(No Model.) 2 Sheets—Sheet 1.

H. HANSEN.

CAR BRAKE AND STARTER.

No. 359,152. Patented Mar. 8, 1887.

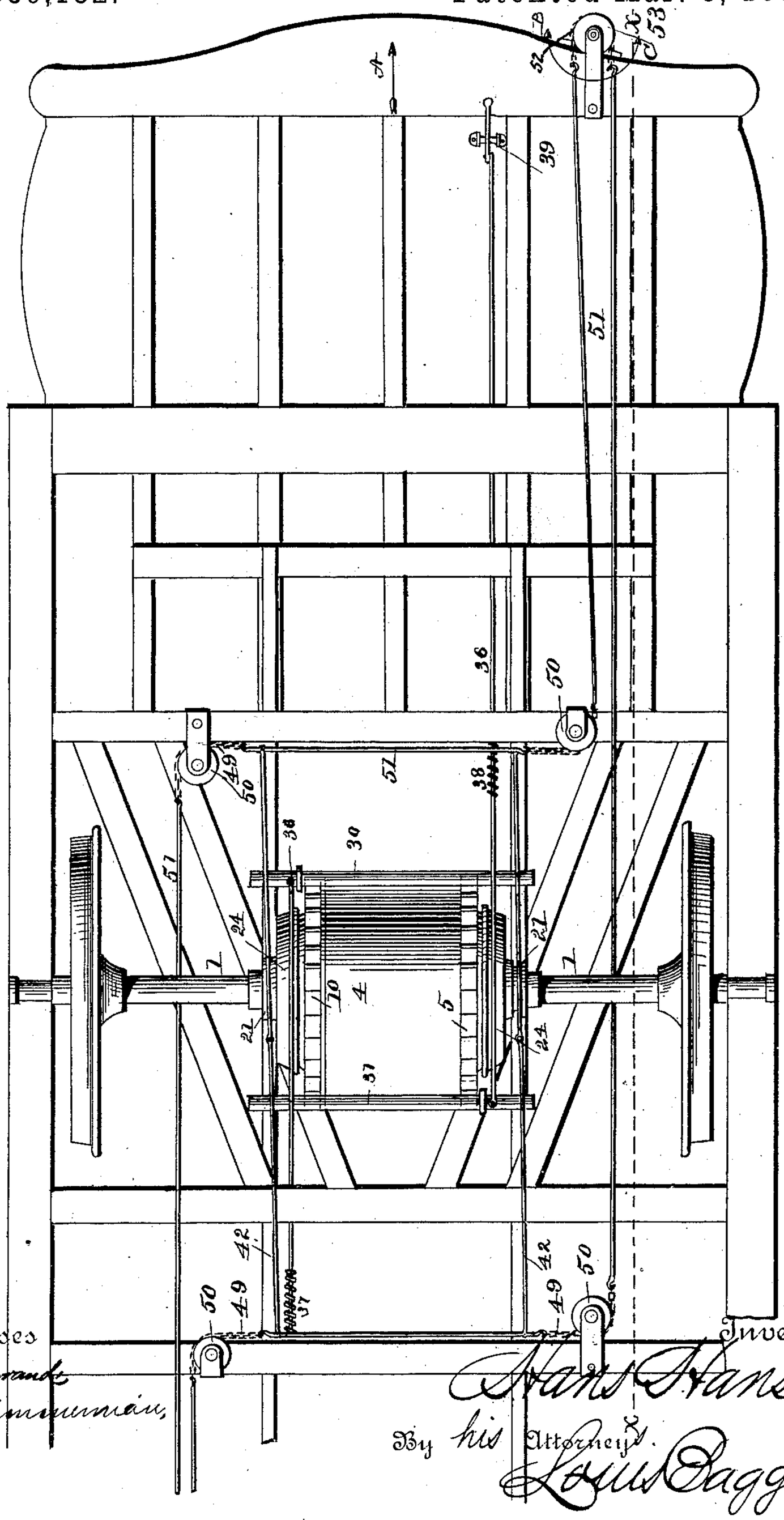

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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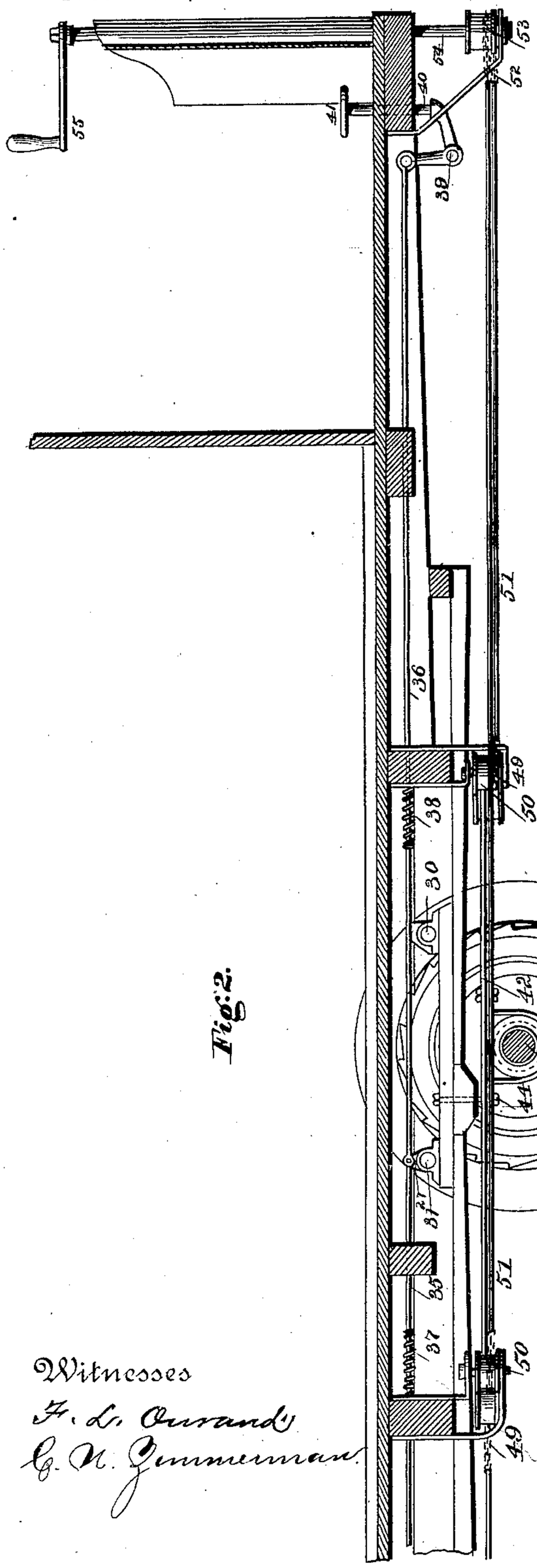

Fig. 2.

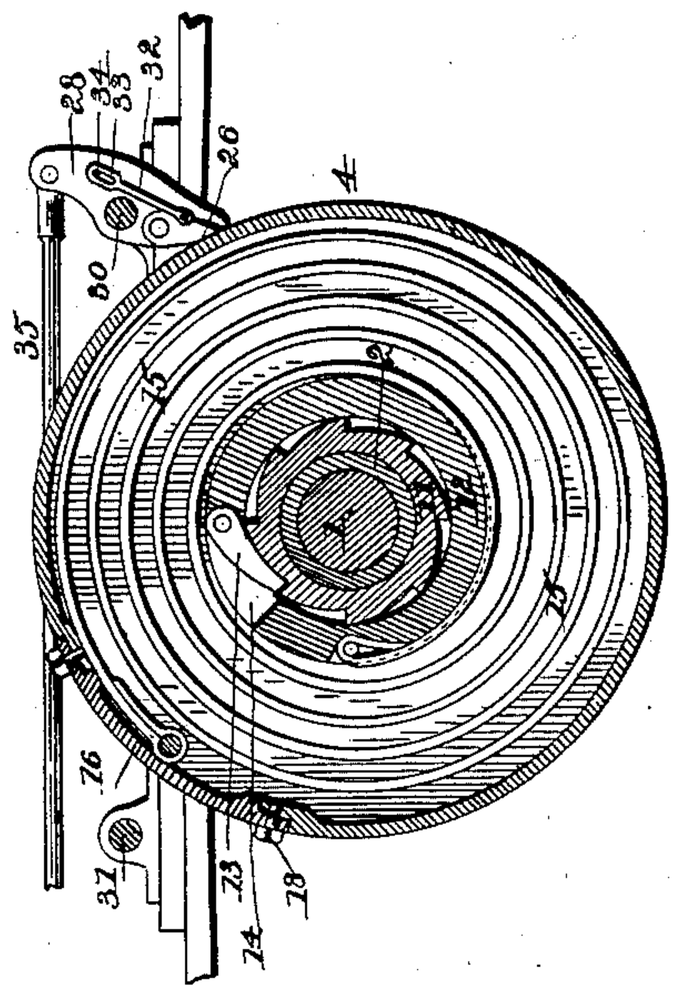

Fig. 4.

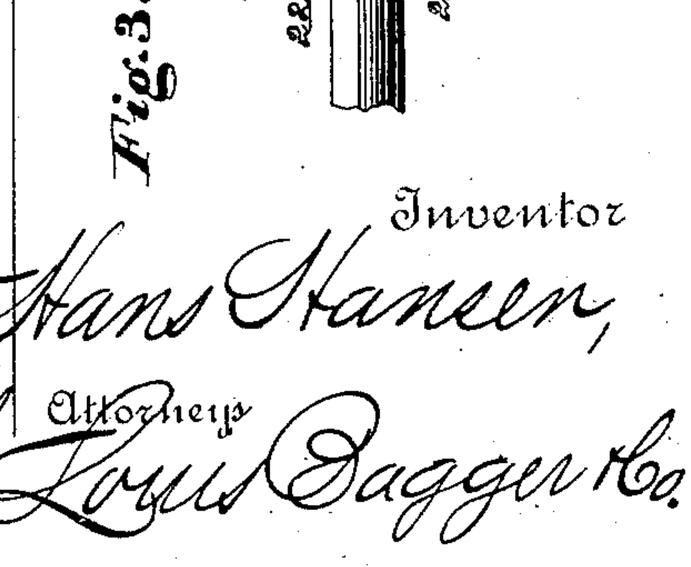

Fig. 3.

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UNITED STATES PATENT OFFICE.

HANS HANSEN, OF COPENHAGEN, DENMARK.

CAR BRAKE AND STARTER.

SPECIFICATION forming part of Letters Patent No. 359,152, dated March 8, 1887.

Application filed November 23, 1886. Serial No. 219,645. (No model.)

To all whom it may concern:

Be it known that I, HANS HANSEN, a subject of the King of Denmark, residing at the city of Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Improvements in Apparatus for Braking and Starting Rotary Axles; and I do 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, and in which—

Figure 1 is a bottom view of the frame of a railway-car provided with my improved brake and starting device. Fig. 2 is a longitudinal vertical sectional view of the same on line *x x*, Fig. 1. Fig. 3 is an axial sectional view of the spring-case upon the axle, and Fig. 4 is a transverse sectional view of the same.

Similar numerals of reference indicate corresponding parts in all the figures.

My invention has relation to that class of devices for braking and again starting revolving shafts or axles especially adapted for starting and stopping railway-cars or tram-cars in which the last revolutions of the axle or shaft wind a spring or springs, which on being released will give to the axle or shaft the power stored in them; and it consists in the improved construction and combination of parts of such a device, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates the axle of one pair of wheels, only one-half of the car being shown, and a sleeve, 2, fits upon the middle of the axle and has a head, 3, secured to one end of it, the said head having the sides 4 of a drum secured to its periphery. The end of the drum attached to the head is formed with a ratchet-rim, 5, and the head is formed with a truncate conical flange, 6, upon its outer side. A correspondingly-shaped head, 7, is provided with a sleeve, 8, which fits upon the sleeve of the other head and has a truncate conical flange, 9, upon its outer face and a ratchet-rim, 10, flush with the periphery of the drum, against the open end of which it bears. The sleeve of this head is provided with a number of ratchet-rims, 11, having their teeth facing in a direction opposite to the teeth of the outer ratchet-rims, and collars 12 fit upon the ratchet-sleeve and have pawls 13, pivoted in recesses 14 in them, engaging the ratchet-rims with the said pawls. The inner ends of flat helical springs 15 are secured to these collars, and the outer ends of the springs are secured in lids or covers 16, secured by screw-bolts 18 in the outer drum, the said drum having apertures 19 in its periphery covered by the said lids.

Sleeves 20, having peripherally-grooved ends 21, fit upon the axle at the outside of the heads, which are prevented from sliding longitudinally upon the axle by means of collars 22 upon the axle, and the said grooved sleeves slide with their grooved hubs upon feathers 23 upon the axle, and have disks 24 upon them, which disks are formed with inwardly-inclined flanges 25 at their edges, which flanges may fit upon and bear against the outer sides of the conical flanges upon the drum-heads.

The ratchet-rims upon the periphery of the drum are engaged by two pawls, 26 and 27, respectively pivoted upon cams 28 and 29, pivoted upon shafts 30 and 31, parallel to the axle, and each pawl is provided with an arm, 32, pivoted to it, and having a longitudinal slot, 33, with which it slides upon a pin, 34, upon the cam, the said slotted arm and pin allowing the pawl to engage the ratchet-rim and to slide over its teeth when the cam is tilted with its upper end away from the drum, while they will raise the pawl from the engagement with the ratchet-rim when the cam is tilted with its upper end toward the drum, the construction of the pawls and the cams being clearly shown in Fig. 4 of the drawings.

The shafts having the cams upon them are journaled transversely to the frame of the car, parallel to the axle, at both sides of the upper portion of the drum, and rods 35 and 36 are pivoted to the upper ends of the said cams, and pass over the axle and to each end of the car, having springs 37 and 38 upon them, which serve to draw the rods back, and each rod is pivoted at its end to the arm of a bell-crank, 39, pivoted under the end of the floor of the car, and having the lower end of a vertically-sliding rod, 40, pivoted to its other arm, the

said vertically-sliding rod having a treadle-plate, 41, upon its upper end.

Arms 42 and 43 are pivoted, respectively, upon bolts 44 and 45, projecting from the under side of the frame of the car, rocking in a horizontal plane, and each of these rods, having its fulcrum inside of the axle, is provided with a stirrup, 46, which surrounds the groove in the end of each of the sleeves sliding upon the axle, and which is provided with a suitable pin, 47, engaging the groove, so that the said sleeves may be moved by tilting the arms. The ends of the arms are pivoted to the ends of transverse rods 48, the ends of which rods are provided with chains 49, passing over pulleys 50, journaled under the frame of the car at both sides of the axle and at both sides of the longitudinal axle of the car, each axle having four pulleys surrounding its drum and placed in a rectangle around the said drum.

Rods 51 are secured with their inner ends to the chains of the pulleys at the same side, two rods passing to one end of the car and two rods passing to the other end of the car, and the outer ends of these rods are connected by means of a chain, 52, winding from opposite sides upon a vertical drum, 53, upon the lower end of a brake-shaft, 54, having a suitable handle, 55, at its upper end, and journaled in vertical bearings at the end of the car.

When the car is in motion, the disks upon the sleeves sliding upon the axle are in such a position that they may revolve freely with the axle without coming in contact with the conical flanges of the heads of the drum, and when it now is desired to stop the car, supposing the car to travel in the direction of the arrow A in the drawings, the brake-handle is revolved in the direction of the curved arrow B, which will draw the outer ends of the arms engaging the sliding sleeves to the side, sliding the sleeve toward the drum, so as to bring the inclined flange of the disk upon the sleeve to bear against the conical flange 9 upon the head 7, so that the said head and its sleeve will be revolved with the axle, causing the ratchet-rims upon the sleeve to engage the pawls, and thus to wind the springs upon the sleeves, the said winding of the springs gradually stopping the revolution of the axle. The brake-handle may now be released, the pawls holding the drum from being revolved, and when, now, the handle is revolved to the other side in the direction of the arrow C the other sleeve and disk will be brought into frictional contact with the conical flange upon the other head of the drum, when the pawl may be released which holds the drum by forcing the treadle down at the end of the car, while the other pawl holds the head at the other end of the drum in position, so that the force of the unwinding springs communicated to the drum will be communicated to the axle through the conical flange of the head of the drum and the disk and sleeve upon the axle being held firmly against the conical flange.

The car may be provided with the device upon one axle and be operated from both ends of the car, or both axles may be provided with the device, either each device being operated from its end of the car or both devices being operated simultaneously from both ends, the connecting rods and chains being carried from one device to the other.

As before stated, this device, although principally intended for railway-cars, and especially for street-railway cars, may be used for stopping and again starting other revolving axles or shafts—as, for example, shafts of gas-machines—where there is liability of the shaft stopping at a dead-center, necessitating the starting of the shaft before the power of the machine may be exerted upon it.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a device for stopping and starting axles and shafts, the combination of a drum secured thereto, the periphery of which is provided with an aperture, a lid for said aperture, a spring secured to said lid and to the sleeve or axle of said drum, and means, substantially as described, for operating said drum and spring.

2. In a device for stopping and starting axles or shafts, the combination of a drum secured thereto, consisting of two heads, one of which has a sleeve and a periphery or side and the other head only a ratcheted sleeve, a cam around said sleeves, pawls pivoted to said collar and engaging with said ratcheted sleeve, a spring secured to said collar at one end and to the inner side or periphery of the drum at the other, and means, substantially as described, for operating said drum and spring.

3. In a device for stopping and starting axles or shafts, the combination of a spring-actuated drum secured thereto, each head of the drum having a ratchet around its periphery, two cams pivotally secured upon the under side of the car, a pawl pivoted to each of said cams, a pin upon each cam, an arm having a slot at one end secured to said pawl and said pin, and means, substantially as described, for operating the same.

4. In a device for stopping and starting axles or shafts, the combination of a spring-actuated drum secured thereto, each head of the drum having a flange upon its side, two flanged disks adapted to slide longitudinally upon the axle and engage with the flanges upon the heads of the drum, two arms pivotally secured to the bottom of the car and engaging with said disks, two rods secured to and connecting the opposite ends of said arms, four rollers secured to the bottom of the car, a chain secured to each end of said rods and passed around each roller, a brake-rod secured to each end of said chains, and means, substantially as described, for operating the same.

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

HANS HANSEN.

Witnesses:
FREDERIK WOLFF,
SIGVARD REDDERSEN.