

(No Model.)

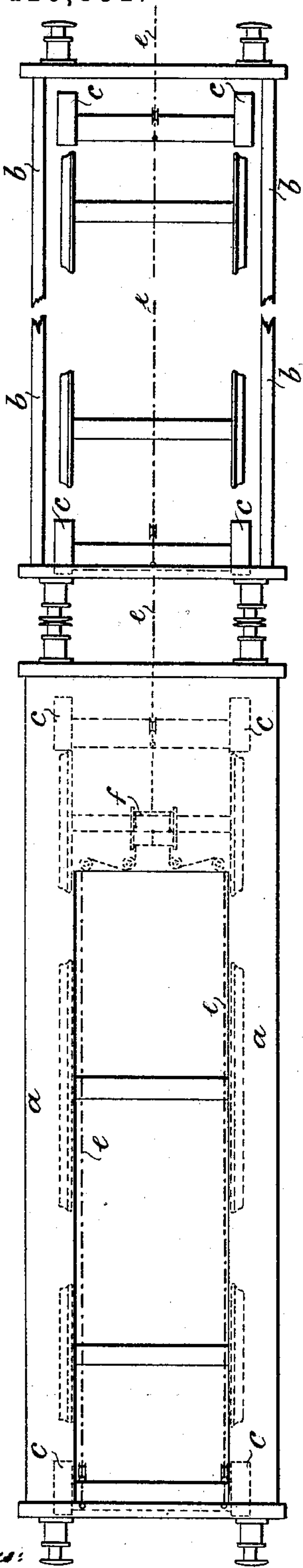
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P. F. DE FORESTA.  
CAR BRAKE.

No. 410,881.

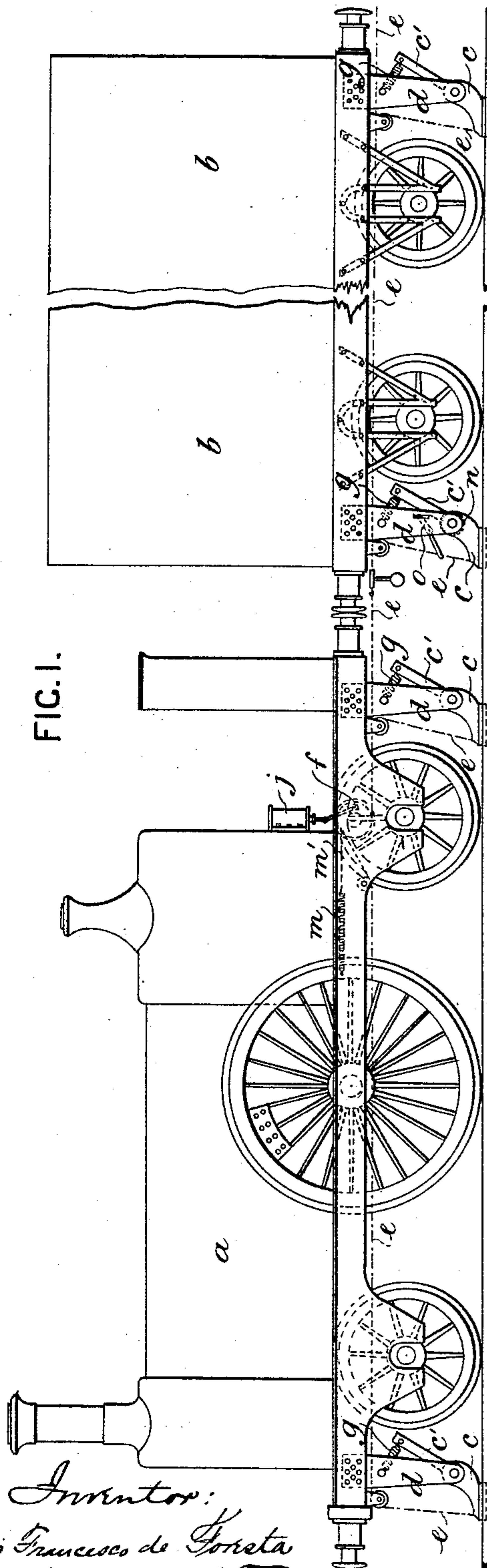
Patented Sept. 10, 1889.

FIG. 2.



Witnesses:  
*J. A. Rutherford*  
*Geo. H. Rea*

FIG. 1.



Inventor:  
*Pietro Francesco de Foresta*  
By *James L. Norris*  
*Attorney.*

(No Model.)

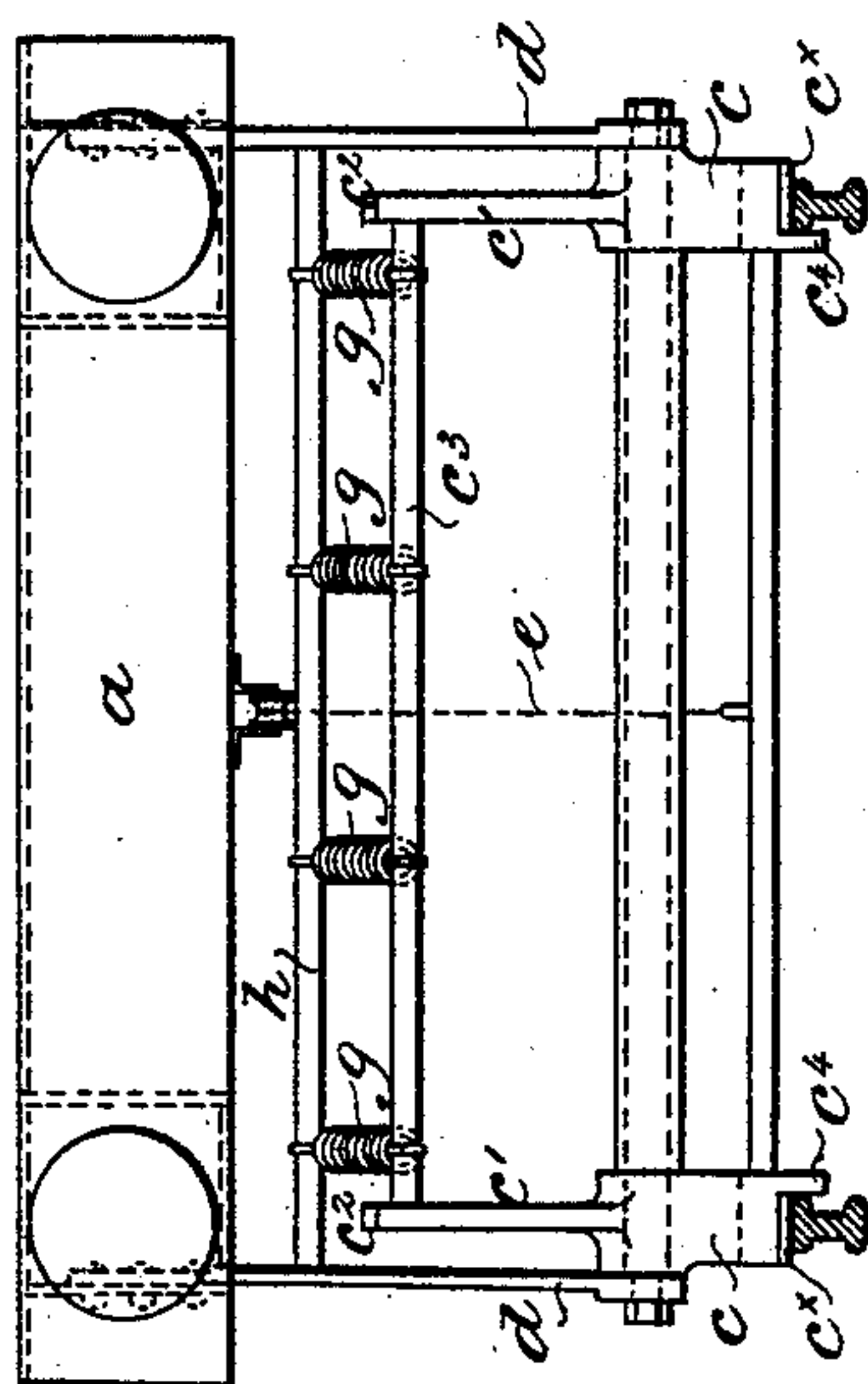
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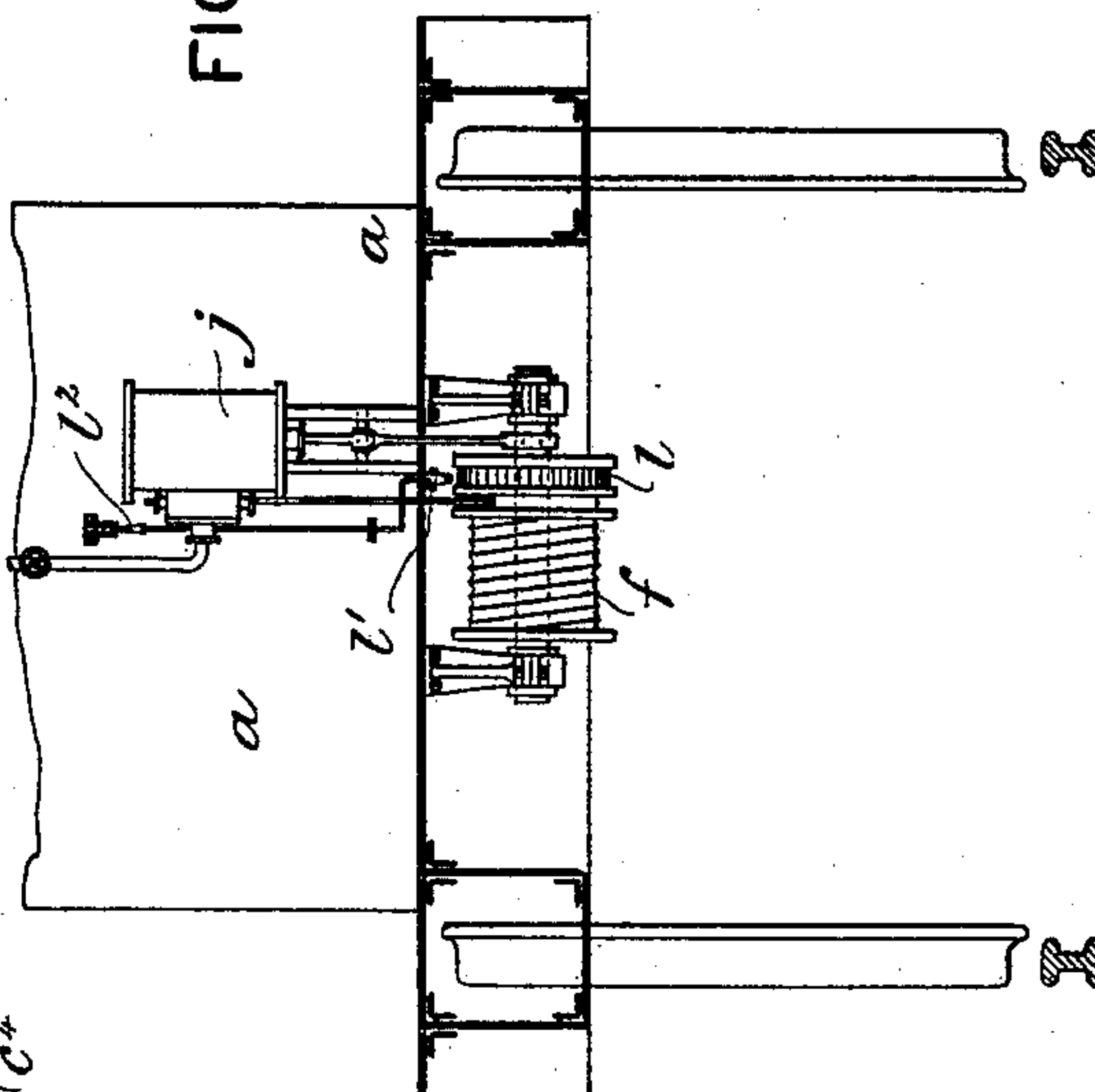
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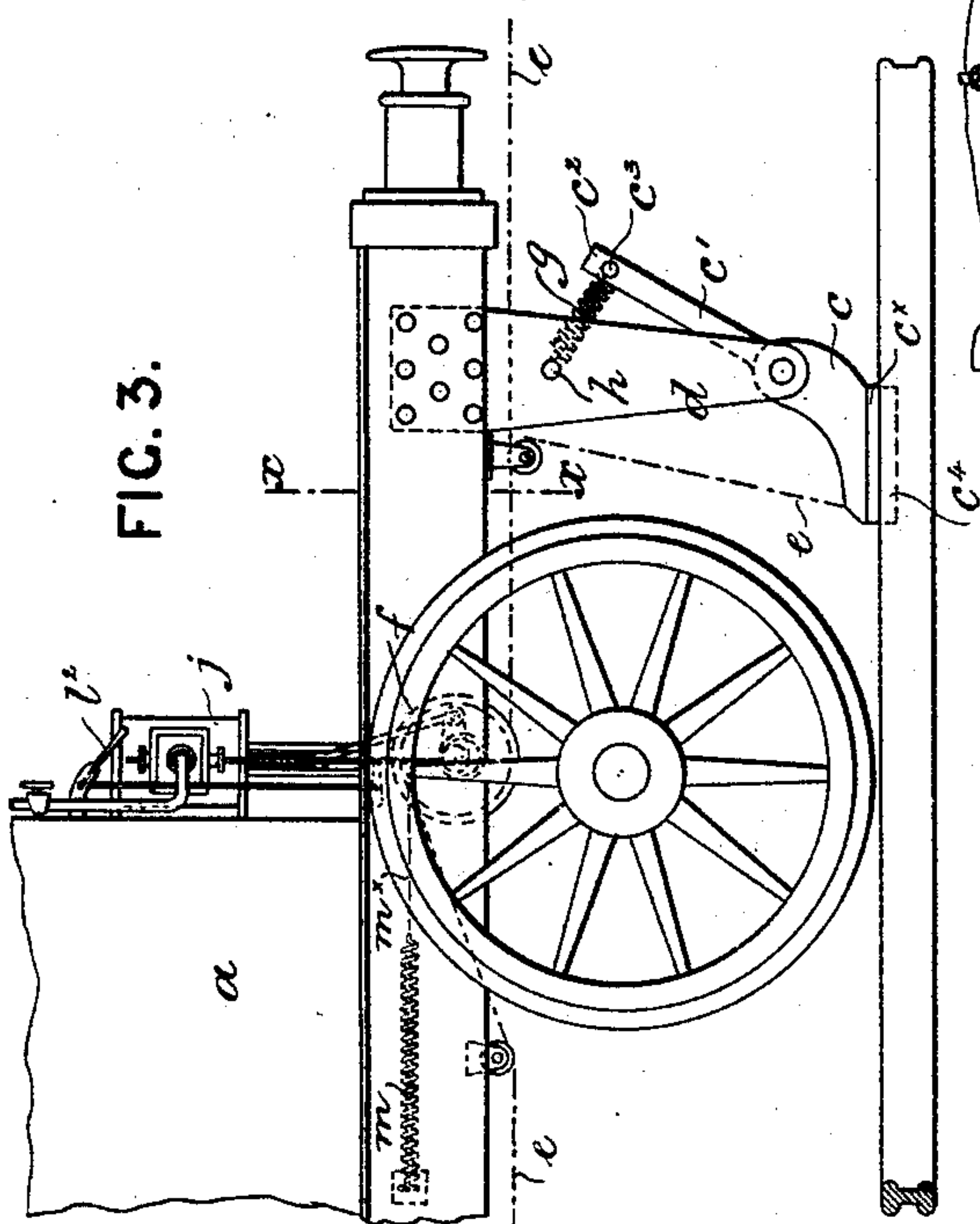
**FIG. 4.**



FILE 5



**Fig. 5.**



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3 Sheets—Sheet 3.

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FIG. 6.

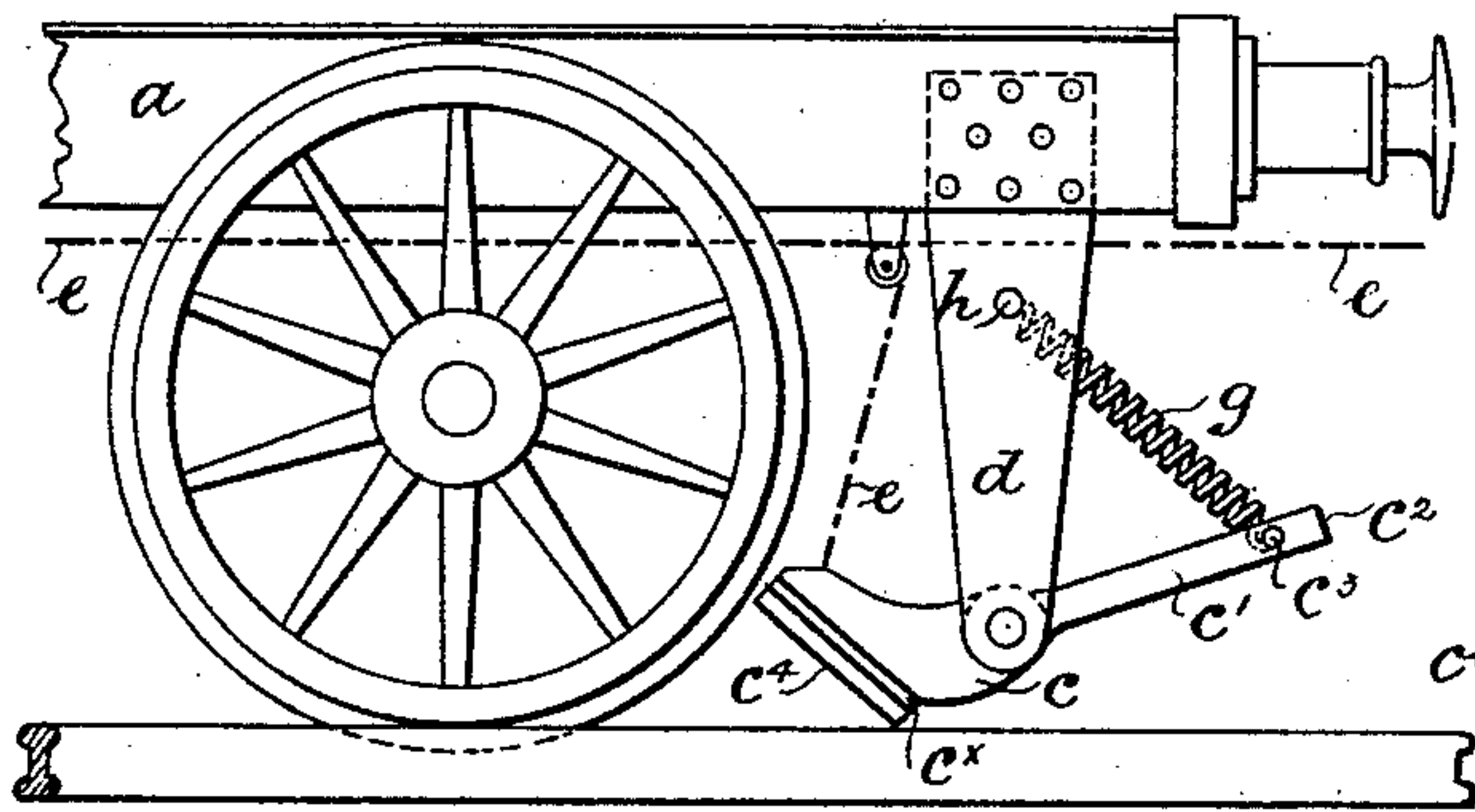


FIG. 7.

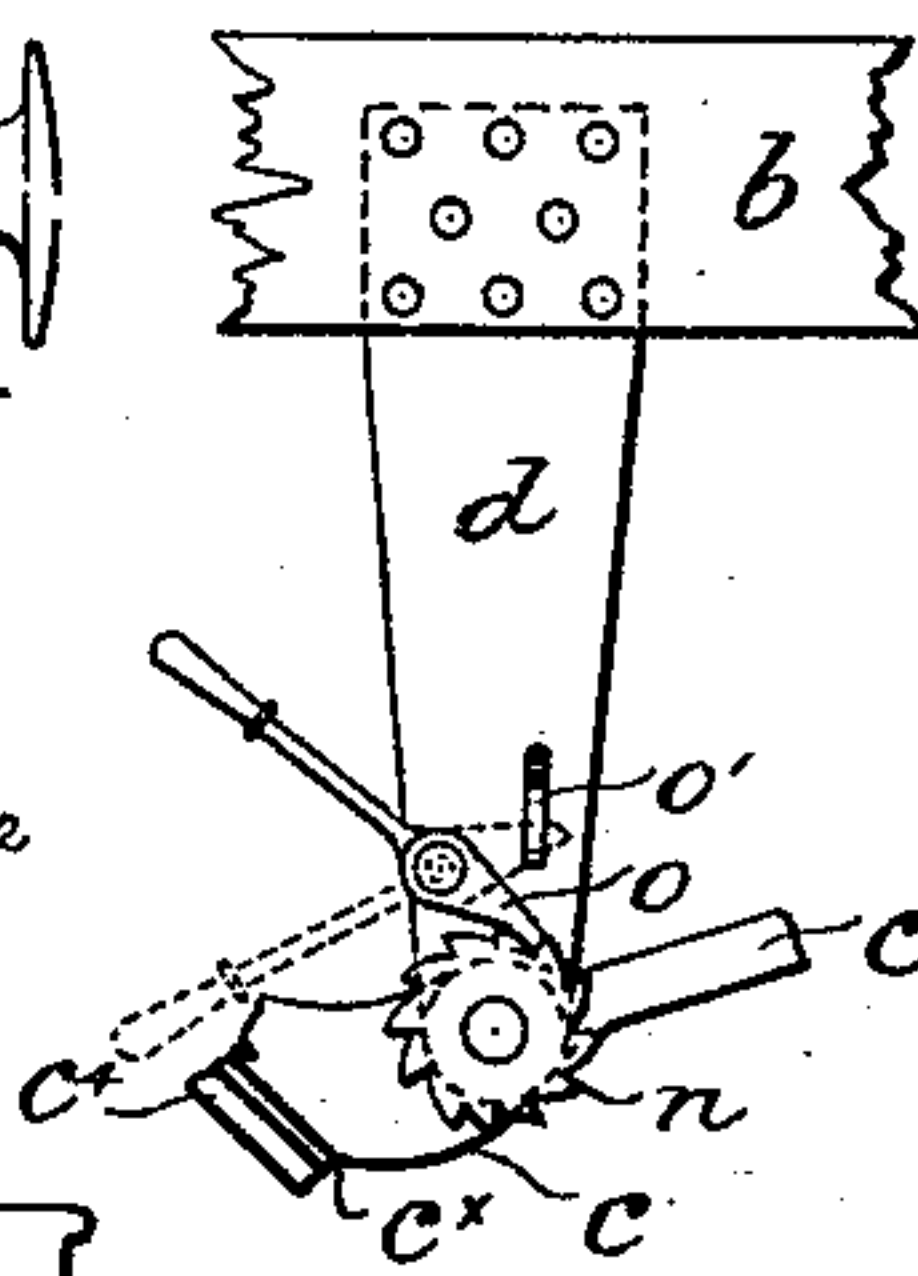


FIG. 8.

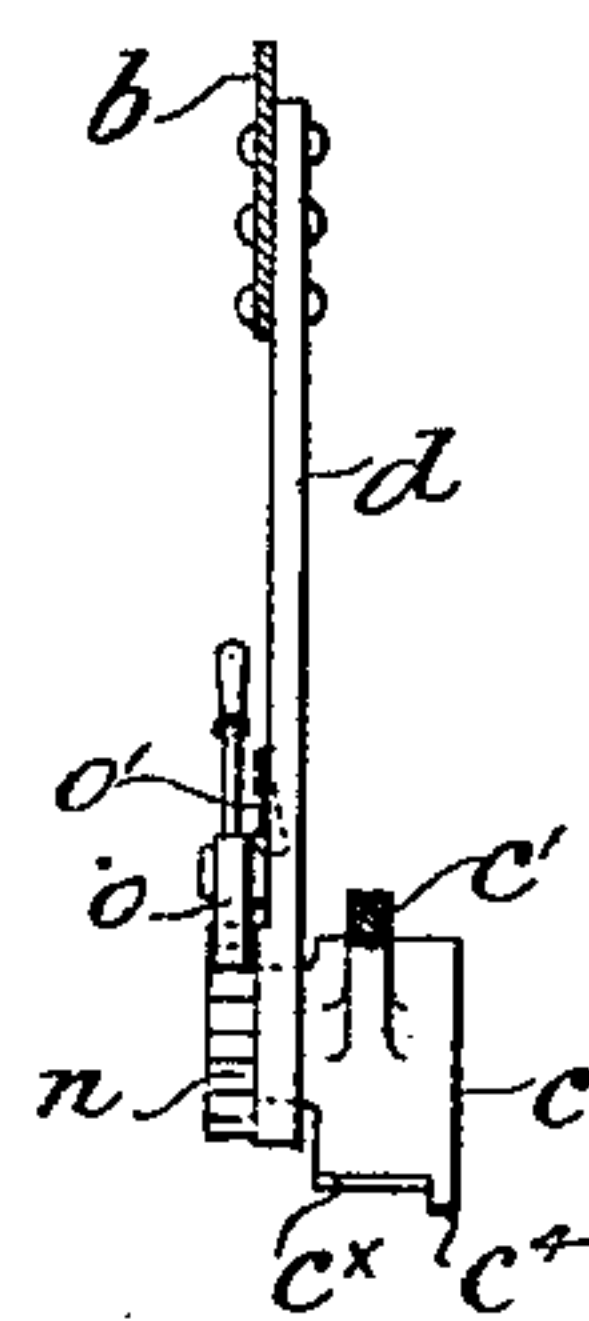


FIG. 9.

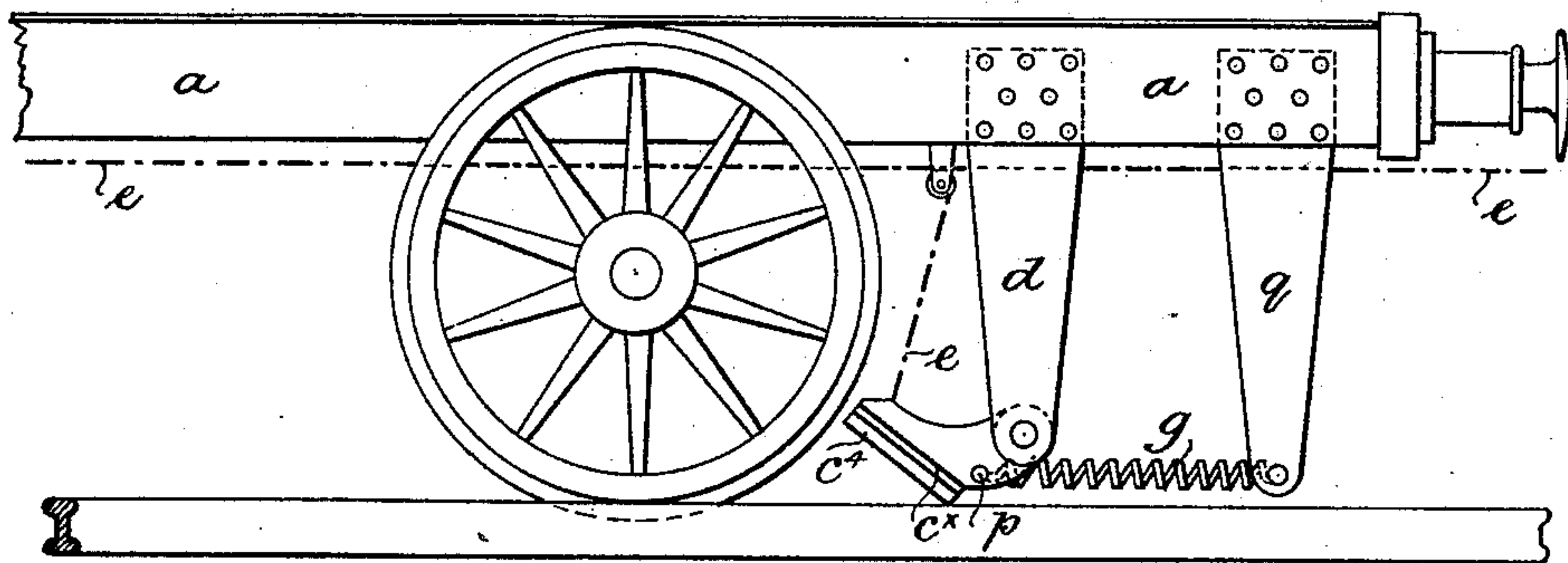
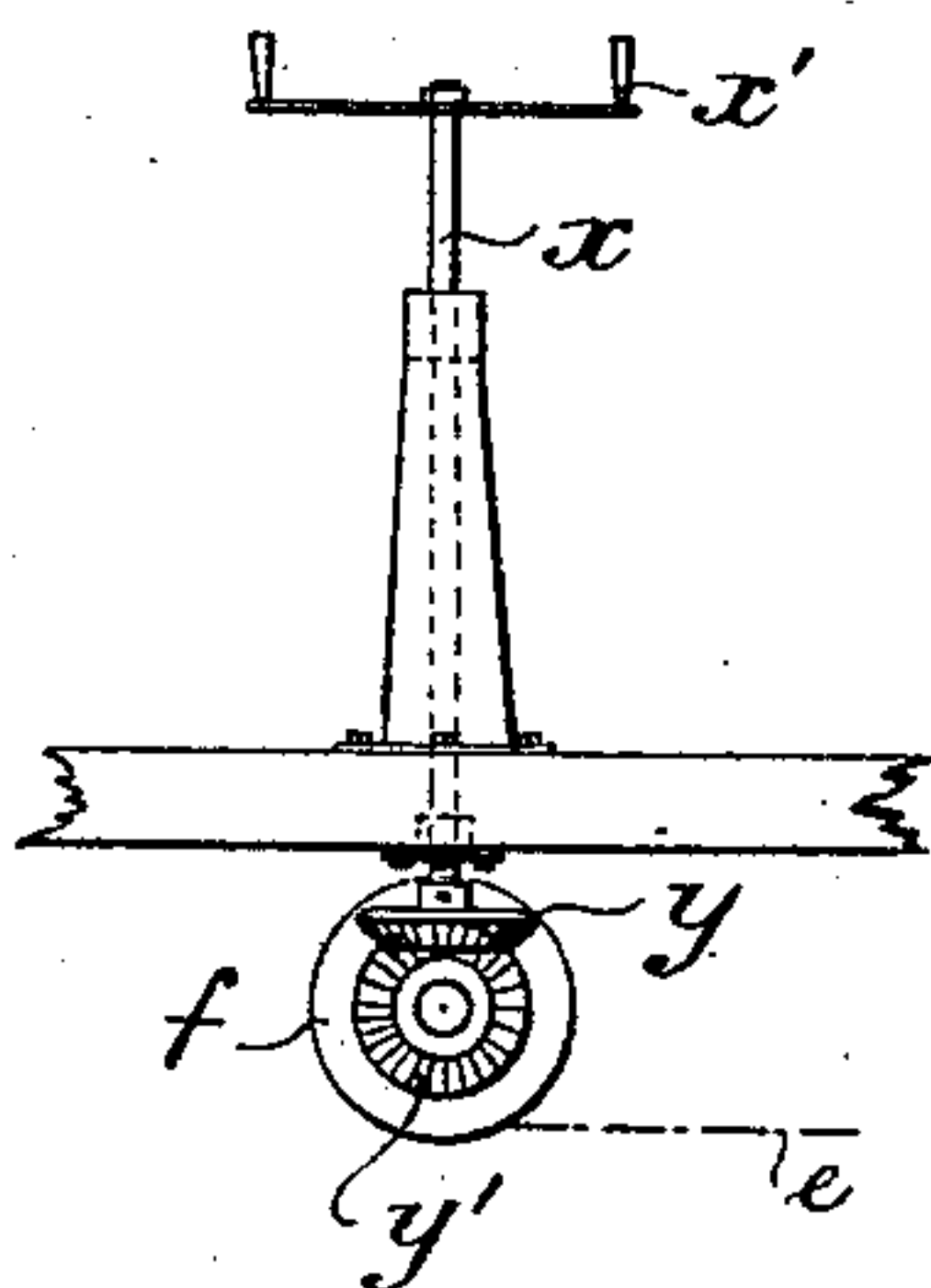


FIG. 10.



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# UNITED STATES PATENT OFFICE.

PIETRO F. DE FORESTA, OF FLORENCE, ITALY.

## CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 410,881, dated September 10, 1889.

Application filed July 18, 1889. Serial No. 317,872. (No model.)

*To all whom it may concern:*

Be it known that I, PIETRO FRANCESCO DE FORESTA, a subject of the King of Italy, residing at Florence, in the Kingdom of Italy, have invented a new and useful Improved Brake Apparatus for use on Railways and Tramways, of which the following is a specification.

My invention has for its object an improved brake apparatus for use on railways and tramways, and which is arranged in such a manner that when caused to operate the entire train or the tram-car shall be raised or elevated above the rails by means of brake-blocks allowed to fall upon and bite such rails, thereby arresting further motion of the train or the tram-car, said brake-blocks being under the control of the driver and capable of being rapidly restored or raised to their normal position to allow the train or the tram-car to descend again upon the rails and be ready to continue its journey.

My invention will be readily understood on reference to the accompanying drawings, which show one mode of carrying out the same.

Figure 1 is a side elevation, and Fig. 2 is a plan, of a portion of a railway-train. In the latter figure the under framing only of the locomotive and carriages is shown. Fig. 3 is a side elevation of the right-hand end of the locomotive; Fig. 4, an end view of the same; and Fig. 5 a section on the line  $x x$ , Fig. 3. The above figures show the brakes in their fallen position and the train lifted from the rails. Fig. 6 shows the position the parts assume when the brakes are raised. Figs. 7 and 8 show mechanism applied to a carriage or a tender for retaining the brakes in the raised position when uncoupling is to be effected. Fig. 9 shows a modification. Fig. 10 shows means for raising the brake-blocks by hand when applied to tram-cars. Figs. 3 to 9 are drawn to an enlarged scale.

$a$  is the locomotive.  $b b$  are carriages coupled to the same in any ordinary way.

$c c$  are the brake-blocks, which are arranged in pairs at the front and rear of each carriage and of the locomotive, as shown at Fig. 4. They are carried by arms or supports  $d$ , and are connected, by means of chains  $e$ , to a winding-drum  $f$ .

Standing out from each brake-block is an arm  $c'$ , whose outer end is connected by a tie-rod  $c^3$  to the corresponding arm  $c'$  of the brake-block on the opposite side.

Powerful springs  $g$ , carried by the tie-rods  $c^3$  and  $h$ , cause the brake-blocks to turn on their axes and to descend and firmly bear on the rails, and by thus acting as levers raising or elevating the entire train. The under side of each brake-block is covered with vulcanized rubber  $c^x$ , or other suitable material, for causing the blocks to firmly bite the rails. There is also a flange  $c^4$  on the inner side of each block, which comes against the side of the rails when the blocks are lowered and keeps them in position on the rails.

$j$  is an auxiliary cylinder, operated by steam taken from the boiler, for working the winding-drum, which, when turned, winds up the chains upon it and raises the brake-blocks into the position shown by Fig. 6.

A pawl  $l'$ , engaging with the teeth of a ratchet-wheel  $l$ , mounted on the axis of the drum, retains the brake-blocks in their raised position. Should it be desired to cause the brakes to act, the pawl  $l'$  is lifted by means of the lever  $l^2$ , and the springs  $g$ , being no longer prevented from contracting, bring the brake-blocks firmly down upon the rails, their combined power being sufficient to raise the entire train above the rails.

$m$  is a concussion-spring, one extremity of which is connected by a chain  $m'$  to the winding-drum  $f$  and the other to the under framing of the locomotive. This spring is provided in order that when the brake-blocks are released from their raised position their too sudden fall shall be prevented and the passengers relieved from sudden jolting; but instead of using the concussion-spring  $m$ , I may allow steam to enter the auxiliary cylinder  $j$  at the time of releasing the brakes, and in this way regulate the too sudden falling of the brake-blocks.

$n$  is a ratchet-wheel carried by one of the brake-blocks of each carriage and capable of turning with it, and  $o$  is a pawl engaging with the same. When it becomes necessary to uncouple any of the carriages, the pawl  $o$  is turned into the position shown by the full lines in Fig. 7 and prevents the brake-blocks from falling. When the carriages are coupled



up again, this pawl is turned into the position shown by the dotted lines. A spring-catch *o'* coming beneath the nose of the pawl prevents the said pawl from inadvertently engaging with the ratchet-wheel when the train is running.

Fig. 9 shows a modification in which the arm *c'* is dispensed with and one end of the springs *g* connected to the brake-blocks at *p* and their other ends to the arm *q*, there being a corresponding arm on the other side and a tie-bar between them.

When applying my improved brake apparatus to tram-cars, I so arrange the same as to enable the driver to raise the brake-blocks by hand, as shown by Fig. 10, in which *x* is an axis carrying at its lower end a bevel-wheel *y*, gearing with another bevel-wheel *y'* on the axis of the winding-drum *f*, so that on turning the handle *x'* the drum is caused to wind up the chain *e* and so raise the brake-blocks. As in the previous arrangement, the disengaging of a pawl from the teeth of a ratchet-wheel on the drum releases the drum and allows the brake-blocks to fall; or the arrangement hereinbefore described and worked by steam may be retained and be worked by compressed air, or when steam is used to drive the car the apparatus may be worked by steam.

My improved brake apparatus is not intended to replace the existing brakes, although it may be used in place thereof, but as an extra means of effectually and rapidly stopping the train or tram-car.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The improved brake apparatus, which consists of spring-impelled brake-blocks adapted to descend upon and bite the rails

of a railway, and suitable mechanism for withdrawing said brake-blocks, substantially as described.

2. The frictionally-faced brake-blocks *c*, having flanges *c'* and projecting arms *c'*, in combination with springs *g*, tending to forcibly press said brake-blocks onto the rails and so elevate the train or tram-car and arrest its further progress, substantially as described.

3. In combination with friction brake-blocks, the mechanism for applying said brake-blocks to the rails, consisting of a winding-drum *f*, carrying a ratchet-wheel *l*, and upon which chains *e*, leading from the brake-blocks, are wound to raise said blocks, a pawl *l'*, having a hand-lever *l''*, engaging with said ratchet-wheel, and means actuating such mechanism, substantially as described.

4. The combination, with the friction brake-blocks, the winding-drum *f*, and a chain connecting said blocks and drum, of an anti-coussive spring *m*, one end of which is connected, by means of a chain *m'*, to said winding-drum and the other end to the under framing of the locomotive, substantially as described.

5. In combination with the brake-blocks, the means for retaining said brake-blocks in their raised position when the vehicles are to be uncoupled, consisting of the ratchet-wheel *n*, pawl *o*, and spring-catch *o'*, for keeping said pawl out of the teeth of the ratchet-wheel when the vehicles are running, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

PIETRO F. DE FORESTA.

Witnesses:

H. A. NORRIS,

PERCY WOODWARD.