

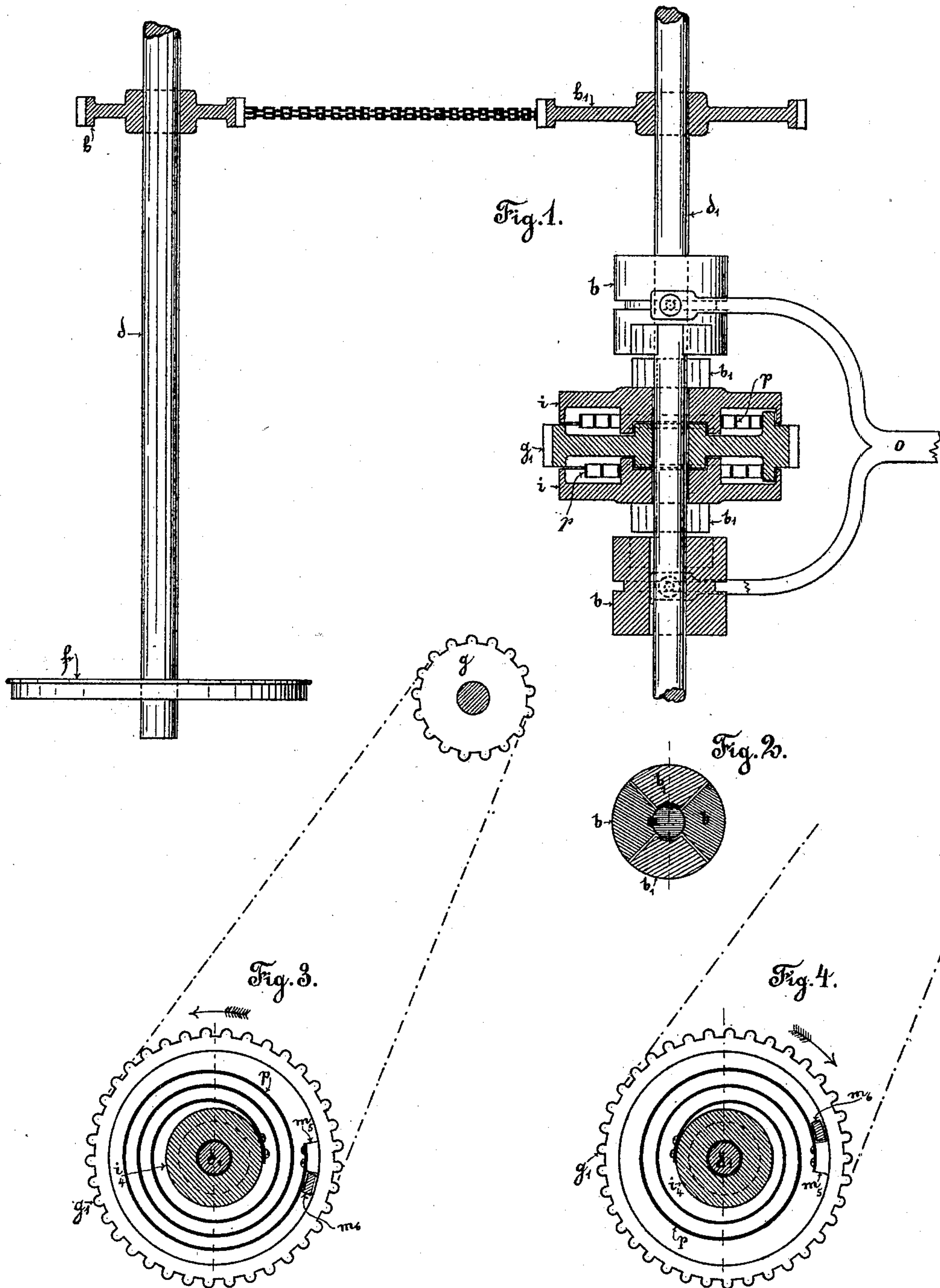
(No Model.)

3 Sheets—Sheet 1.

O. BLESSING.  
TRAM CAR.

No. 391,774.

Patented Oct. 30, 1888.



Witnesses:

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*A. E. Melhuish*

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by *A. H. Addan*

*his attorney*

(No Model.)

3 Sheets—Sheet 2.

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Fig. 5.

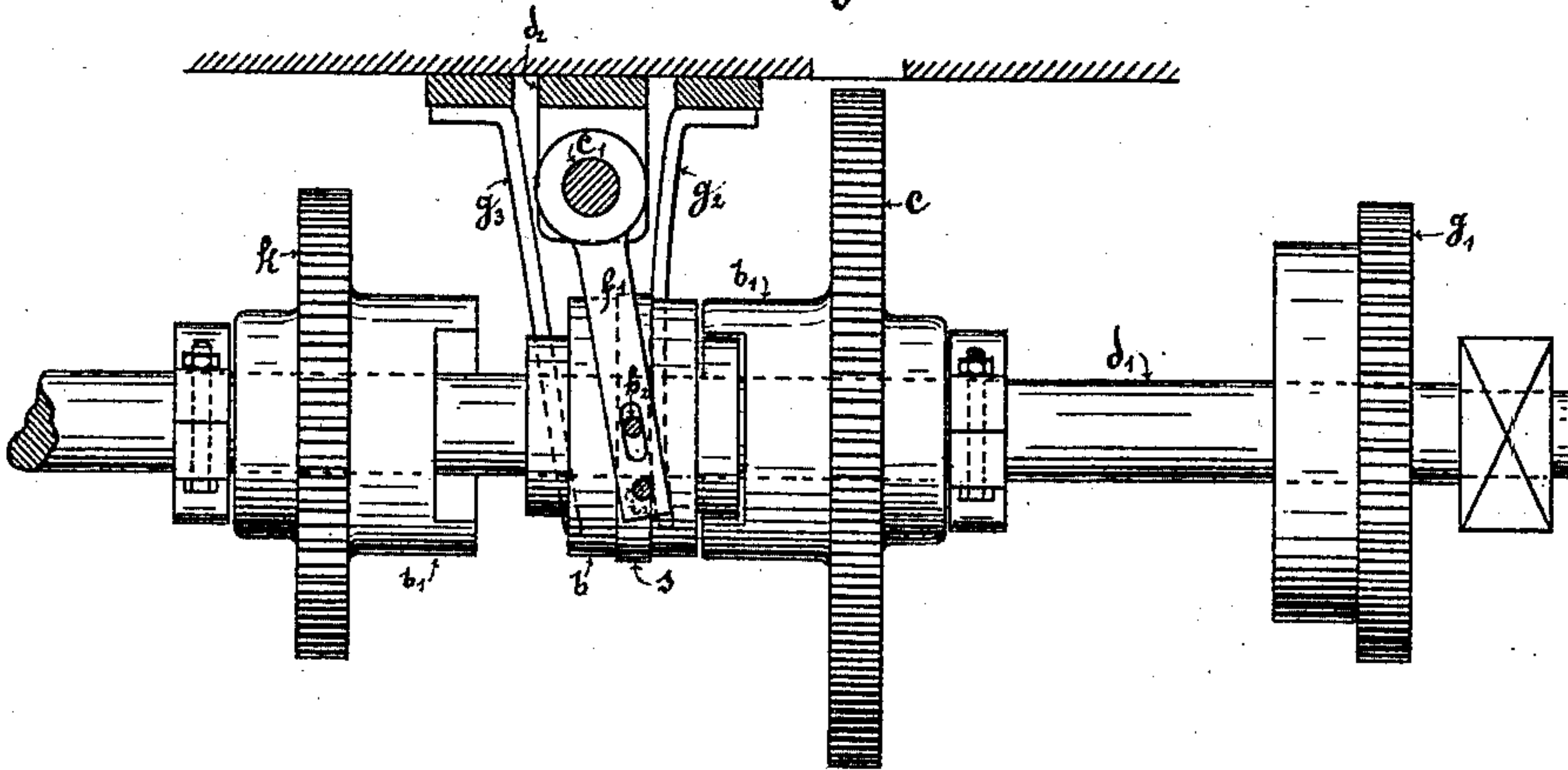


Fig. 6.

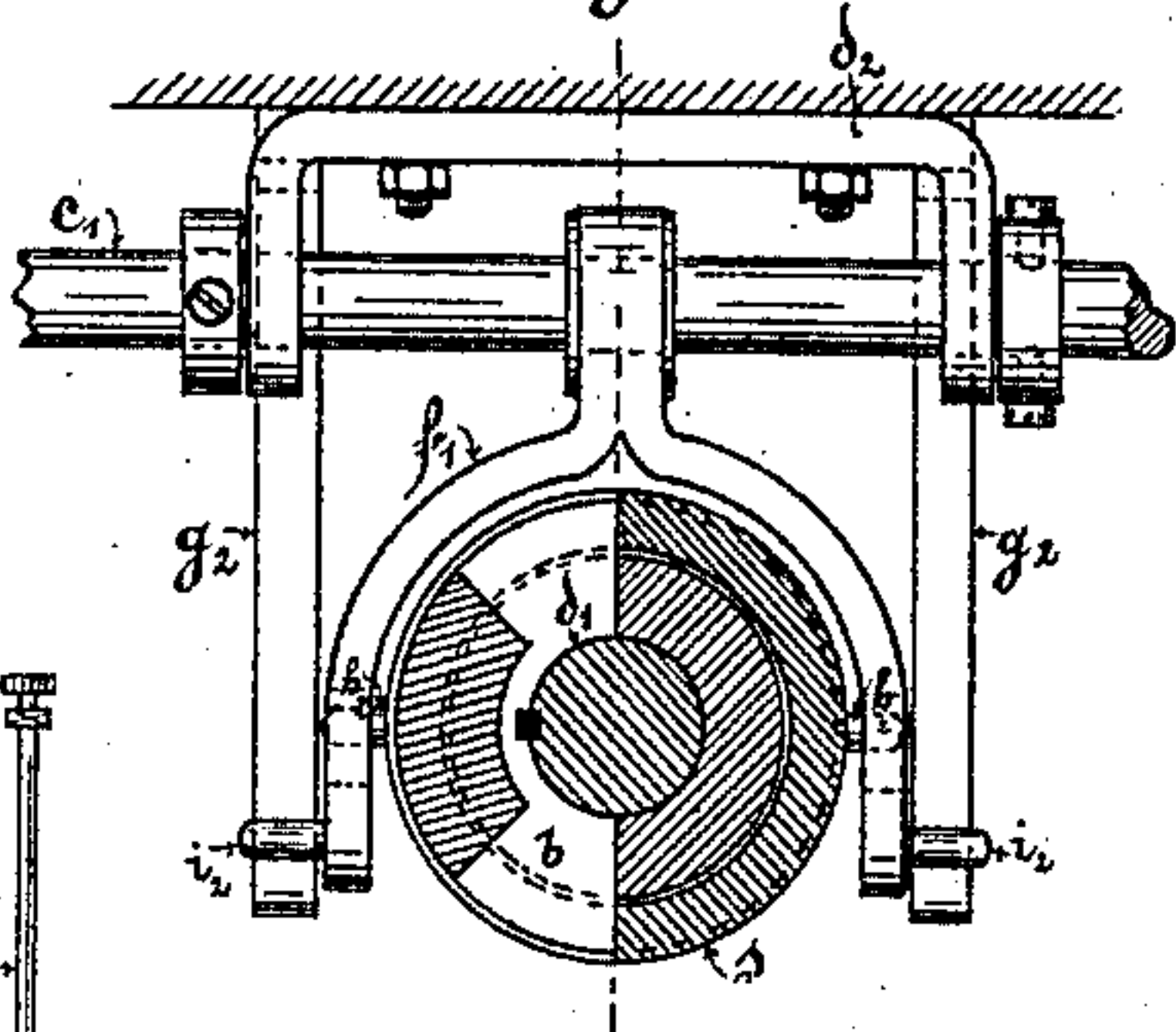


Fig. 7.

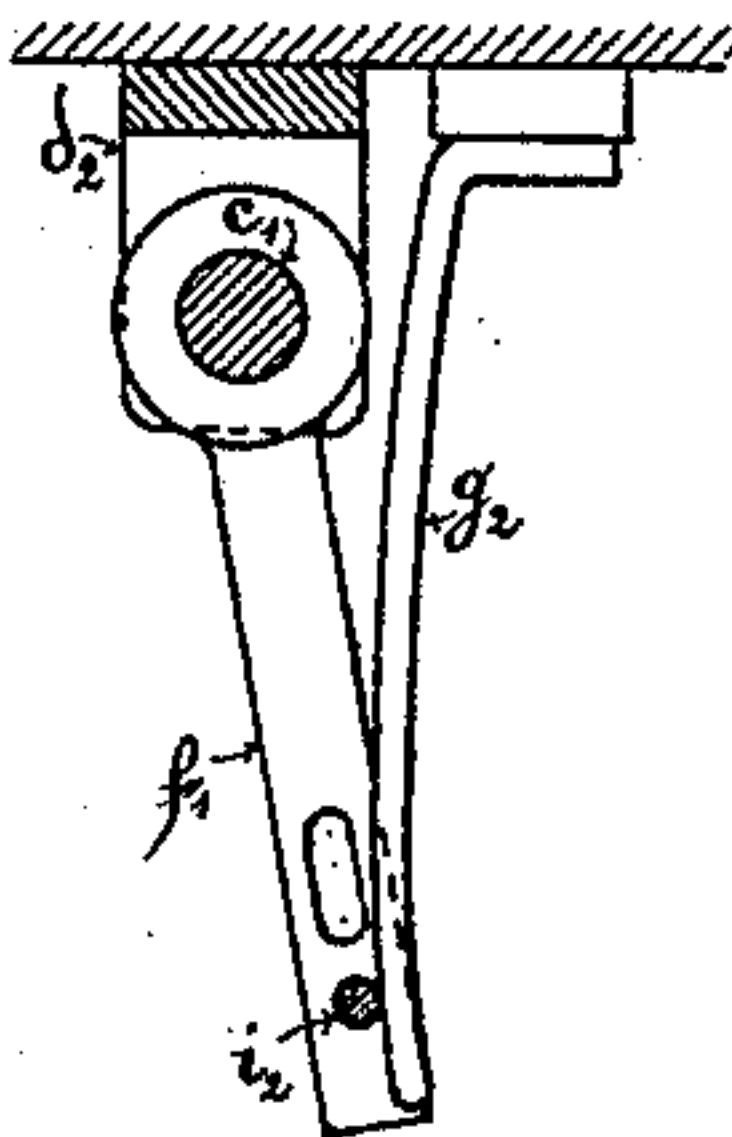


Fig. 8.

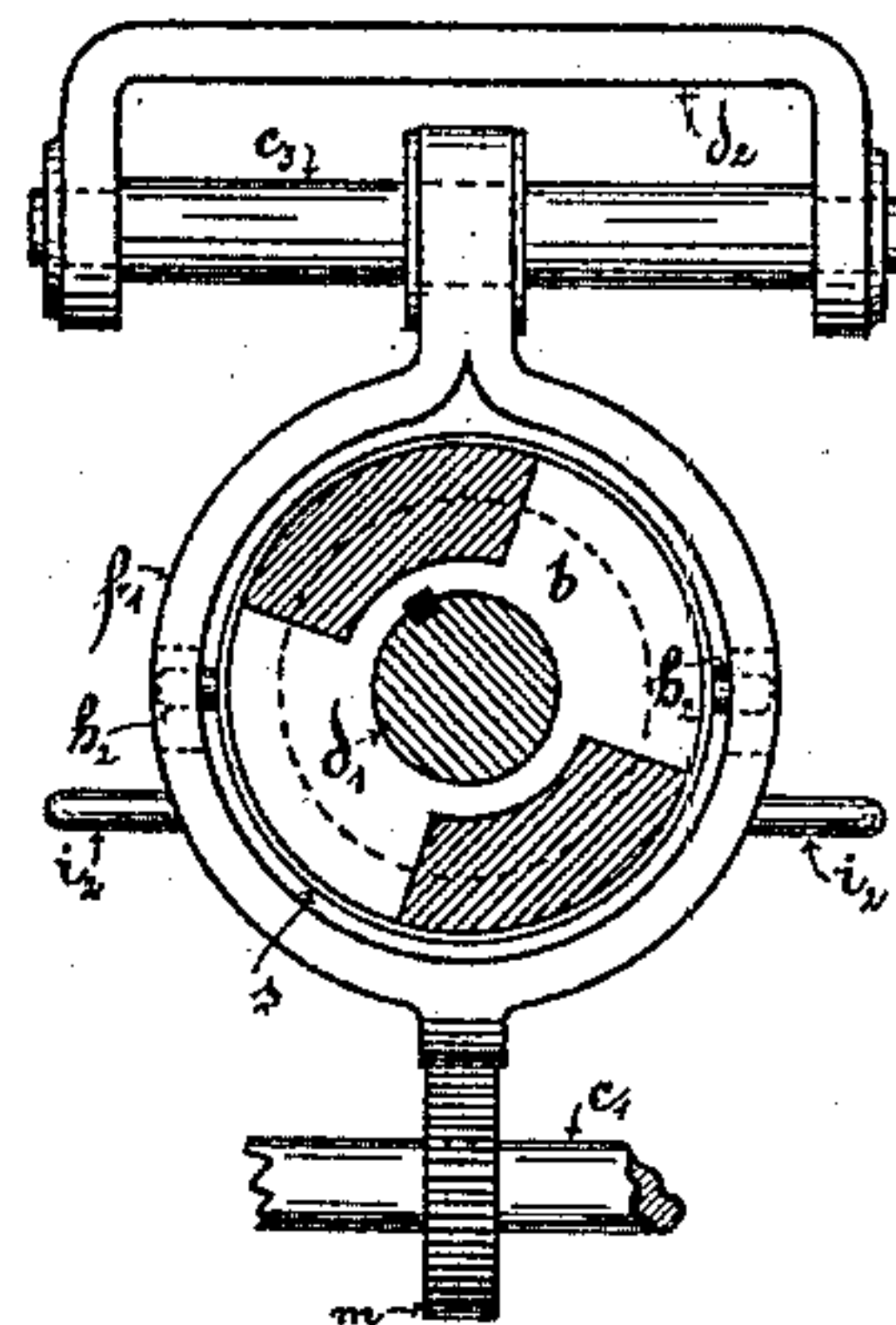


Fig. 10.

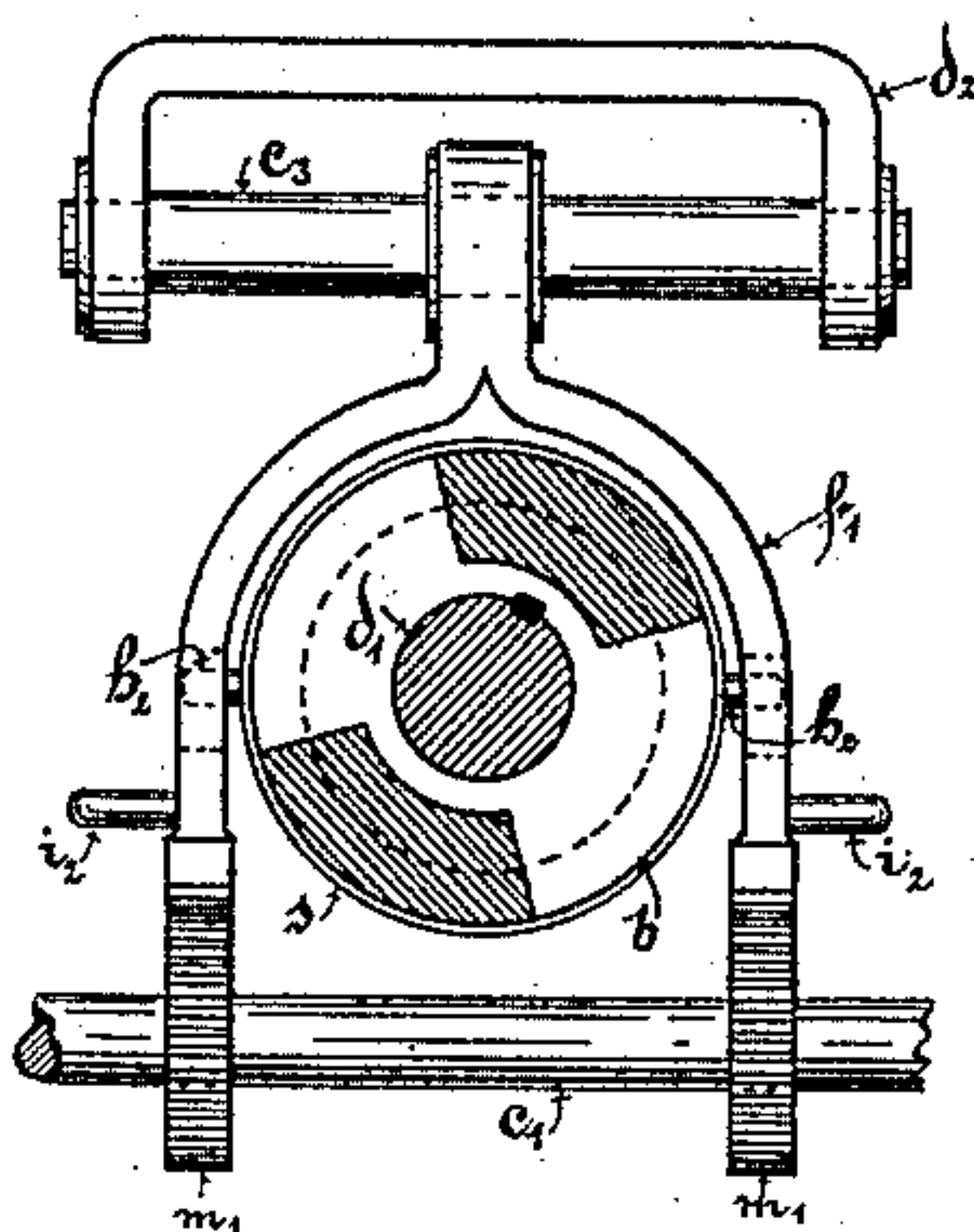
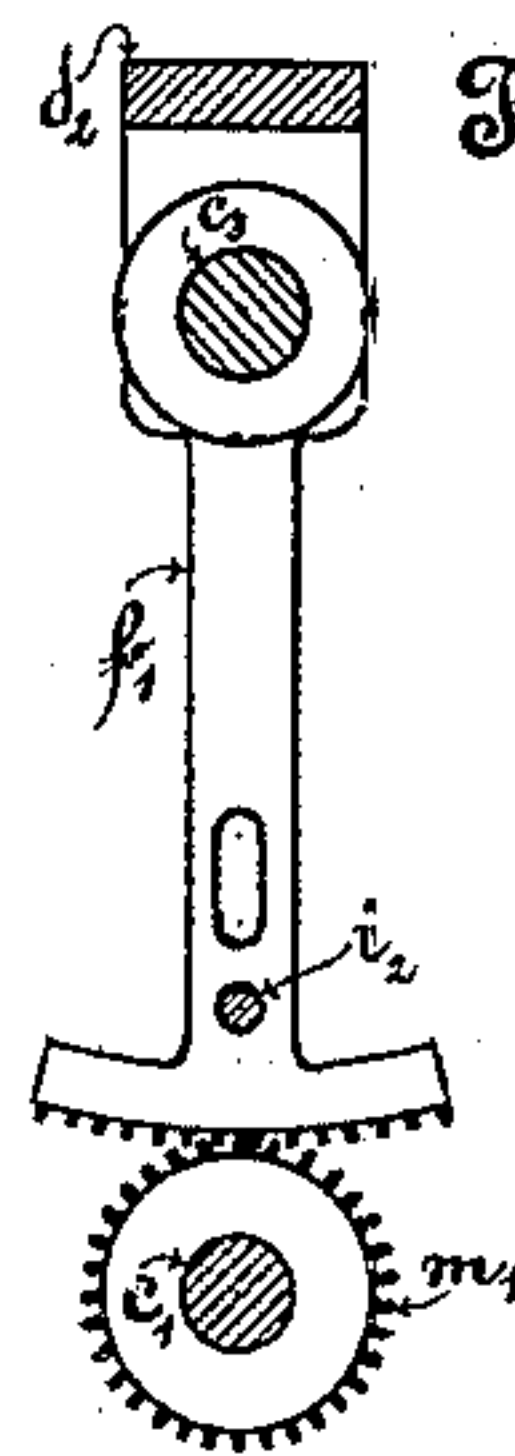


Fig. 11.



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(No. Model.)

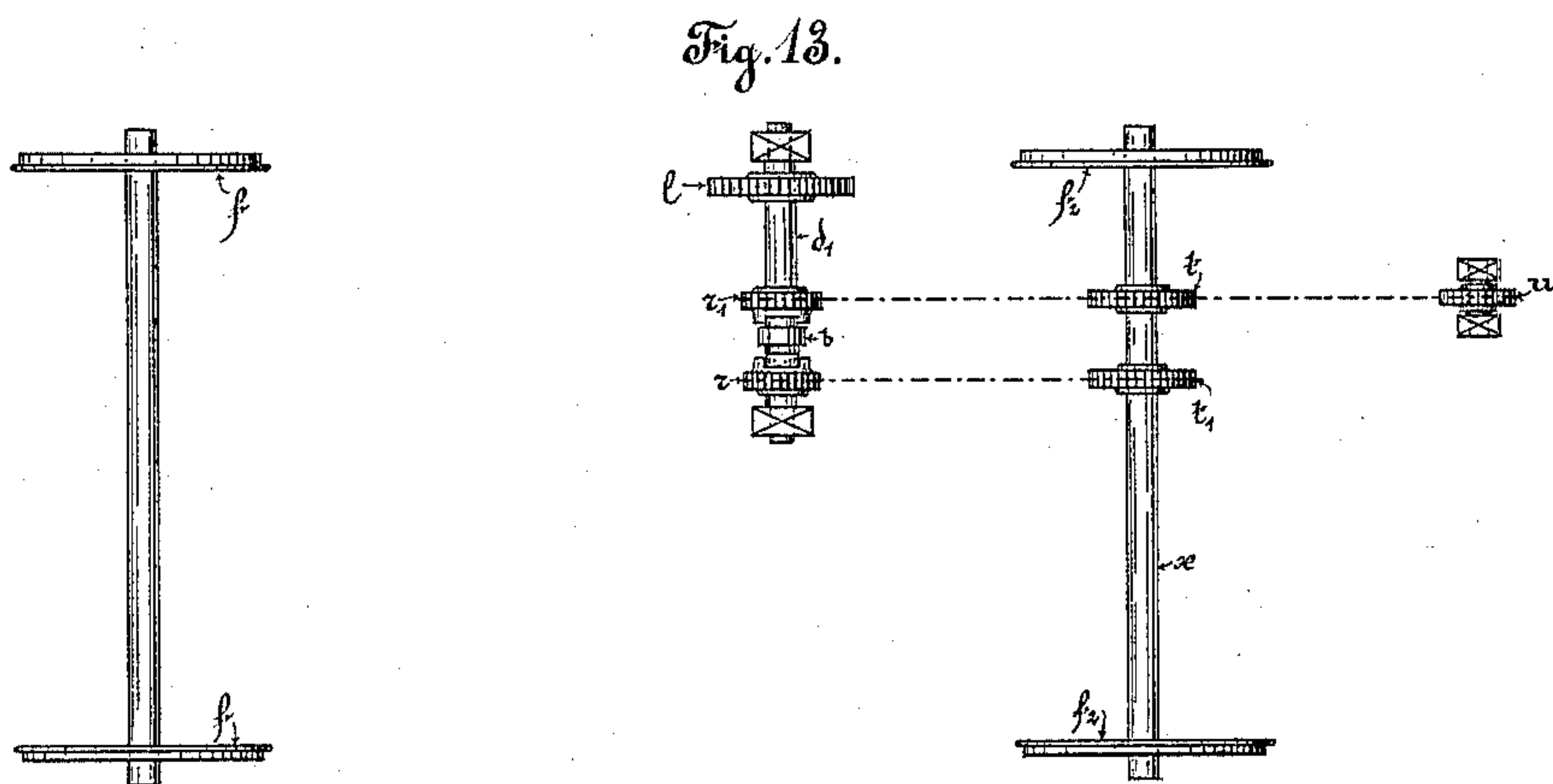
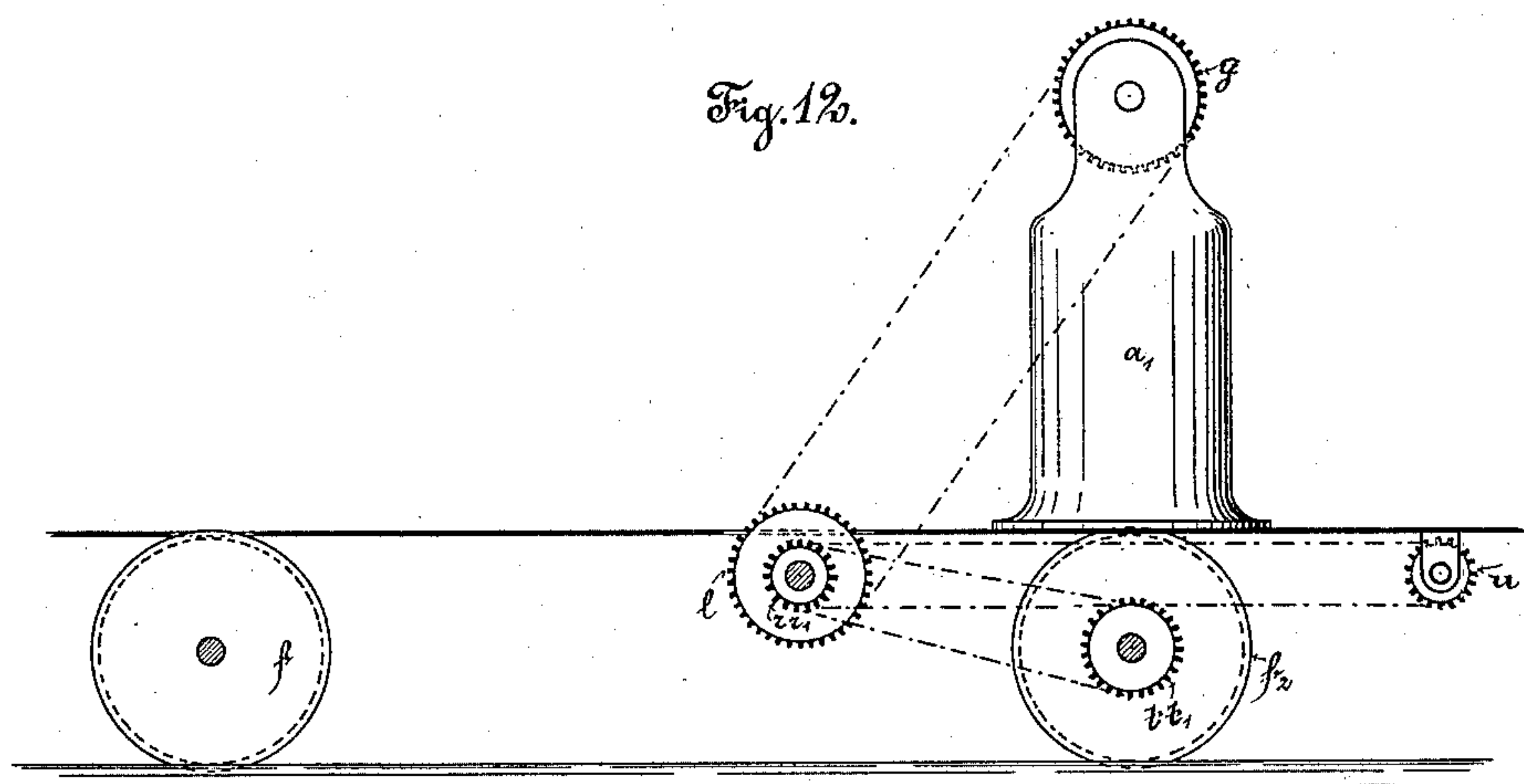
3 Sheets—Sheet 3.

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Witnesses.

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# UNITED STATES PATENT OFFICE.

OSKAR BLESSING, OF REUDNITZ, SAXONY, GERMANY.

## TRAM-CAR.

SPECIFICATION forming part of Letters Patent No. 391,774, dated October 30, 1888.

Application filed February 13, 1888. Serial No. 263,757. (No model.)

*To all whom it may concern:*

Be it known that I, OSKAR BLESSING, a subject of the King of Saxony, and a resident of Reudnitz, in Saxony, Germany, have invented  
5 new and useful Improvements in Tram-Cars and other Vehicles Driven by Gas or Petroleum Motors, of which the following is a specification.

This invention relates to tram-cars or other like vehicles driven by gas or petroleum motors; and the improvements have for their purpose, first, to prevent, on starting and reversing of the car for forward as well as for backward movement, a sudden reaction on the motor and a stoppage of the latter thereby; second, a form of clutch for speed-gearing and  
15 other purposes devised for normal disengagement; third, to allow of a forward and rearward movement of the vehicle without reversing the motor.

Referring to the accompanying drawings, Figure 1 is a horizontal section of the mechanism for preventing sudden strain on the motor and gear when starting or reversing the car. Fig. 2 is a section through one of the clutches thereof when in engagement. Figs. 3 and 4  
25 are sections, one on each side of the wheel  $g'$ , Fig. 1. Fig. 5 is a view of part of speed and power gear and clutch thereof. Fig. 6 is a cross-section thereof; Fig. 7, a detail view of the clutch fork and springs. Fig. 8 is a modification. Fig. 9 is a general plan view of the speed-lever and rod system for operating the engagement of the speed or power gear from  
30 either end of the car. Figs. 10 and 11 are further modifications of the means for operating said clutch. Figs. 12 and 13 show gear whereby the car may be moved in either direction without reversing the motor.

To prevent sudden reaction and concussion  
40 in reversing the car, on the shaft  $d'$  is loosely revoluble a chain-wheel,  $g'$ , having on each side projections  $m^5$ . On each side of said chain-wheel, and likewise loose upon the shaft, are two disks,  $i$   $i$ , having central hubs,  $i^4$   $i^4$ .  
45 The said hubs are connected by scroll-springs  $p$  to the projections  $m^5$  aforesaid, the springs being coiled in opposite directions and connected to the respective hub  $i^4$  at their inner and to the projection  $m^5$  at their outer ends. On  
50 the outer faces of the disks  $i$   $i$  are segmental projections  $b'$   $b'$ , serving as clutch-teeth and

adapted to catch into corresponding recesses in the drums  $b$ , feathered to the shaft. The said drums are simultaneously moved by fork  
60  $o$ , according to the direction in which the chain-wheel  $g'$  revolves. To prevent overstraining of the springs, stops  $m^6$  are arranged on the disks  $i$   $i$ , so that the extent of the relative movement of the wheel  $g'$  and disks  $i$   $i$  is limited to one revolution. On the impulsion  
65 of the chain-wheel  $g'$ , when, as shown in Fig. 1, both the couplings  $b$  are out of gear with the disks  $i$ , the chain-wheel  $g'$  and the disks  $i$  taken along with the same by the springs  $p$  revolve loosely on the shaft  $d'$ . On  
70 gearing one of the disks  $i$  with the shaft by means of the respective coupling  $b$ , situated beside the same, while the other coupling  $b$  remains out of gear with the other disk  $i$ , the disk  $i$  so geared and the coupling geared into  
75 said disk are revolved in the same direction, first by the spring  $p$ , tensioned thereby, and at length by the peg  $m^5$  of the chain-wheel  $g'$ , said peg abutting against the peg  $m^6$  of the disk  $i$ ; hence the motion is transmitted to the  
80 shaft  $d'$ , and from there by means of chain-wheels  $h'$   $h$  or speed and power gear or other gear to the car-axle  $d$  without suddenly taking the full power for the impulsion of the latter from the motor, whereby damage might be  
85 done to the latter. In lieu of the chain-wheel  $g'$ , also a belt-pulley or spur-wheel may be employed according to circumstances.

The second improvement has for its purpose to normally hold clutches automatically dis-  
85 engaged, and is shown by Figs. 5 to 11. As shown by Figs. 5 and 6, this improvement consists in providing the pairs of springs  $g^2$  and  $g^3$ , either one pair,  $g^2$ , or the other,  $g^3$ , being tensioned by the pins  $i^2$  or the fork  $f'$ , as shown  
90 in Fig. 7, when engaging the clutch. The sleeve  $d$  is displaceable on shaft  $d'$ , but secured against revolution on the same and provided with clutch-teeth. On the right and left of this clutch  $b$  are situated loose on shaft  $d'$  the  
95 chain or gear wheels  $k$  and  $c$ , the same being likewise provided with clutch-teeth  $b'$ , so that the clutch  $b$  is alternately brought in connection—i. e., coupled with the one or the other of the wheels  $k$  and  $c$ —by the engagement of the  
100 teeth. The displacement of the clutch  $b$  on shaft  $d'$  is effected by turning the shaft  $c'$  through



fork  $f'$ , secured on said shaft, which fork, as shown, is provided with two longitudinal slots, into which catch-pins  $h^2$  on a ring,  $s$ , revolvably held in a groove of the clutch  $b$ .

5 In place of the ring  $s$  carrying the two pins  $h^2$ , the fork  $f'$  may be provided with two pins instead of two slots, said pins catching into a groove in the clutch. On the fork  $f'$  are situated the two pins  $i^2$  between the pairs of  
10 springs  $g^2$  and  $g^3$ . By engagement of the clutch  $b$  one of the pairs of springs is so tensioned by the pins  $i^2$  that as soon as the driver frees the lever acting on the rod-gear  $k'$  or  $k^2$  at  $n$  or  $n'$ , respectively, Fig. 9, the clutch  $b$  is either  
15 automatically disengaged by the rebounding force of the tensioned-springs  $g^2$  or  $g^3$ , respectively, or the force of the springs  $g^2$  or  $g^3$  assists in disengaging the clutch  $b$  and maintaining it in disengaged position.

20 The arrangement of the pins  $i^2$  and springs  $g^2$  and  $g^3$ , respectively, has for its purpose to produce a certain and rapid disengagement, which is very important with tram-cars driven by motor force.

25 Figs. 10 and 11 show the fork  $f'$  provided with two toothed sectors, into which gear pinions  $m'$  on the shaft  $c'$ . The fork  $f'$  is moved thereby, revolving about the shaft  $c^3$ . Fig. 8 also shows the fork  $f'$  in the shape of a complete circle provided with one toothed sector,  
30 into which gears a pinion,  $m$ , on the shaft  $c'$ .

In Fig. 9 the gear for speed and power driving is shown with this improvement, as it is intended to be placed below the tram-car.  
35 The force for moving the car is transmitted from shaft  $d'$  by either the wheels  $k k^3$  or  $c c^2$ , by means of chains, to the wheel-axle—thus by  $k k^3$  with power and less speed and by  $c c^2$  with greater speed.

40 The shaft  $c'$  is revolved from each platform by an exchangeable lever acting on the pinion  $n$  through shaft  $k'$ , levers  $o'$  and  $p'$ , and rod  $q$  on one platform, and from the other platform through pinion  $n'$ , shaft  $k^2$ , levers  $p^2$  and  $o^2$ , and  
45 rod  $q'$ .

The third improvement, which has for its purpose to allow the car to be moved forward and backward without reversing the motor, is shown in Figs. 12 and 13. This improvement  
50 consists in the peculiar arrangement of the two pairs of chain-wheels  $r t'$  and  $r' t$ , each of which serves independently of the other to transmit the working power from shaft  $d'$  to the car-axle  $x$ . The shaft  $d'$  is actuated by

means of chain and chain-wheels  $g$  and  $l$  from 55 the motor  $a'$ . The wheels  $r$  and  $r'$  are loose on shaft  $d'$ , the wheels  $t$  and  $t'$  are fixed on the car-axle  $x$ , and the wheel  $u$  is lodged separately on the frame of the vehicle. Between the wheels  $r$  and  $r'$  is the clutch  $b$ , displaceable 60 in the longitudinal direction of the shaft  $d'$ , but secured against revolution on the same. This clutch can be alternately coupled with the wheels  $r$  and  $r'$  for the purpose of actuating the wheel-axle  $x$ , either by the one or the other 65 pair of wheels. The pair of wheels  $u r'$  is so arranged that the wheel  $t$  is touched tangentially by the chain passing thereover, the latter gearing with the teeth of the wheel  $t$ . By this arrangement the chain, during operation 70 by this pair of wheels  $r' u$ , revolves the wheel  $t$  and the car-axle  $x$  in the contrary direction to that of the shaft  $d'$ . During operation by the pair of wheels  $r t'$ , however, the car-axle  $x$  revolves in the same direction as the shaft  $d'$ . 75 Therefore the car-axle  $x$  is revolved with the pair of wheels  $r' u$  in one direction and with the pair of wheels  $r t'$  in the other direction, and thus the vehicle is moved forward and backward without necessitating the moving 80 direction of the motor to be reversed. The wheel  $r$  or  $r'$ , respectively, not in connection with the coupling  $b$ , runs loosely on shaft  $d'$ .

I claim in tram-cars and other vehicles driven by gas or hydrocarbon motors— 85

1. The wheel  $g'$ , having projections  $m^5$ , and right and left wound scroll-springs  $p$ , in combination with disks  $i$ , having projections  $m^6$  and clutch teeth  $b'$  thereon, together with clutches  $b$ , adapted to be simultaneously moved for alternate engagement, substantially as and for the purpose set forth. 90

2. The combination, with a clutch,  $b$ , of fork  $f'$ , pins  $i^2$  on said fork, and springs  $g^2$  and  $g^3$ , substantially as and for the purpose set forth. 95

3. The combination, with a shaft,  $d'$ , of chain-wheels  $r r'$  on said shaft, shaft  $x$ , chain-wheels  $t t'$  on said shaft, chain-wheel  $u$ , chains gearing said wheels, as set forth, and clutch  $b$ , substantially as and for the purpose described. 100

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

OSKAR BLESSING.

Witnesses:

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