

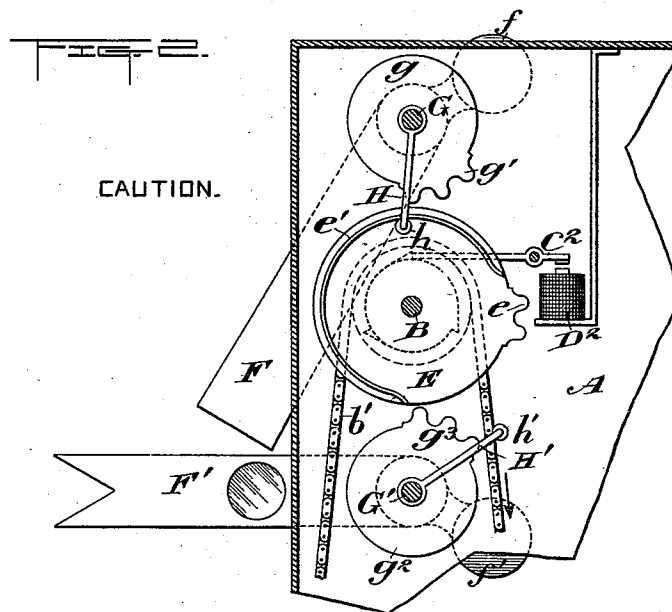
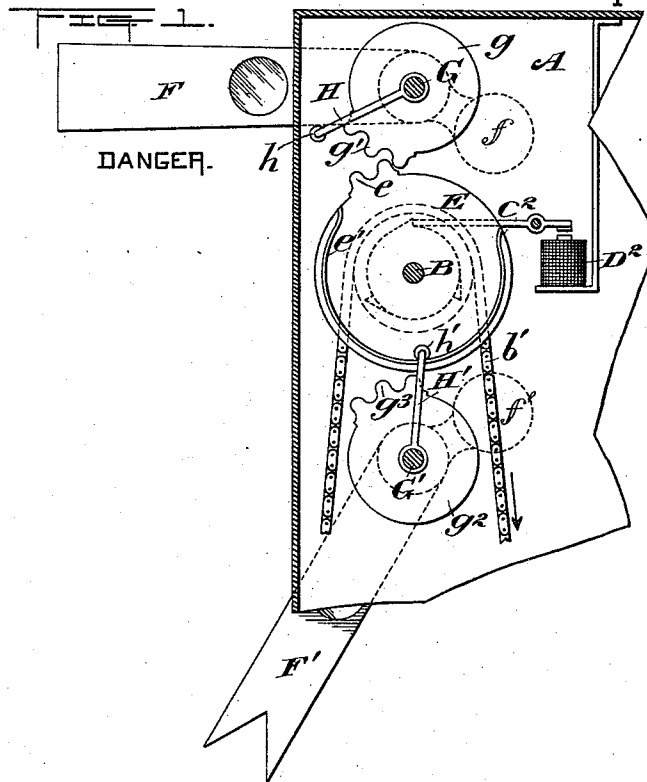
(No Model.)

2 Sheets—Sheet 1.

G. L. THOMAS.
ELECTRIC RAILWAY SIGNAL APPARATUS.

No. 537,133.

Patented Apr. 9, 1895.



Witnesses.
R. E. Howard
C. E. Sundgren

Inventor
George L. Thomas,
by attorneys
Brown & Howard

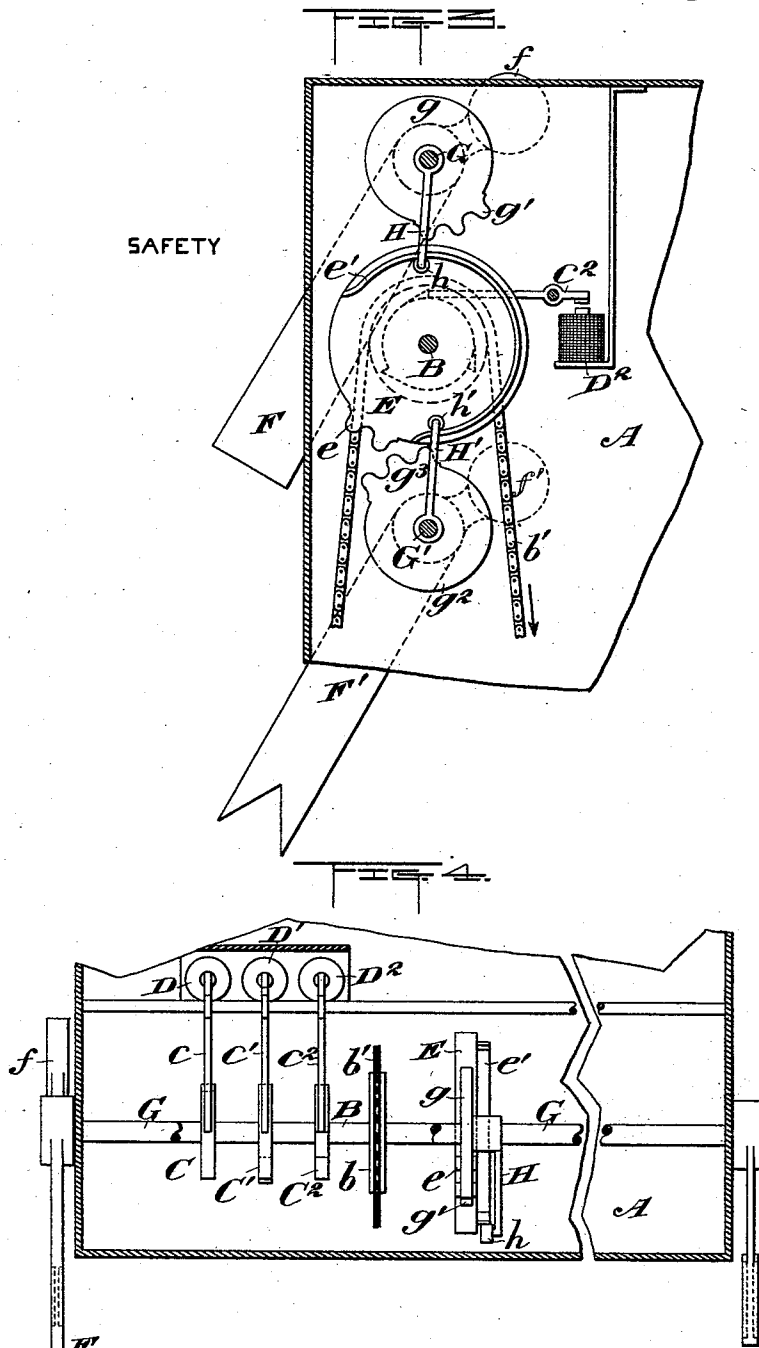
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UNITED STATES PATENT OFFICE.

GEORGE L. THOMAS, OF BROOKLYN, ASSIGNOR TO THE HASELL PERFECTED RAILWAY SIGNAL COMPANY, OF NEW YORK, N. Y.

ELECTRIC RAILWAY SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 537,133, dated April 9, 1895.

Application filed April 23, 1894. Serial No. 508,600. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. THOMAS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Electric Railway Signal Apparatus, of which the following is a specification.

My invention relates to an improvement in electric railway signal apparatus in which a plurality of semaphore arms are caused to reciprocate by means of an actuating wheel on a spindle actuated by some suitable motive power.

The particular object in view is to adapt the ordinary upper and lower swinging semaphore arms to the mechanically operated spindle, released by the energizing of electro magnets in the manner shown, described and claimed in Letters Patent of the United States, No. 508,356, granted to Thomas and Seward on the 7th of November, 1893.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the signal arms and the operating mechanism immediately connected therewith in side elevation, the casing at the head of the tower being shown in section. Fig. 2 is a view taken on the same plane as Fig. 1, showing the position which the parts assume after the signals have been operated from danger to caution, the position of danger being that shown in Fig. 1. Fig. 3 is a similar view, showing the position of the parts when the signal has been changed from caution to safety, and Fig. 4 is a top plan view of the parts in the position in which they appear in Fig. 1, the casing being shown in section.

In illustrating my present invention, I have shown those parts only of the general system which intimately co-operate with the signal arms and their operating mechanism, it being assumed that suitable electric circuits under the control of a passing train may be employed to energize the electro magnets to release the spindle on which the master wheel is located and that the spindle shall be mechanically operated when released by the electro magnets, by a suitable weight or its equivalent in a manner, such, for example, as that shown,

described and claimed in the Letters Patent above referred to.

The casing of the tower is denoted by A; the spindle which carries the master wheel by B, the latter being provided with a suitable driving gear wheel or pinion *b*, in the present instance a sprocket pinion, with which a sprocket chain *b'*, leading to a suitable drive wheel—not shown, engages to rotate the spindle B when the latter is released. On the spindle B there are located three disks C, C', C², each provided with abutments, in the present instance a tooth, for engaging the ends of releasing dogs *c*, *c'*, *c²* corresponding to the several disks. A set of electro magnets D, D', D² are in position to operate the dogs *c*, *c'*, *c²* when the magnets are energized, by elevating the ends of the dogs out of engagement with the abutments on the disks. The abutments on the disks are so arranged that in the present instance the spindle B will be permitted to rotate one-third of a revolution when the dog, for the time being holding the spindle, is released, before the rotary movement of the spindle is interrupted by the engagement of one of the other holding dogs with the abutment on a companion disk; the purpose being to provide for turning the signals consecutively from danger to caution, from caution to safety and from safety to danger, the position of danger being the normal position.

The spindle B is provided with a master wheel E having on its periphery a mutilated gear *e* and on its side a laterally projecting mutilated annular flange *e'*. The flange *e'* is broken away for about one-third of its length more or less and the gear *e* on the periphery of the master wheel is just sufficient to rock the semaphore arms through an arc of about sixty degrees.

The upper semaphore arm, or that which—when extended in a horizontal position—indicates danger, is denoted by F and the lower semaphore arm, or that which—when extended—denotes caution, is represented by F'. The arms are further distinguished as is common, by their shape and also by their colors. They are counterbalanced by weights *f*, *f'* which, when the arms are left free, are sufficient to throw the arms into their horizontal

positions. The arm F is secured to a shaft G which extends through the side of the tower to receive the arm thereon exterior to the casing of the tower and within the tower the said shaft G is provided with an actuating disk or wheel *g*, provided on its periphery with mutilated gear *g'* adapted to engage—at certain predetermined intervals—the mutilated gear *e* on the master wheel E. The shaft G is further provided with an arm H fixed thereto or to some suitable support itself fixed to the shaft, the said arm H extending radially away from the shaft and provided at its free end with an antifriction roller *h* extending at right angles to the arm and in position to enter the opening in the flange of the master wheel and take under the flange at the moment the arm F has been rocked by the master wheel from its normal horizontal position down into its depressed position, the said antifriction roller on the arm H serving, while engaged under the flange *e'* on the master wheel, to hold the said arm F depressed against the tendency of the counterbalance weight to return it to its horizontal position after the gear on the master wheel has left its engagement with the gear on the wheel *g*. In like manner, the arm F' is mounted exterior to the head of the tower on the shaft G' carrying a disk or wheel *g''* provided with a mutilated gear *g'''* and having fixed to rotate therewith an arm H' provided with an antifriction roller *h'* in position to enter the opening in the mutilated annular flange on the master wheel and engage underneath the flange when the said semaphore arm F' shall have been forcibly depressed by the engagement of the gear on the master wheel with the gear on its operating disk *g''*, to hold it depressed against the force of its counterbalance weight, so long as the antifriction roller *h'* on the arm H' shall remain engaged with the flange on the master wheel.

The normal or danger position of the signal arms is that shown in Fig. 1, the upper arm standing horizontally and the lower arm depressed. The position of caution which the arms are made to assume when released from the danger position is that shown in Fig. 2, the lower arm being horizontal and the upper arm depressed. The position of safety which the arms are made to assume when released from caution is that shown in Fig. 3, in which both arms are depressed and—from this position—they are again thrown into the position of danger, as shown in Fig. 1. These movements are accomplished as follows: When the dog which holds the spindle B in position to retain the upper semaphore arm horizontal and the lower depressed, is released, the spindle will rotate one-third of a revolution before again being arrested by a companion dog and, during such movement, the mutilated gear *e* on the master wheel E will engage the gear on the wheel *g* and will rock the arm F into a depressed position. This same movement of the master wheel E will

release the antifriction roller *h'* on the arm H of the signal arm F' from the flange *e'* on the master wheel and its counterbalance weight will throw the arm into a horizontal position, the arms thereby assuming the position of caution. When the dog which retains the signal at caution is released, the spindle B will again rotate one-third of a revolution and in so doing, the mutilated gear on the master wheel will engage the gear on the disk *g''*, thereby forcing the signal arm F' into a depressed position, the flange on the master wheel holding—during this interval—the arm F in a depressed position by the engagement of the antifriction roller *h* on its arm H with said flange. This therefore will present the two arms both in depressed position to indicate safety. When the dog which retains the signals at safety is released, the spindle B will continue its rotation another one-third revolution and in so doing, the master wheel will permit the antifriction roller *h* on the arm H of the signal arm F to escape from its flange and its counterbalance weight will promptly return it to a horizontal position while the antifriction roller *h'* on the arm H' of the semaphore arm F', will still retain it in a depressed position and the arms will thereby be held in position to indicate danger, the normal position, and in position to again assume the successive signaling positions described.

It is obvious that slight changes might be resorted to in the form and arrangement of the several parts herein described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth, but

What I claim is—

1. The combination with a plurality of reciprocating semaphore arms mounted at different elevations, of an actuating wheel for swinging the said arms, means for bringing the arms under the control of the actuating wheel to hold them in position and for releasing them from the actuating wheel to permit them to operate under gravity, at predetermined intervals during the rotary movement of the actuating wheel, means for applying motive power to the actuating wheel and electric devices under the control of a moving train to release the said actuating wheel to operate the arms, substantially as set forth.

2. The combination with a rotary spindle, means for actuating the spindle and electric circuits including electro magnets for releasing the spindle at intervals, of reciprocating counterbalanced semaphore arms mounted independently of one another and having operating wheels fixed to reciprocate with the arms, a master wheel adapted to engage the arm-operating wheels successively, and arm retaining devices having holding engagements with the master wheel at intervals to retain and release the arms, substantially as set forth.

3. The combination with the rotary spindle

and means for actuating it, of a master wheel fixed on the spindle and provided with a mutilated gear and with a mutilated flange, rock shafts, each carrying a semaphore arm and provided with disks or wheels having mutilated gear in position to engage the mutilated gear on the master wheel and retaining arms fixed to rotate with the semaphore arms

and provided with means for engaging the mutilated flanges on the master wheel, substantially as set forth.

GEORGE L. THOMAS.

Witnesses:

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