No. 79,480. PATENTED JUNE 30, 1868.

J. KNIGHT.

INDICATOR FOR STREET RAILWAY CARS.

Fig: 1.

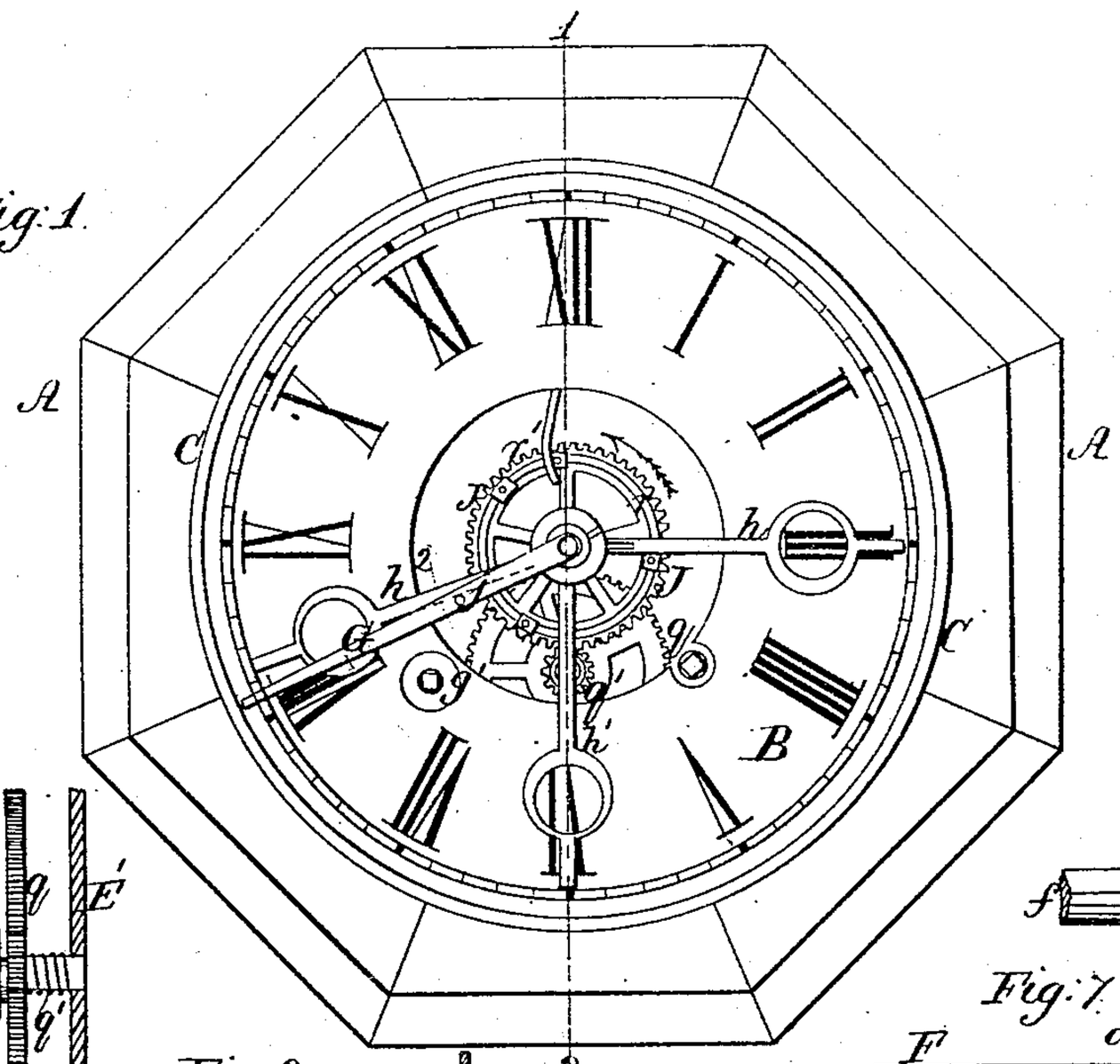


Fig: 8.

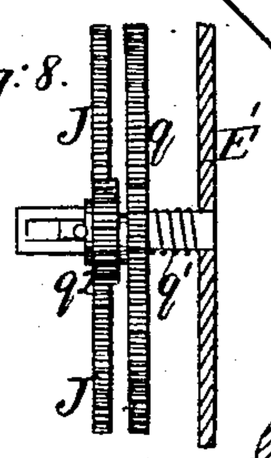
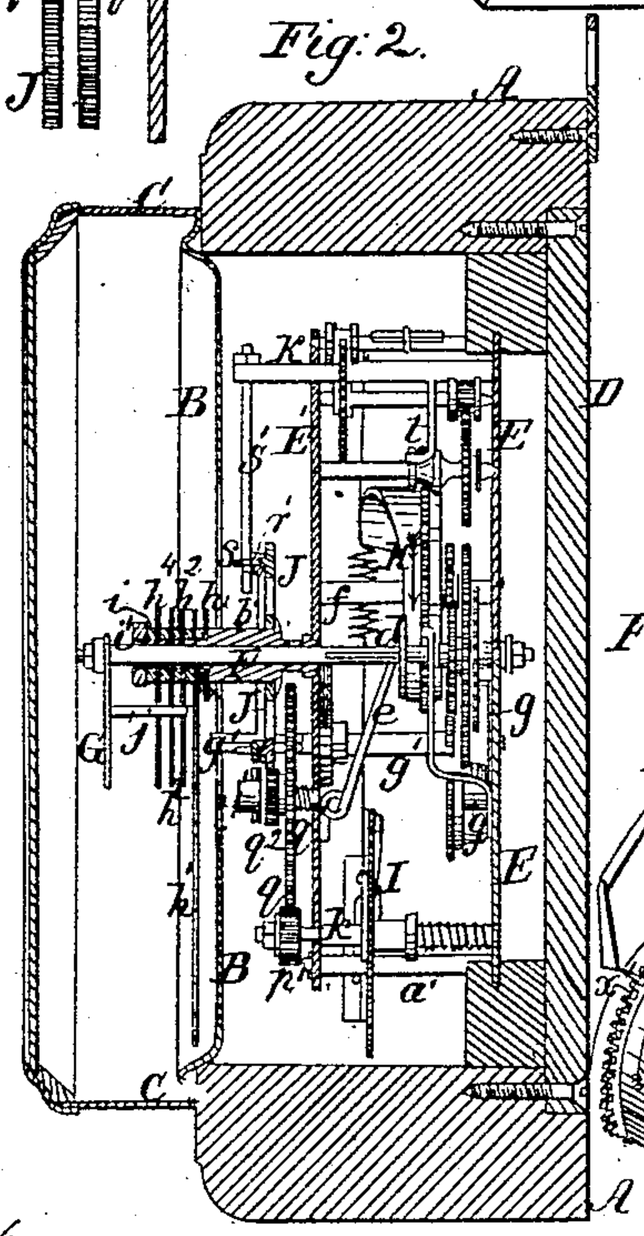


Fig: 2.



2.

Fig: 5.

Fig: 7.

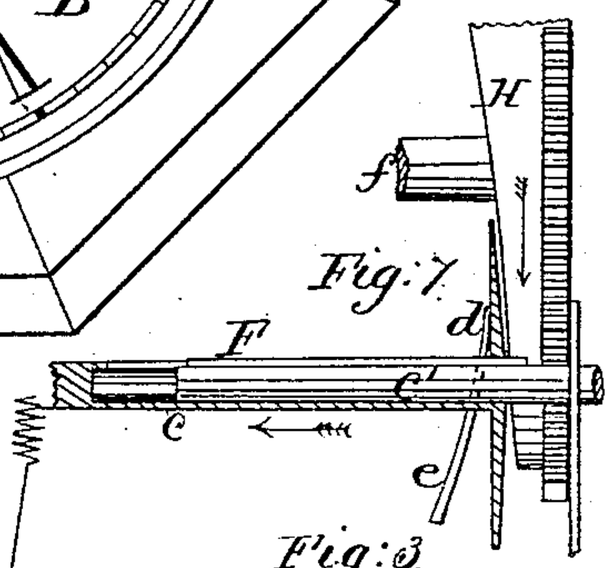


Fig: 3.

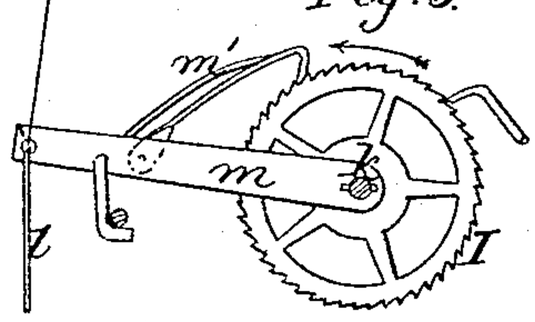


Fig: 6

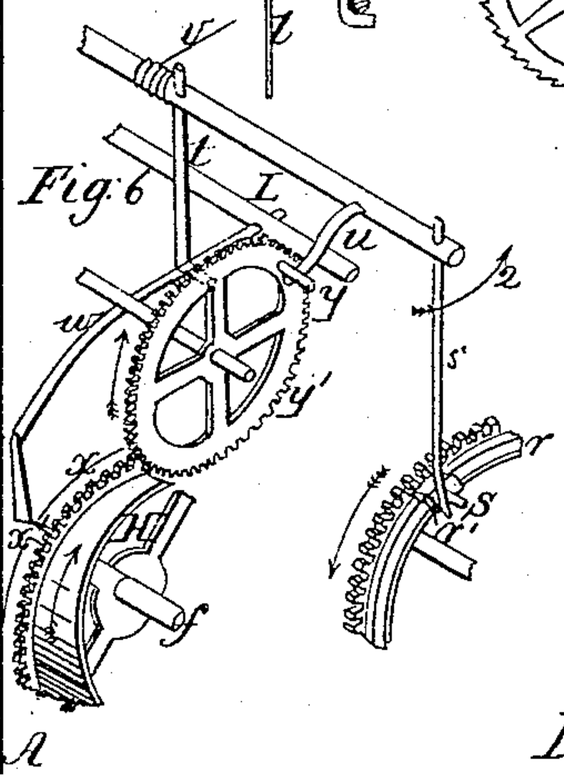
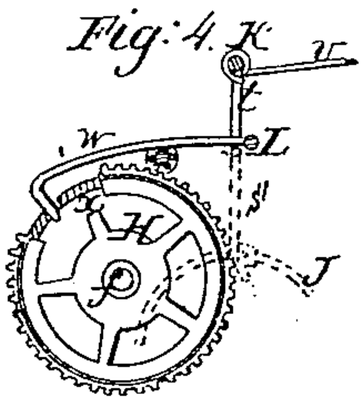


Fig: 4.



Witnesses

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Letters Patent No. 79,480, *dated June* 30, 1868.

IMPROVEMENT IN INDICATORS FOR STREET-RAILWAY CARS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES KNIGHT, of Philadelphia, State of Pennsylvania, have invented an Improved Indicator for Street-Railway Cars; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists of an indicator operated partly by clock-work and partly by the revolving wheel or axle of the street-railway car, to which it is applied, the said indicator determining at the end of a trip whether the car has been running regularly, and if not, at what points on the road improper stoppages have been made, or where the speed of the car has been improperly increased or retarded; all of which is fully described hereafter.

In order to enable others to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a face view of my improved indicator for street-railway cars.

Figure 2, a vertical section of the same on the line 1–2, fig. 1.

Figures 3, 4, and 5, detached views illustrating my invention.

Figure 6, a perspective view; and

Figures 7 and 8 detached views drawn to an enlarged scale.

Similar letters refer to similar parts throughout the several views.

The case A of the indicator, which may be octagonal, round, or of other convenient form, is provided with a dial-plate, B, hinged door C, and detachable back D, and to the latter, within the case, is secured a plate, E, connected by rods *a*, fig. 2, to a similar plate, E′. A clock-spindle, F, is arranged to turn in the plate E, and in a tubular stem, *b*, of the plate E′, the latter passing through an opening in the dial-plate B, and at the outer end of the spindle is secured a minute-hand, G, operated in the usual manner by clock-work, contained between and turning in the opposite plates E and E′.

The spindle F is divided into two parts, one portion, *c*, fitting over and being arranged to slide upon, but not to turn independently of the other portion, *c*′, as shown in fig. 7, and to the inner end of the portion *c* of the spindle is secured a disk, *d*, against one side of which bears a spring, *e*, having a tendency to force the opposite side of the disk against a cam-wheel, H, the latter being hung to a spindle, *f*, turning in the opposite plates E and E′, and being connected by suitable cog-gearing with a coiled spring, *g*, (fig. 2,) whose spindle, *g*′, also turns in the opposite plates, and projects through an opening in the dial-plate B, as shown in fig. 1, so that it may be readily turned in order to wind up the spring.

Five pointers or hands, *h*, h^1, h^2, h^3, and h^4, are, in the present instance, hung to the stem *b* of the plate E′, each hand being split, as shown in fig. 5, so that it may be sprung upon the stem, and thus fit snugly to the same. Washers *i* intervene between the hands, and the whole are confined to the stem by a nut, *i*″, (fig. 2,) which so regulates the pressure upon the hands that a slight force is necessary to turn them either separately or together upon the stem *b*.

The minute-hand G has projecting from it towards the dial-plate a pin, *j*, (fig. 2,) which, as the hand revolves, strikes and turns one or more of the loose hands *h*, according to the position of the sliding portion *c* of the spindle F, and the latter depends upon the position of the cam-wheel H, which is operated by devices which I will now proceed to describe.

A ratchet-wheel, I, figs. 2 and 3, is hung to a spindle, *k*, which turns in the opposite plates E and E′, and is operated by a wire, *l*, through the medium of an arm, *m*, and spring-pawl *m*′, as shown in fig. 3, and on the outer end of the spindle *k* is a pinion, *p*, gearing into a cog-wheel, *q*, upon a spindle, q^1. The latter wheel and a spindle, q^2, are arranged to move longitudinally upon but not to turn independently of their spindle, as shown in fig. 8, for a purpose described hereafter, and the pinion gears into a cog-wheel, J, which turns on the stem *b*. Extending around the face of the latter wheel is a dove-tailed guide, *r*, to which are secured, at determined points, adjustable blocks *r*′, each having a projecting pin, *s*, which, as the wheel J revolves, are arranged to

strike and partly turn a rod or arm, s', of a spindle, K, (fig. 6.) The latter is also provided with two other arms, t and u, and with a coiled spring, v, which has a tendency to turn the spindle in the direction of the arrow 2, fig. 5.

The bent end of the arm t of the spindle passes beneath, and is arranged, when operated by the wheel J, to turn an arm, w, of a second spindle, L, so as to raise the bent end of the latter clear of the notched flange x of the cam-wheel H, as shown in figs. 4 and 6. The cam-wheel is thus permitted to turn by the action of its spring until its motion is arrested by the pin y of a cog-wheel, y', with which it is geared, the said pin striking the arm u of the spindle K, as will be more fully described hereafter.

Operation.

The indicator above described is placed within a street-railway car in such a position that its wire, l, can be readily attached to a cam or eccentric on the axle or wheel, or to any suitable device that will impart to the wire a regular reciprocating motion as the axle revolves.

The clock portion of the indicator, and the spring g, by which the cam-wheel H is operated, are wound up up in the usual manner, and the ratchet-wheel I, and cog-gearing connected therewith, are operated as the car-axle revolves, through the medium of the wire l and spring-pawl m'.

The rate of speed at which the car is to travel, and the proper time for crossing certain streets having been determined, the minute-hand G and all of the hands h are turned until they point to the figure XII, or starting-point of the dial-plate. Then, before the car is started, an authorized person so adjusts the blocks r' of the wheel J, that their pins s shall, at the proper time, and in succession, strike and turn the arm s' of the spindle K, as will be hereafter described; after which the door C of the indicator is closed and locked to prevent unauthorized persons from tampering with the instrument.

The car is then started, and the minute-hand G, actuated by its clock-work, begins to travel around the dial-plate B, carrying with it, by means of its pin, j, (fig. 2,) all of the hands h, and, at the same time, the ratchet-wheel I is turned by the revolving axle, its motion being communicated by the gearing described to the cog-wheel J, which revolves slowly in the direction of its arrow, (figs. 1 and 6.)

If it be desired to indicate the proper time of crossing the first street, say fifteen minutes after starting, the pin s of the first block r', which has been previously adjusted, strikes at the end of that time the arm s' of the spindle K. The latter is turned by the pin, and the arm w (fig. 6) is raised clear of the first notch x' of the cam-wheel H, but the latter is prevented from turning by the pin y of the cog-wheel y', which strikes the arm u, as shown in fig. 6.

The wheel J continues to revolve until the pin s passes the end of the arm s', when the latter, and the arms t and u will, by the action of the spring v, turn in the direction of the arrow 2, fig. 6, thus permitting the wheel y' to turn, and the arm w to fall upon the flange x of the cam-wheel H. The latter, then, by the action of the spring g, turns in the direction of the arrow until the end of the arm w falls into the second notch x', and thus arrests the motion of the cam-wheel.

During this partial revolution of the cam-wheel H, the disk d of the spindle F, which bears upon it, is, together with the sliding portion c of the spindle, pushed outwards until the pin j of the minute-hand is clear of the indicating-hand h, which is then no longer moved by the minute-hand, but is left pointing towards the figure III of the dial-plate, as shown in fig. 1.

After leaving the hand h, the minute-hand and remaining indicating-hands continue to travel around the dial-plate until a sufficient time has passed to enable the car to reach the second cross-street, which we will suppose to be in half an hour from the time of starting. At the end of this time, if the car has been running regularly, the second pin s of the wheel J will strike and turn the arm s', thus releasing the cam-wheel H, and permitting it to turn until the hand G has been moved outwards sufficiently to drop the second indicating-hand h^1, which it does at the figure VI of the dial-plate, as shown in fig. 1.

The remaining hands are left in succession at the proper points on the dial-plate in a similar manner, the minute-hand, operated by the cam-wheel H, moving outwards a short distance for each, as before described.

After all of the indicating-hands have been left at the proper points on the dial-plate, the disk d bears against the widest portion of the cam-wheel, the minute-hand G having been thus pushed outwards considerably beyond the dial-plate, but at the next partial revolution of the cam-wheel, the disk will, by the action of its spring, l, be forced inwards against the narrow portion of the cam, and the hand G be drawn back accordingly.

At the end of the trip, the person whose duty it is, can, by examining the dial-plate of the indicator, readily see whether the car has been running regularly, and if not, determine at what points improper stoppages have been made, or where the speed of the car has been improperly accelerated or retarded.

For instance, if a stoppage of five minutes is made before arriving at the first street, the minute-hand of the indicator will still continue to move, while the wheel J remains stationary, consequently the first indicating-hand h will be left at the figure IV instead of at the figure III of the dial-plate, thus showing that five minutes have been lost between the starting-point and the first street.

If the speed of the car is then increased one-third, so as to enable it to arrive at the second cross-street at the end of half an hour, the second indicating-hand h^1 will be left at the proper point, or figure VI, of the dial-plate, thus surely indicating to the examiner at the end of the trip the points between which the speed has been thus improperly increased.

Neglect or inattention on the part of the conductor of the car is thus readily detected, and a more regular rate of speed is consequently maintained.

It will be evident that the number of indicating-hands h may be increased or diminished at pleasure, so as

to indicate the time of passing any desired number of streets, the blocks r' being properly adjusted, and their number correspondingly increased or diminished.

In some cases, instead of adjusting the blocks r', they may be brought to the desired position in respect to the arm s' by turning the wheel J, which is hung loosely to the stem b. This may be done readily by throwing it out of gear with the pinion q^2, the hub of the latter being pressed upon, so as to move it longitudinally upon its spindle, as shown in fig. 7.

I claim as my invention, and desire to secure by Letters Patent—

1. The minute-hand G and its pin, j, turned by clock-work, as described, and moved towards or from the dial-plate by a cam-wheel, H, in combination with loose indicating-hands h, which are turned by the minute-hand, and released at certain determined points on the dial-plate, all substantially in the manner and for the purpose specified.

2. The wheel J, having adjustable blocks r', and being operated through the medium of the gearing described by a wire, l, connected with the wheel or axle of a street-railway car.

3. The above, in combination with the arms s', t, and u of a spindle, K, and with the arm w of a spindle, L, for starting and arresting the motion of the cam-wheel H, as described.

4. The cam-wheel H, operated by a coiled spring, g, or its equivalent, for imparting a longitudinal sliding motion to the portion c of the spindle F, for the purpose specified.

5. The manner, substantially as herein described, of securing the indicating-hands h to the stem b, so that they may be turned either separately or together upon the said stem.

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

J. KNIGHT.

Witnesses:

JOHN WHITE,

W. J. R. DELANY.