maximum resistance to movement in the brake-wheels, and therefore in the car-wheels, may be secured. To release the brake, the electric current magnetizing the car-wheels is cut out, and simultaneously a current is sent through the demagnetizing-coils on the coherer-bar, when rollers 15 will be released and the spring 25 will draw off and hold the coherer-bars in a position with the brake-wheels out of contact with the car-wheels.

It will be noted that there is no wear due to friction on the peripheries of the car-wheels, because the brake-wheels have a rolling contact with the car-wheels. Owing to the simple and compact arrangement of the parts, there is little danger of the device getting out of order.

In descending grades a gradual and firm braking resistance can with my device be brought to bear on the wheels to overcome the usual acceleration due to movement down an inclined plane.

In Fig. 4 only coherer-bar 5′ is used, provided with demagnetizing-coil 23′, as in Figs. 1, 2, and 3. The bar 30 is of non-magnetic metal, and 31 represents coiled springs on pins 32, which press against friction-plate 18′. The pins 32 may pass through circular holes 33 in friction-plate. Other parts are as described for Figs. 1, 2, and 3.

The friction-disks 18 and 18′, the pins 19 and 32, and the springs 20 and 31 may be omitted from the device, if desired, and only the variable strength of resistance to movement caused by the magnetic lines of force passing between the teeth 22 and the brake-rollers 15 as they touch may be utilized.

No claim is herein made to any specific means for magnetizing the car-wheel. This may be accomplished in any well-known way—such, for instance, as by means of coils thereon.

What I claim, and desire to secure by Letters Patent, is—

1. In an electromagnetic brake, a bar or bars pivotally arranged as described, a suspending device and one or more brake-wheels mounted at each end of the bars and adapted to be brought into contact with the magnetized car-wheels.

2. In an electromagnetic brake, a bar or bars pivotally arranged as described, a suspending device, one or more brake-wheels carried at each end of the bars and means to permit the bars to have a movement relatively to the suspending device, as set forth.

3. In an electromagnetic brake, coherer-bars secured together but separated as described, a shaft arranged at each end of the bars and supported thereby, brake-wheels

mounted upon said shafts, a spacing device arranged between each pair of brake-wheels and inwardly-projecting teeth carried by the bars and adapted to come into contact with the brake-wheels, in the manner specified.

4. In an electromagnetic brake, bars pivotally arranged as described, said bars being secured together but spaced apart as set forth, a shaft arranged at each end of the bars and supported thereby, a pair of brake-wheels mounted upon each shaft, a spacing device arranged between the wheels of each pair, inwardly-projecting teeth on the bars and friction-disks mounted on the shafts, as described and provided with slots for the passage therethrough of the teeth on the aforesaid bars.

5. In an electromagnetic brake, bars pivotally arranged as described and spaced apart but secured together, a suspending device, a shaft arranged at each end of the bars and carried thereby, a pair of brake-wheels mounted on each of said shafts, a spacing device between the wheels of each pair, inwardly-projecting teeth on the bars, friction-disks mounted on each shaft as set forth and provided with slots for the passage therethrough of the said teeth, and coiled springs interposed between the friction-disks and the sections of the bar, in the manner and for the purpose described.

6. In an electromagnetic brake, bars pivotally mounted as described, spaced apart but secured together, as described, a pair of spaced brake-wheels carried at each end of the bars and slidable transversely as set forth and coils of insulated wire, mounted upon the bars and electrically connected in series for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT C. LOWRY.

Witnesses:

WALTER B. WHITCOMB,

ROLLO WHITCOMB.