

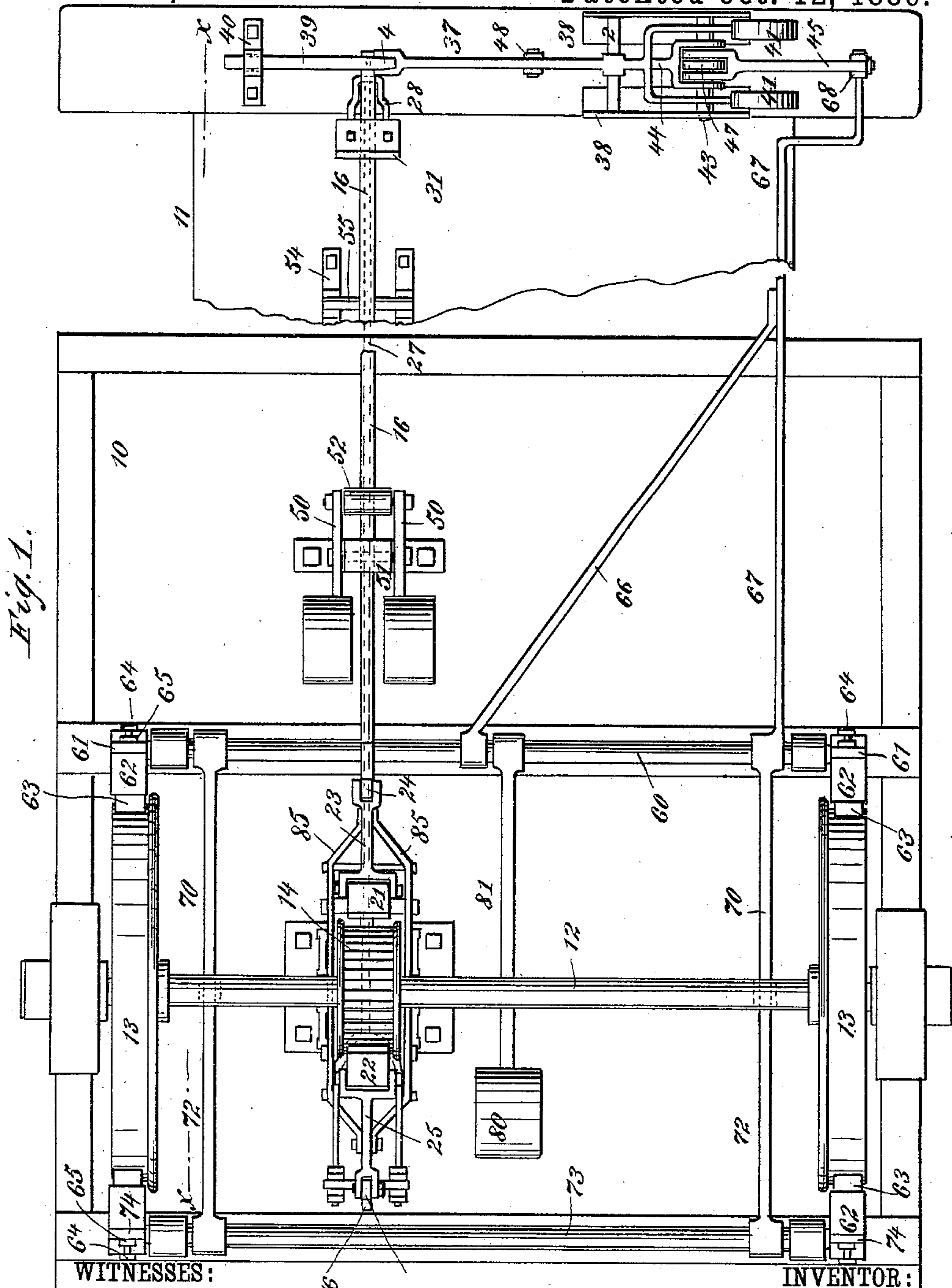
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3 Sheets—Sheet 1.

T. COX & T. COX, Jr.  
CAR STARTER AND BRAKE.

No. 350,661.

Patented Oct. 12, 1886.



WITNESSES:

*Donn Twitchell.*  
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INVENTOR:

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ATTORNEYS.

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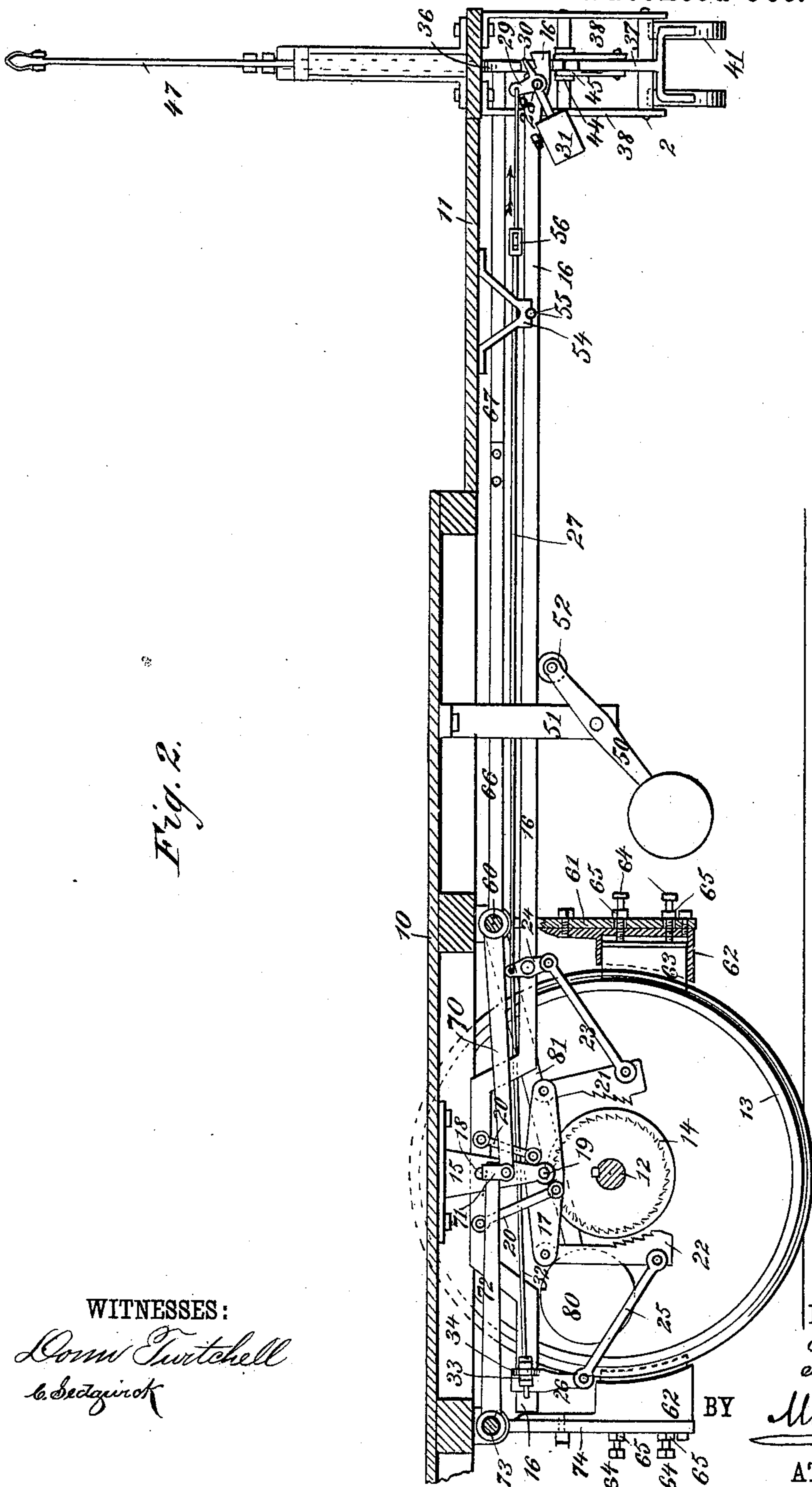


Fig. 2.

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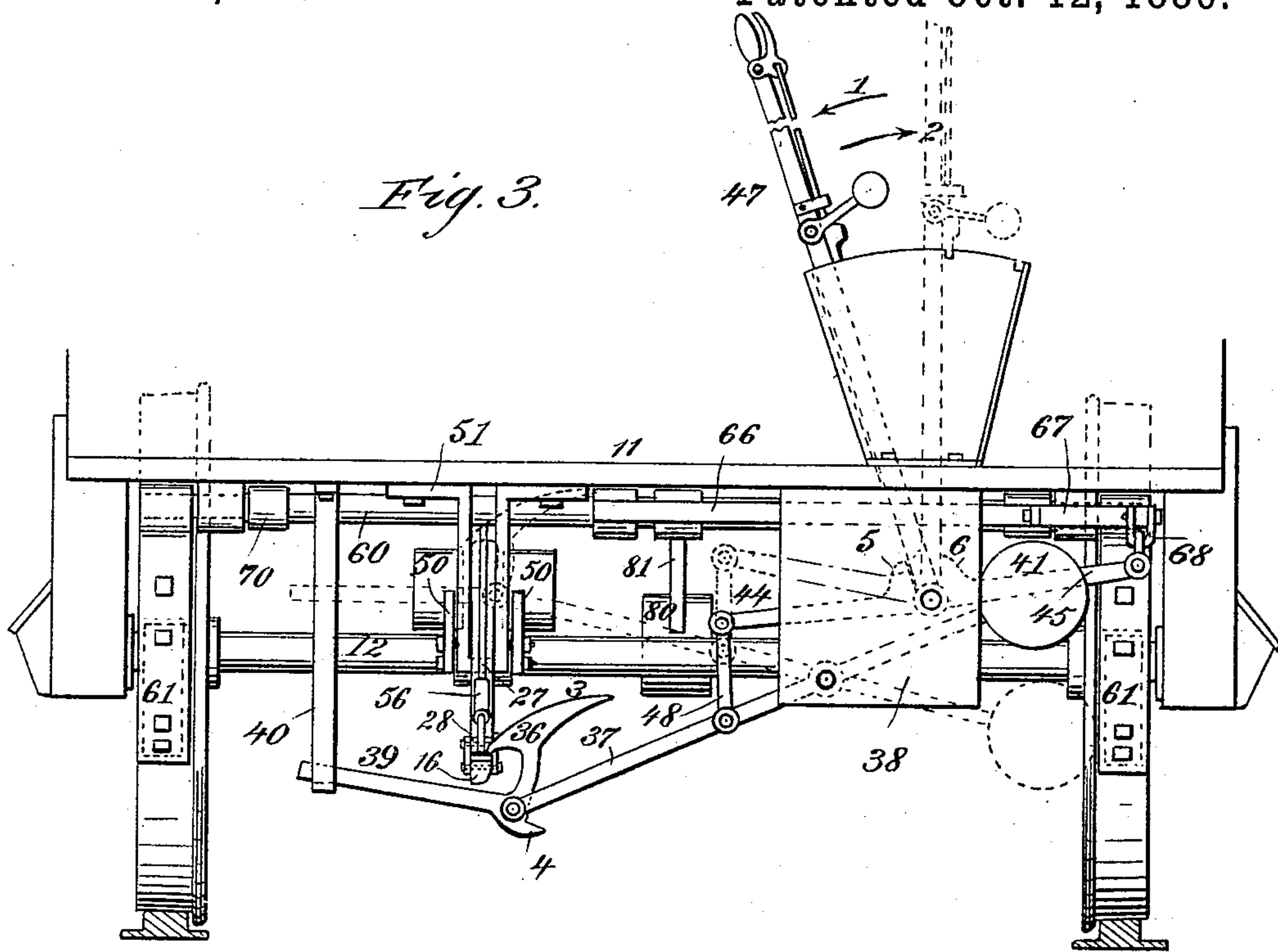
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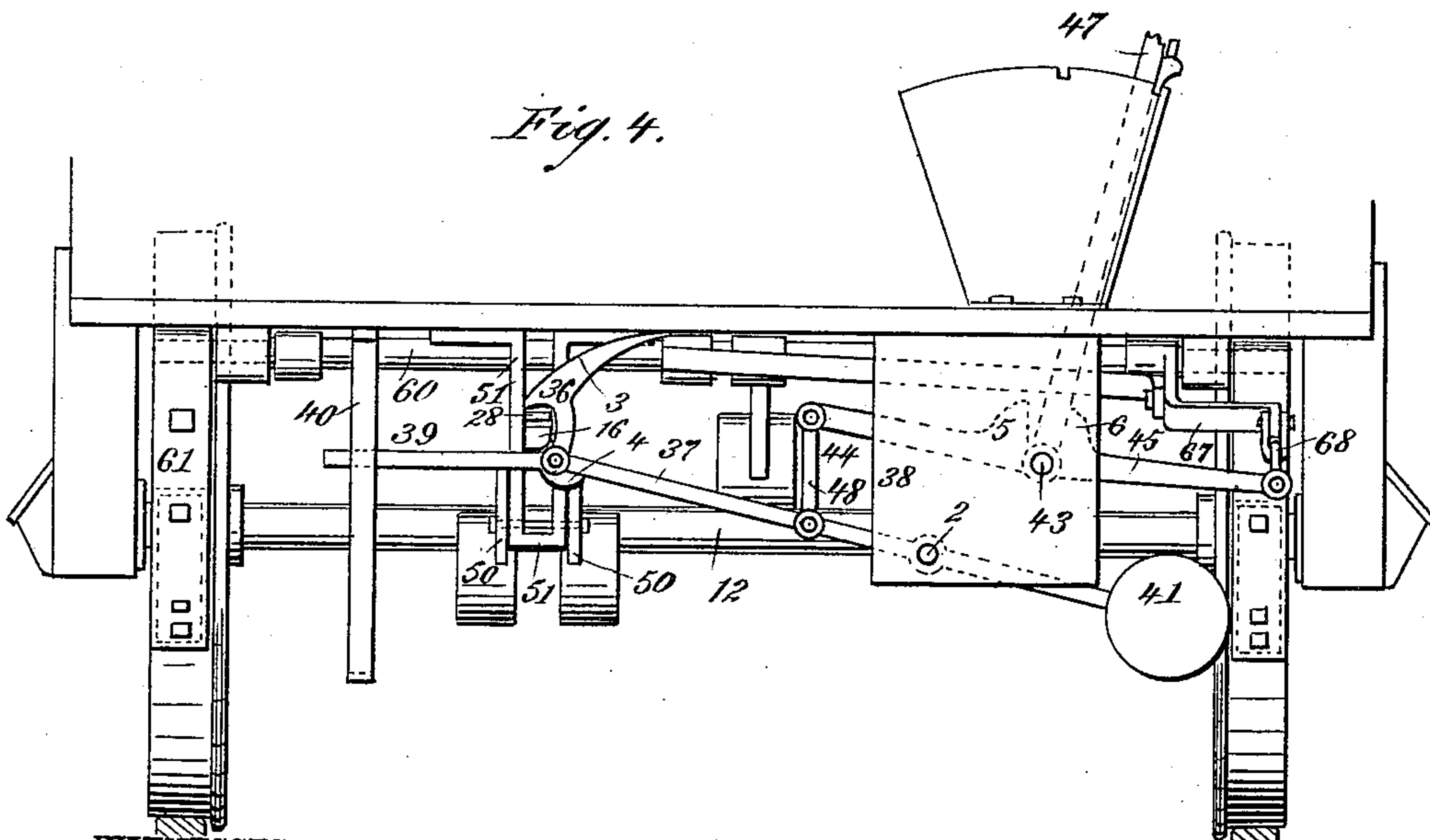
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*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

THOMAS COX AND THOMAS COX, JR., OF GLOSTER, MONTANA TERRITORY.

## CAR STARTER AND BRAKE.

SPECIFICATION forming part of Letters Patent No. 350,661, dated October 12, 1886.

Application filed June 14, 1886. Serial No. 205,079. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS COX and THOMAS COX, Jr., of Gloster, in the county of Lewis and Clarke and Territory of Montana, have invented a new and Improved Car Starter and Brake, of which the following is a full, clear, and exact description.

Our invention relates to the construction of a car starter and brake wherein the mechanisms employed to start and stop the car are controlled by a single manipulating-lever.

The main objects of the invention are to entirely dispense with the use of springs, and to so arrange the parts that the starting mechanism may be employed time after time in quick succession, should the load upon the car be excessively heavy; but, although these are the main objects of the invention, many other objects are aimed at and secured through the medium of the novel constructions and combinations illustrated in the drawings, which constructions will be hereinafter described, and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the figures.

Figure 1 is an inverted plan view of a portion of a car provided with our improved form of car starter and brake. Fig. 2 is a sectional elevation of the same, taken on line *x x* of Fig. 1, the main lever in this case, however, being slightly different in construction from the lever illustrated in Fig. 1. Fig. 3 is an end view of the car, representing upon the left in full lines the position of the car-starting attachment when such attachment is in operation, and representing in dotted lines upon the same side of the drawings the normal position of the starting attachment; upon the right in the figures the normal position of the braking mechanism is illustrated; and Fig. 4 is a similar view representing the normal position of the car-starting attachment in full lines upon the left, while upon the right the car-braking mechanism is illustrated in the position it assumes when the brakes are being applied.

Referring, now, to the general construction illustrated in the drawings, 10 is the car-floor, and 11 the forward platform. 12 is the main axle, and 13 are the car-wheels. Upon the

axle 12 there is keyed a toothed wheel, 14, and just above the axle there is secured a downwardly-extending bracket, 15, which serves as the pivotal support for the main operating-lever 16, and for a beam-lever, 17, the lever 16 being connected to the bracket by means of a pin or bolt, 18, while the beam-lever rocks upon a pin, 19, this arrangement being best shown in Fig. 2. The levers 16 and 17 are connected by links 20, that are arranged as close as possible upon either side of the fulcrum of the lever 17, as shown, this close adjustment of the center requiring links of unequal length, such as those illustrated. To either end of the lever 17 there are pivotally connected clutches 21 and 22, the clutch 21 being connected, through the medium of a link, 23, with a rocker, 24, that is carried by the lever 16, while the clutch 22 is connected by a link, 25, with a sliding block, 26, that is mounted upon the inner or rear end of the lever 16. A connecting-rod, 27, extends from the upper end of the rocker 24 forward to a bell-crank lever, 28, which lever is pivotally connected to the forward end of the lever 16, the rod 27 being connected to its nearly-vertical arm 29, while its arm 30 extends forward in a plane just above that occupied by the forward end of the lever 16. A weight, 31, is secured to an extension of the arm 30 of the lever 28, and acts to hold the parts to the position in which they are shown in Fig. 2.

The block 26, which, as before stated, rides upon the rear end of the lever 16, is connected with the rocker 24 by means of a link or rod, 32, the end of which is threaded to engage with lock-nuts 33, arranged on either side of a flange, 34, which is formed upon the block 26. The forward end of the lever 16 and of the arm 30 of the lever 28, which, as before stated, overlaps the forward end of the lever 16, project outward through a vertical guideway formed by a bracket, 51, that is secured to the under side of the platform, the points of the two levers being in the path of a latch-piece, 36, said latch-piece being pivotally connected to the end of a lever, 37, that is pivotally mounted in a frame, 38, at the point 2, the latch-tooth being provided with an outwardly-extending heavy arm, 39, which is guided in a second vertical way formed in a bracket, 40, the way in the bracket 40 being at right angles to the



way in the bracket 51. The upper face of the latch 36 is curved from the point backward toward the center of the platform of the car, as shown at 3, and upon the lower end of the latch there is a stop, 4, which bears against the under edge of the lever 37, which lever carries a weight, 41, which acts to hold the parts in the position in which they are shown on the left in Fig. 4.

In the frame 38 there is mounted a shaft, 43, which carries two arms, 44 and 45, the ends of each of the arms being bifurcated and formed with apertures, through which the shaft 43 passes. The bifurcated ends of the levers 44 and 45 are formed with upwardly-extending projections 5 and 6, respectively, thus forming shoulders, against which the sides of a lever, 47, that is mounted upon the shaft 43, may be brought to bear. The end of the lever 44 is connected with the lever 37 by means of a link, 48. As has been above stated, the normal position of the car-starting attachment is shown on the left in Fig. 4—that is, the weight 41 has been allowed to act to elevate the latch 36 to a position above the extending ends of the levers 16 and 28. When the parts are in this position and the lever 47 is thrown in the direction of arrow No. 1, Fig. 3, the lower side face of this lever will abut against the shoulder of the lever 44 and carry it to the position in which it is shown in full lines in Fig. 3, thus moving down the unweighted end of the lever 37, the first effect of which motion is to rock the bell-crank lever 28, thus advancing the connecting-rod 27 in the direction of the arrow shown in connection therewith in Fig. 2, and from the construction described it will be seen that this movement of the rod will throw the clutches 21 and 22 into engagement with the toothed wheel 14, and as the motion of the lever 47 is continued the lever 16 will be carried downward in the direction of the arrow shown in connection therewith, thus rocking the beam 17 and starting the car-wheels forward, as will be readily understood from the construction illustrated. Just before the parts reach the position shown in full lines upon the left in Fig. 2 the extending end 39 of the latch 36 will have struck against the lower defining-edge of the slot in the guiding-way in the bracket 40, and any continued movement of the lever 47 will cause the latch to free itself from engagement with the levers, which levers upon being released will be returned to the position in which they are shown in Fig. 2 by the action of a pair of weighted levers, 50, that are mounted on a bracket, 51, said levers carrying a roller, 52, which bears against the under side of the lever 16, the upward motion of the forward ends of the levers being arrested by brackets 54, that are arranged in line with a pin, 55, that is carried by the lever 16. After the lever 16 has returned to the position in which it is shown in Fig. 2 the lever 47 may be returned to the vertical position, and being so returned the weight 41 will carry the lever 37 to the position shown on

the left in Fig. 4, the upper curved edge of the latch 36 striking against the under edge of the lever 16 and being forced backward, so as to pass beyond the levers, when the weighted arm 39 will act to throw the parts to the position shown in the figure last referred to, and immediately upon the return of the parts to the position indicated the lever 47 may be again thrown in the direction of the arrow, and an additional force may be applied to impart a forward rotary motion to the wheels of the car.

In order that the length of the rod 27 may be adjusted as required, we provide a turn-buckle, 56, which may be located at any convenient point along the line of the rod.

The braking mechanism used in connection with the starting mechanism hereinbefore described consists of a rock-shaft, 60, that is mounted in proper bearings arranged beneath the flooring of the car, and upon this rock-shaft we secure brake-arms 61, which are rigidly connected to the shaft and carry boxes 62 upon their lower ends. In the boxes 62 there are arranged the brake-shoes 63, which are forced to the required position by set-screws 64, that ride in threaded sockets formed in the boxes 62, and are held in place against accidental displacement by jamming nuts 65, the arrangement being such that as the shoes are worn they may be advanced toward the peripheral surface of the wheels. The forwardly-extending lever-arm 67, which is rigidly connected to the shaft 60 and braced by a diagonal bar, 66, is coupled to the end of the lever 45 by the shackles 68, from which construction it will be seen that as the lever 47 is thrown in the direction of arrow No. 2—that is, to the position shown upon the right in Fig. 4—the forward end of the lever 67 will be depressed, and the shaft 60 will be slightly rocked, carrying the brake-shoe against the periphery of the wheel, thus checking its motion and stopping the car; but in order that the brakes may be applied to the rear as well as to the forward edge of the wheel we provide rearwardly-extending arms 70, which carry loops 71, in which there are arranged the outer ends of arms 72, which are secured to a second rock shaft, 73, formed with downwardly-extending arms 74, carrying brake-boxes 62, in which the shoes are arranged, as hereinbefore described, so that as the shaft 60 is rocked the rear end of the lever or arm 70 will be raised; which movement of the arm 70 will raise the arm 72 and throw the rear brake-shoe against the periphery of the wheel. When the lever 47 is returned to the vertical position, a weight, 80, which is carried by an arm, 81, that is rigidly secured to the shaft 60, will throw the parts to the position in which they are shown in Fig. 2, and upon the right in Fig. 3.

Although we have described our invention as applied in connection with a street-car, it will of course be understood that the invention could be applied with advantage to any form



of stationary engine to help the fly-wheel over the center, thus doing away with the use of the pinch-bar or pinion-gear, either of which is very dangerous.

5 In Fig. 1 the lever 16 is represented as being provided with two side braces or strengthening-bars, 85, in order that the strength of the lever may be increased without materially adding to the weight of the attachment.

10 Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a car-starting mechanism, the combination, with a toothed wheel arranged to be 15 rigidly connected to the axle, of clutches arranged to be thrown into engagement with the wheel, and a mechanism, substantially as described, whereby, after the clutches have been thrown into engagement with the wheel, one 20 of them will be elevated and the other depressed, substantially as described.

2. In a car-starting mechanism, the combination, with a toothed wheel carried by the axle, of a beam-lever carrying clutches, a 25 mechanism, substantially as described, for throwing the clutches into engagement with the toothed wheel, a lever, 16, links 20, connecting the lever 16 and the beam-lever, and a mechanism, substantially as described, 30 whereby the forward end of the lever 16 may be depressed, as and for the purpose stated.

3. The combination, with a shaft or axle carrying a toothed wheel, of a beam-lever carrying clutches, a main lever carrying a rocker 35 and a sliding block that are connected by links with the clutches, connecting-rods extending from the sliding block to the rocker, and from the rocker to a bell-crank lever that is pivoted to the main lever, links connecting the 40 main lever and the beam-lever, and an operating mechanism, substantially as described.

4. In a car-starting mechanism, the combination of the following elements: toothed wheel carried by the axle, clutches 21 22, carried by 45 a beam-lever, 17, links connecting said beam-lever with a main lever, 16, a mechanism for throwing the clutches into engagement with the toothed wheel, and an operating mechanism consisting of a lever, 47, mounted on a 50 shaft, 43, an arm, 44, also mounted on said

shaft and formed with a shoulder, 5, a lever, 37, carrying a weight, 41, connected to the arm 44 by a link, 48, a latch, 36, formed with a curved face, 3, and provided with an arm, 39, and a stop, 4, all substantially as described, 55 and for the purpose stated.

5. In a car-starting mechanism, the combination, with a toothed wheel carried by the axle, of a beam-lever carrying clutches 21 and 22, a link, 23, connecting the clutch 21 with 60 a rocker, 24, said rocker, a connecting-rod, 27, bell-crank lever 28, link 25, sliding box 26, and a rod, 32, extending from the box to the rocker 24, a lever, 16, connecting-links 20, extending from the main lever to the beam- 65 lever 17, a manipulating-lever, 47, mounted on a shaft, 43, an arm, 44, mounted on said shaft and formed with a shoulder, 5, a lever, 37, provided with a weight, 41, connecting-link 48, latch 36, formed with a stop, 4, and 70 an inclined face, 3, and having an arm, 39, said latch being arranged to engage with the extending ends of the levers 28 and 16, substantially as described.

6. The combination, with a lever, 47, of an 75 arm, 45, formed with a shoulder, 6, a rock-shaft, 60, a lever, 67, connected to the arm 45, and a braking attachment carried by the rock-shaft, substantially as described.

7. In a car-braking mechanism, the combination, with a lever, 47, of an arm, 45, formed 80 with a shoulder, 6, a lever, 67, rigidly connected to a rock-shaft, 60, arms 61, carrying brake-boxes 62, brake-shoes 63, mounted in said boxes, arms 70, extending to the rear from 85 the rock-shaft 60 and rigidly connected thereto, a rock-shaft, 73, provided with arms 72, which overlap the arms 70, and arms 74, extending downward from the rock-shaft 73, carrying brake-shoes, substantially as described. 90

8. The combination, with a rock-shaft, of an arm, 61, carrying a brake-box, 62, a brake-shoe, 63, adjustably mounted in said box, and an operating mechanism, substantially as described.

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Witnesses:

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