

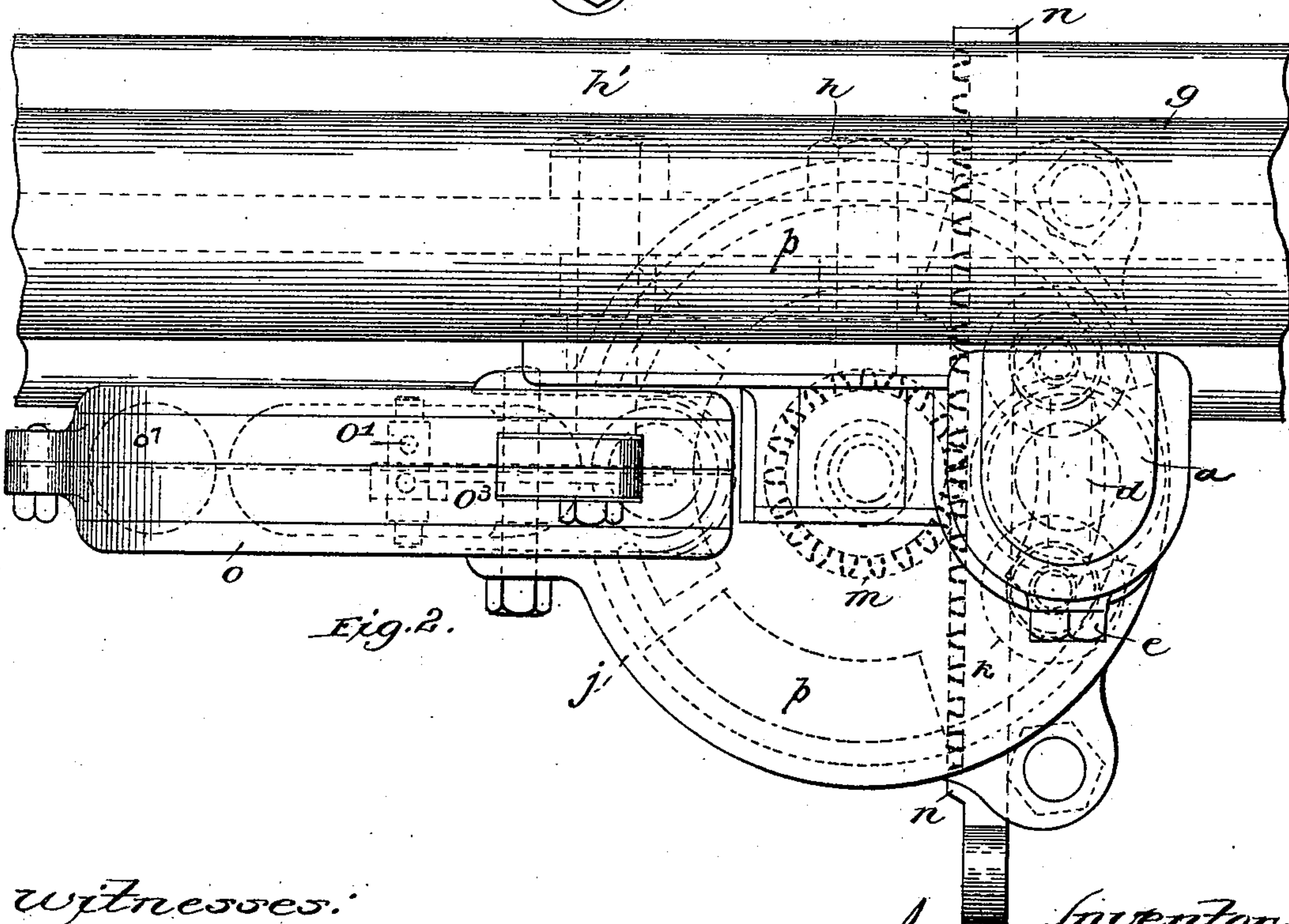
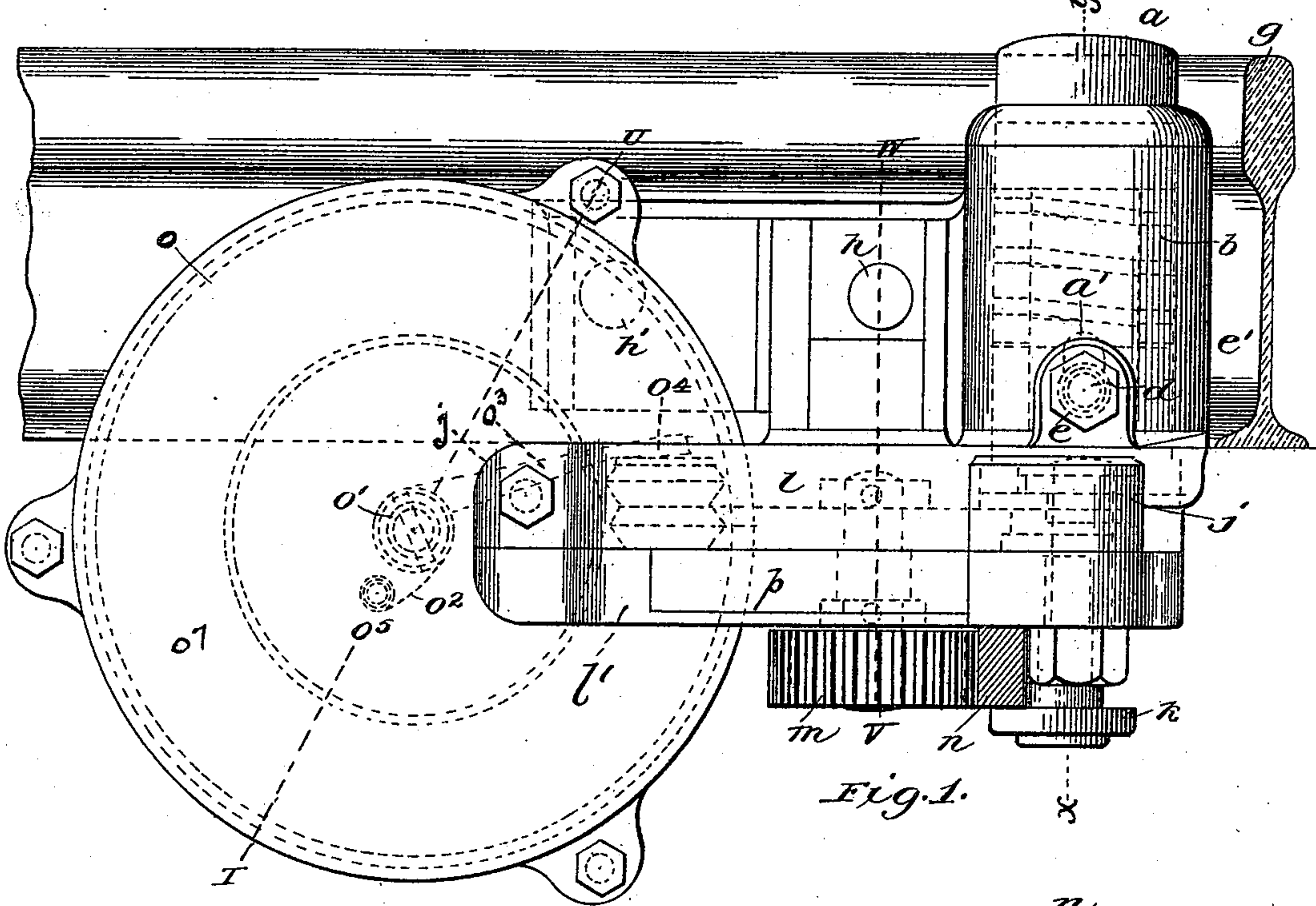
(No Model.)

2 Sheets—Sheet 1.

J. P. O'DONNELL.  
DETONATING RAILROAD SIGNAL.

No. 516,219.

Patented Mar. 13, 1894.



witnesses:  
Harry D. Rohrer.  
Edwin Case.

Inventor:  
John P. O'Donnell.  
By *G. W. T. H. H. H.*  
Atty.



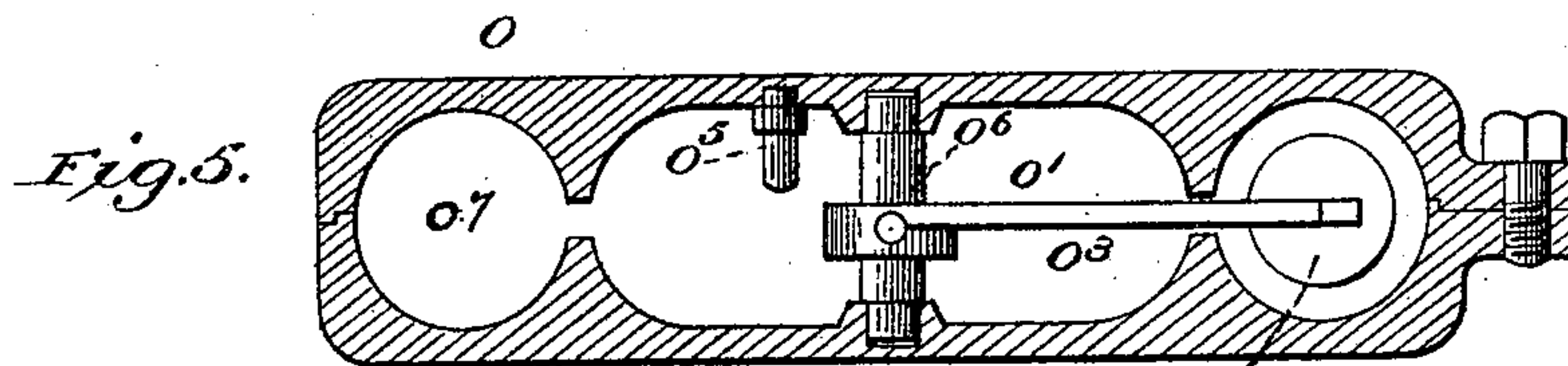
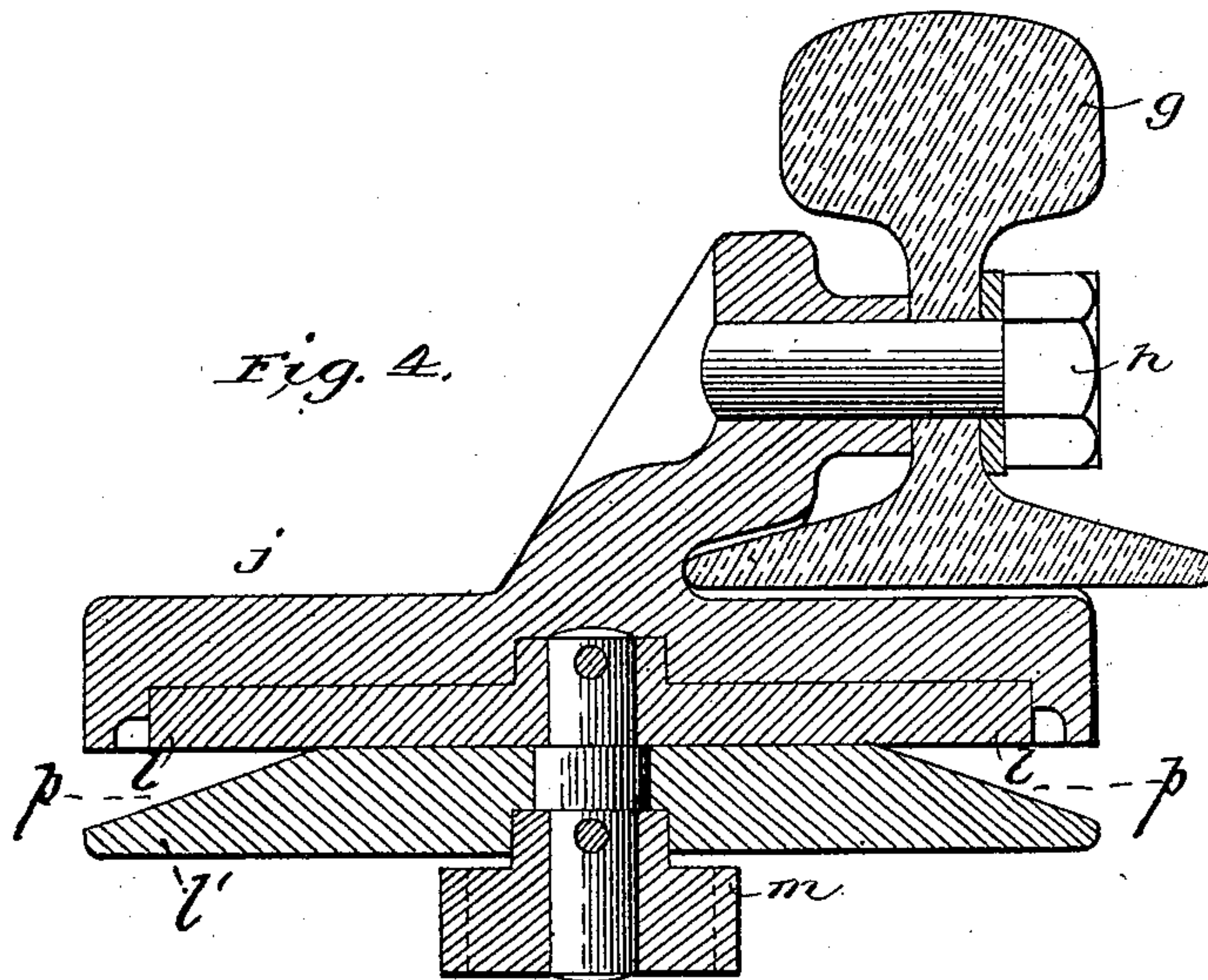
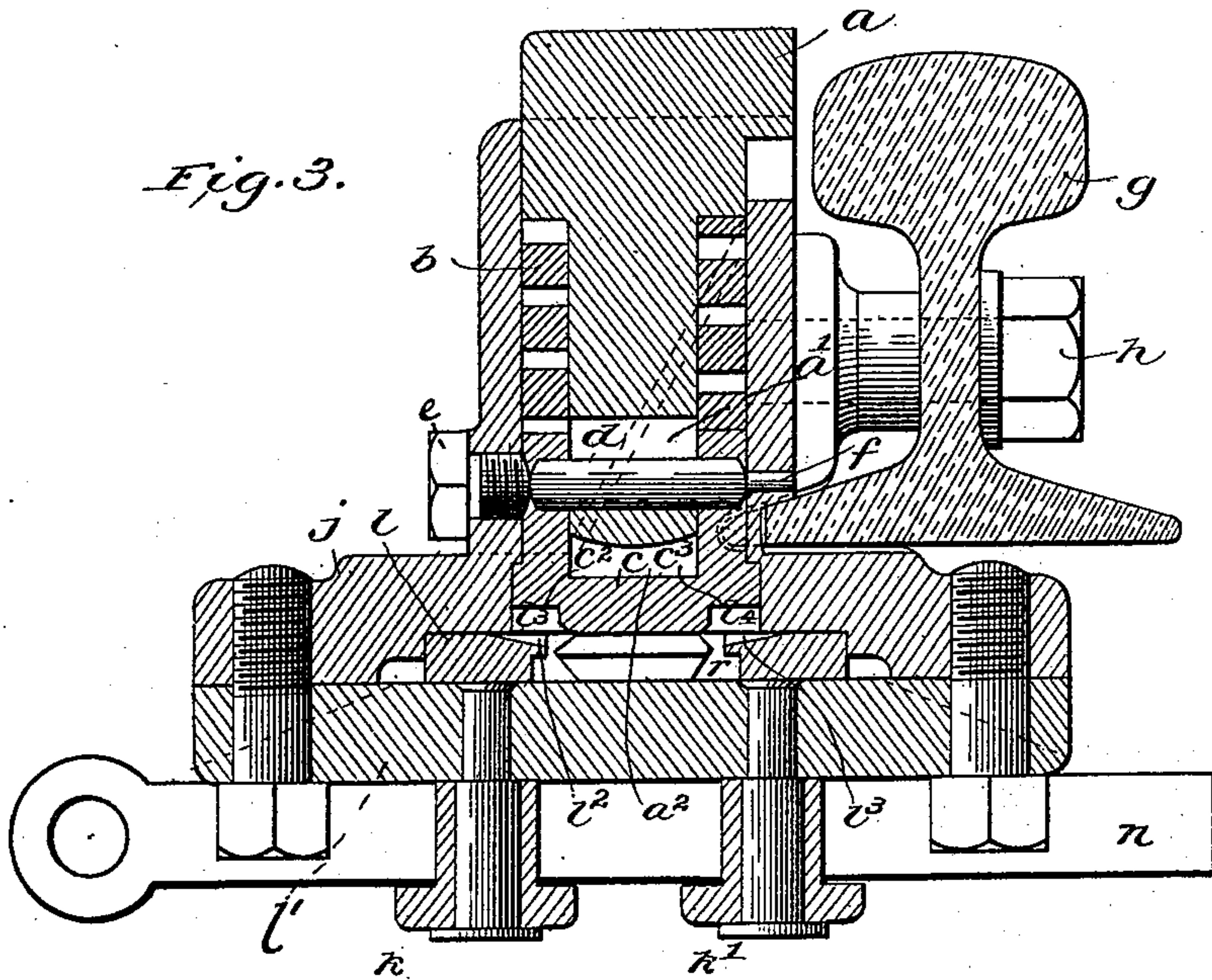
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Atty.



# UNITED STATES PATENT OFFICE

JOHN PATRICK O'DONNELL, OF LONDON, ENGLAND.

## DETONATING RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 516,219, dated March 13, 1894.

Application filed June 23, 1893. Serial No. 478,681. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN PATRICK O'DONNELL, a subject of the Queen of Great Britain and Ireland, residing at "Fingall," Hammeton Road, Bromley, London, in the county of Kent, England, have invented a new and useful Improved Detonating Railroad-Signal, of which the following is a specification.

My invention consists in an improved form of operating detonators, applicable either in connection with the switches or signals on railways.

My apparatus is arranged that if desirable a detonator may be placed in position for explosion when the signal is either in the "danger" attitude or in the "safety" attitude, and if it is desired that the explosion takes place only in the "danger" attitude of the signal, then a dummy can be fixed or only one opening made in the detonator carrier or disk.

My invention consists of a striking piece fixed adjacent to the rail, which is operated by the tread of the wheel of a passing vehicle or locomotive. Working with the striker and forming part of it, is a suitable spring. Underneath the striker is the disk which is employed for carrying the detonators from the magazine into position underneath the striker and on the top of the base plate. In the disk are arranged two openings into which the detonators fall or are forced from the magazine, by the spring, into position.

For the purposes of description the drawings illustrate two openings in the disk; in the normal position one of these is arranged at the opening of the magazine for the detonators to be pressed into position in the opening of the carrying disk, and when the disk is revolved half a revolution the end in which the detonator is held is moved into position under the striker; the other hole or opening in the carrying disk is now in position to receive a second detonator from the magazine. The base plate is arranged beveled, and on each side between the striker and the magazine are openings for the discharge of what remains of the exploded detonators to fall clear of the machine.

Attached to the machine is a circular magazine, in the center of which is a spindle and round the spindle is arranged a spring. From the spindle a finger is provided with an end

corresponding to the top of the detonator, which is employed for pressing the detonators into position.

The means I employ for operating the machine consist in a rack and pinion movement, the rack being attached to the signal wire in connection with any known means for insuring a certainty of movement every time. By this means I insure that the carrying disk always moves exactly into the same position for charging and for explosion.

In order that my invention may be better understood and more readily carried into effect I will proceed to describe the drawings hereunto annexed.

The same letters refer to the same parts in the several figures of the drawings.

Figure 1 is an elevation of my apparatus, showing the relative positions of the parts of my machine in contact with the rail. Fig. 2 is a plan of Fig. 1. Fig. 3 is a section X—Y of Fig. 1. Fig. 4 is a section V—W of Fig. 1. Fig. 5 is a section T—U of the magazine Fig. 1.

*a* is the upper part of the striker.

*b* is a spiral spring working in a recess surrounding the lower part of *a*.

*c* is the lower part of the striker and is a separate piece.

*d* is a pin inserted to make the upper and lower parts of the striker operate as one provided the spring is not compressed.

*e* is a bolt inserted in the side to keep the pin *d* in position.

*f* is a small hole provided when *e* is withdrawn for driving the pin out.

*g* is the rail.

*h, h'* are bolts for bolting my machine to the web of the rail.

*j* is the cover or case in which all the moving parts operate.

*k, k'* are rollers provided for easing the movement of the carrier, operating in connection with the pinion and holding the rack in position.

*l* is the disk.

*l'* is the base of the cover *j* on which the disk *l* is supported.

*m* is the pinion and *n* the rack.

*o* is the magazine.

*o'* is the spindle round which the spring *o* is coiled.

*o<sup>3</sup>* is the finger keyed to the spindle *o'* hav-



ing a termination  $o^4$  corresponding to the top of the detonators.

$o^5$  is a pin to which is attached the end of the coiled spring.

5  $o^6$  is a stud for holding the other end of the coiled spring.

In loading the magazine the finger  $o^3$  is turned back against the force of the coiled spring  $o^2$  and the detonators are inserted in  
10 the space  $o^7$  the rear detonator being in contact with the termination  $o^4$  of the spindle. Owing to the curvature of the space  $o^7$  the faces of adjacent detonators will not be engaged at all points but will be slightly separated at the outer periphery of the space  $o^7$ .  
15 This will not, however, in any manner affect the proper feeding of the detonators from the magazine.

$a'$  is a slot in the upper part of the striker  
20  $a$ . The spring  $b$  interposed between the parts  $a$  and  $c$  of the striker is sufficiently rigid to cause them to move together to a sufficient extent to explode the detonator, and with a tire that is comparatively unworn the spring  
25 will not be compressed. If, however, the tire of a wheel has become worn to a considerable extent the flange of such wheel will be on a lower level and will therefore have a tendency to force the striker down lower than is  
30 necessary to cause the explosion and thereby injure the mechanism. To obviate this danger I provide a slot  $a'$  in the upper part of the striker to permit it to have a downward movement over the pin  $d$ , independently of  
35 the lower part of the striker, and I also provide a space  $a^2$  between the lower end of the part  $a$  and the part  $c$ . This arrangement permits the upper part  $a$  to have a movement independent of the part  $c$  to compress the spring  
40  $b$  and the several parts are thereby relieved of undue strain. The bevels  $l^2$  are provided for raising the striker after the explosion. They come in contact with the under side of the striker and raise it and it remains raised as  
45 long as the full portion of  $l$  is underneath, but as soon as the opening in the carrying disk with the detonator is in position underneath the striker the bevels are then in operation and allow the striker to rest upon the detonator.  
50 The base  $l'$  is provided with openings  $pp$ , through which the remains of the exploded detonators are discharged.

The action of my invention is as follows:—  
The detonator is in position for explosion.  
55 On the passage of a wheel over the striker  $a$  the latter is forced down on the detonator until, under normal conditions, the parts  $c^2$ ,  $c^3$  come in contact with the full parts  $l^3$ ,  $l^4$  on either side of the beveled part of the carrying disk. Assuming the normal position of the signal to be "danger" (and the explosion has taken place), when the signal lever in the cabin operating the apparatus is worked over and the signal is put to the "safety" attitude  
65 to allow the passage of a train, the disk  $l$  is moved round through the pinion by means of the rack (which is operated by the signal

wire) revolving the pinion and turning the disk  $l$  half round so that the opening  $r$  in which the detonator has been exploded is  
70 moved round into communication with the magazine. During the movement of the opening  $r$  from the point of explosion to the magazine it will pass over one of the openings  $p$  in the base plate  $l'$  and the remains  
75 of the exploded detonator will fall from the opening  $r$  in the disk and be discharged from the machine through the opening  $p$ . When the opening has arrived in position the finger  $o^3$ , through the spring, forces another detonator into the opening. If the signal is  
80 now put to "danger," the reverse action takes place upon the rack, the pinion is moved and in its turn returns the carrying disk  $l$  so that the opening  $r$  with the detonator is moved into  
85 position under the striker. If now a movement of a train takes place over the striker in the "danger" position of the signal the detonator is exploded. If it is desired that the explosion shall take place only in the "danger"  
90 position of the signal then there need only be one opening provided, or if two, the second opening may be filled with a dummy, operating in such manner that after the explosion in the "danger" position of the signal, when  
95 the signal is worked to the "safety" attitude the dummy is under the striker. The dummy is arranged with a recess corresponding with the projection on the under side of the striker and acts so that when in position under the  
100 striker the projection falls into the recess in the dummy, the striker then being below the level of the rail. The striker rises immediately the rack and pinion are operated by replacing the signal to the "danger" attitude.  
105 In that working, the hole in the disk with the detonator is moved in position under the striker. Another reason for forming the recess in the dummy is that it may slide freely under the part where the magazine charges  
110 the disk so that the detonators cannot fall the recess being smaller than the detonator.

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

1. In a detonating railway signal, the combination of a striker in a suitable case the latter bolted to the web of the rail, with a revolving disk for carrying the detonators into position under the striker, all substantially  
115 as described with reference to the drawings annexed.

2. In a detonating railway signal, the combination of a revolving disk provided with one or more openings for moving the detonators from the magazine into position under the striker, of a rack and pinion movement operating the said disk, all substantially as described with reference to the drawings annexed.  
125

3. In a detonating railway signal the combination, as hereinbefore described, of a circular magazine in which a finger or operating piece is fixed, a spring working in connection  
130



therewith so that the detonators are moved into position as the hole in the carrying disk is moved into the magazine, all substantially as described with reference to the drawings  
5 annexed.

4. In a detonating railway signal, the combination with the striker *a*, of the spring *b* acting as connecting the two parts *a* and *c* of the striker by means of the pin, the whole op-  
10 erating that any deviation from the normal movement of the striker is taken up by means

of the spring the lower part of the striker *a* always keeping a regular and uniform movement, substantially as described with reference to the drawings annexed.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

JOHN PATRICK O'DONNELL.

Witnesses:

WILLIAM B. CANDY,  
W. H. LEWERS.