

No. 695,648.

Patented Mar. 18, 1902.

**B. C. ROWELL.**  
**BLOCK SYSTEM FOR RAILWAYS.**

(Application filed Feb. 13, 1899.)

2 Sheets—Sheet 1.

(No Model.)

Fig. 1.

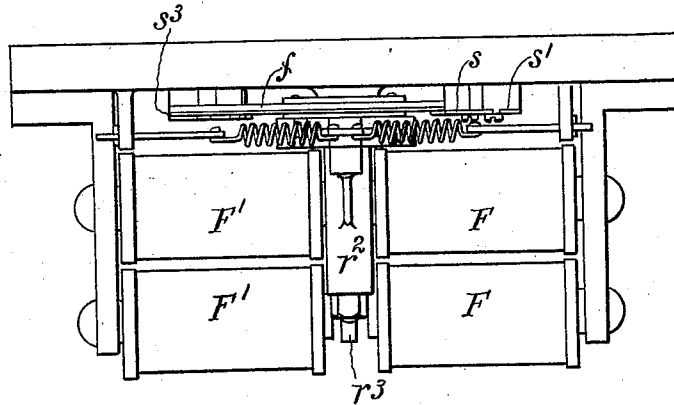


Fig. 2.

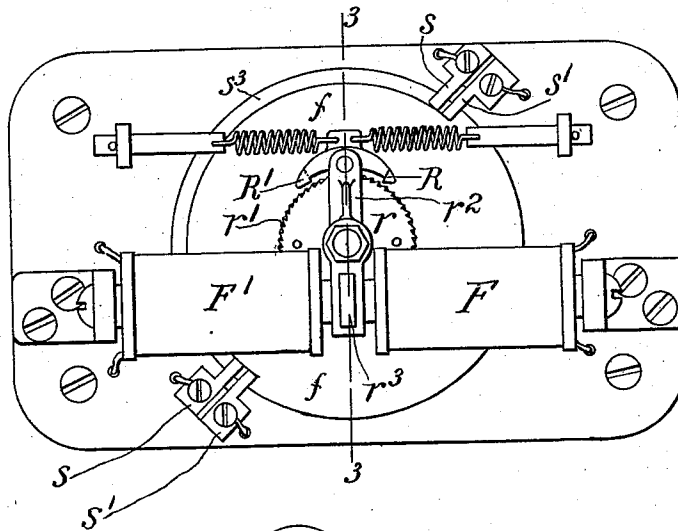
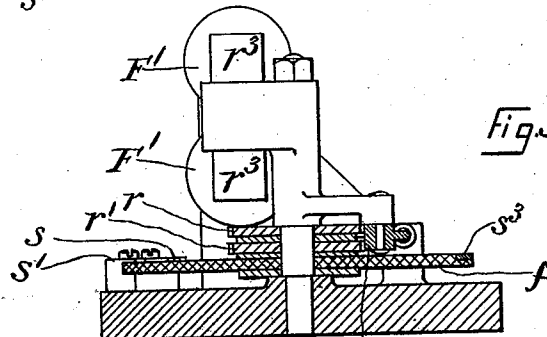


Fig. 3.



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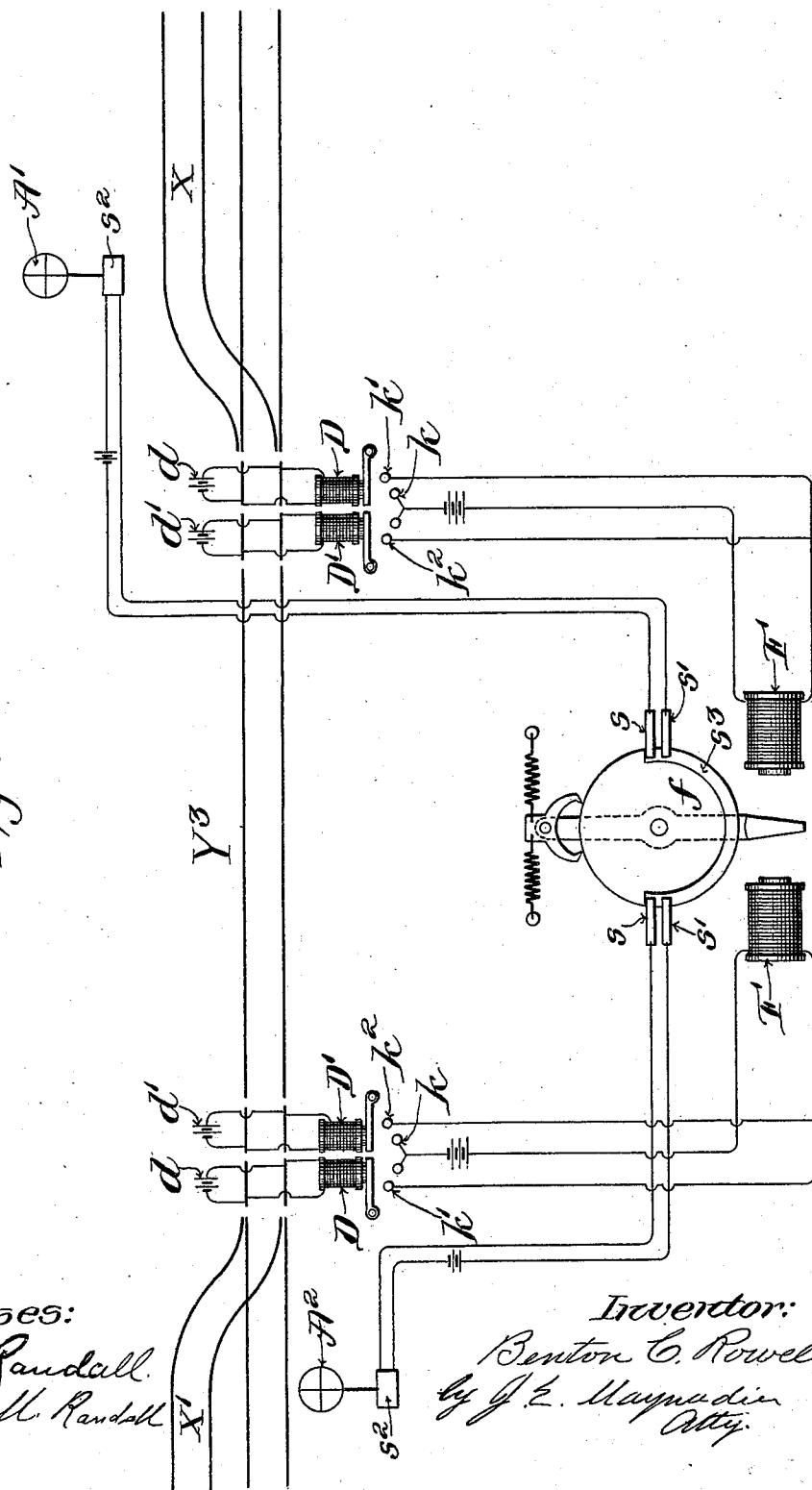
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Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## BLOCK SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 695,648, dated March 18, 1902.

Application filed February 18, 1899. Serial No. 705,432. (No model.)

*To all whom it may concern:*

Be it known that I, BENTON C. ROWELL, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Block System for Railways, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof, in which—

Figure 1 is an elevation of apparatus for use on steam-railways for counting the trains and controlling the signals. Fig. 2 is a plan of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 2. Fig. 4 is a diagram which clearly illustrates my invention.

On single-track railways it is desirable that a train on leaving a turnout should set a signal to "danger" at the next turnout ahead in order to prevent opposing trains meeting between turnouts, and to do this in a practical way it is necessary that each train that runs over a section should not only set the signal at the next turnout in its front to "danger," but should also shift that signal to "safety" when it reaches that turnout, and, moreover, all this must be done in such a manner that several trains may run in succession over the section, each taking part in shifting the signal to "safety," but the last one alone completing the change and giving a right of way to opposing trains over that section.

My invention relates to block systems of this class; and it consists in an improved apparatus comprising signals, (including all forms of blocking appliances,) one at one end and the other at the other end of the section of track to be blocked, two circuits, one for each signal, a step-by-step apparatus controlling both the signal-circuits, and means by which each train operates that step-by-step apparatus one step; but each train running in one direction operates the step-by-step apparatus in one direction and each train running in the opposite direction operates the step-by-step apparatus in the opposite direction, so that each train will by the automatic action of the same step-by-step apparatus control both signal-circuits, as will be made clearer by the following description of the

preferred form of my improved apparatus shown in the drawings.

In Figs. 1, 2, and 3 I have shown the preferred form of apparatus for use when my head blocking system is used on steam-railroads, and in these figures the magnets  $F$   $F'$  actuate the step-by-step apparatus, which consists of pawls  $R$   $R'$  and ratchets  $r$   $r'$ , the pawls being carried by a lever  $r^2$ . This lever also carries the armature  $r^3$  of the magnets  $F$   $F'$ , so that when magnet  $F$  attracts its armature the lever  $r^2$  will be moved and pawl  $R$  will move its ratchet  $r$  one step, and so on as often as magnet  $F$  is energized by successive electrical impulses. When magnet  $F'$  attracts its armature, lever  $r^2$  will be moved in the opposite direction and pawl  $R'$  will move its ratchet  $r'$  one step, and so on as often as magnet  $F'$  is energized by successive electrical impulses. Both ratchets are fast to disk  $f$ , of insulating material, which is pressed upon by spring-jaws  $s$   $s'$ , which are the positive and negative terminals of a circuit through magnet  $s^2$ , and this magnet  $s^2$  when energized by the presence of connector  $s^3$  between jaws  $s$   $s'$  shifts its signal to "safety" and when not energized (by moving connector  $s^3$  from between jaws  $s$  and  $s'$ ) causes the signal to be moved to "danger" by any desired mechanism or force.

The operation in detail and with particular reference to Fig. 4 is as follows: A train leaving turnout  $X$  and passing signal  $A'$ , then at "safety," first short-circuits track-battery  $d$  and deenergizes magnet  $D$ , whose armature drops and connects  $k$  and  $k'$ , thereby making the circuit through the coil of magnet  $F$  and moving disk  $f$  one step and in a direction to carry connector  $s^3$  on disk  $f$  clear of jaw  $s'$  of the circuit through magnet  $s^2$  of signal  $A^2$  and shifting signal  $A^2$  to "danger;" but the motion of disk  $f$  one step in that direction carries connector  $s^3$  one step farther between the jaws  $s$   $s'$  of the circuit through magnet  $s^2$  of signal  $A'$ , leaving signal  $A'$  at "safety," in order that a following train may run from turnout  $X$  onto section  $Y^3$ . The second train from  $X$  onto  $Y^3$  moves disk  $f$  a second step in the same direction, and a third train fol-

lowing the second moves disk *f* a third step in the same direction. When the first train of these three leaves section  $Y^3$  and before it runs onto turnout  $X$ , it short-circuits track-battery  $d'$  and deenergizes magnet  $D'$ , thereby making the circuit through magnet  $F'$  and moving disk *f* one step back; but this first back step of disk *f* does not carry connector  $s^3$  clear of either jaw  $s$   $s'$  of circuit of signal  $A'$ , nor does it carry connector  $s^3$  into contact with either jaw  $s$   $s'$  of circuit of signal  $A^2$ . The second train before leaving section  $Y^3$  moves disk *f* back a second step, and the third train leaving section  $Y^3$  moves disk *f* back a third step, and thereby restores disk *f* and connector  $s^3$  to the position shown in the drawings and shifts signal  $A^2$  from "danger" to "safety."

While a single track-battery  $d$  or  $d'$  and a single magnet  $D$   $D'$  at each end of the section of track  $Y^3$  would answer so far as the present invention is concerned, yet I have shown two track-batteries and two magnets

at each end of section  $Y^3$ , for the reason that in practice they are used for other purposes which need not here be described.

What I claim as my invention is—

1. In a railway block system the combination of two blocking appliances; two circuits one controlling one, the other controlling the other, blocking appliance; and a step-by-step apparatus controlling both those circuits.

2. In a railway block system the combination of two blocking appliances; two circuits, one controlling one, the other controlling the other, blocking appliance; a step-by-step apparatus controlling both those circuits; and means by which the step-by-step apparatus is actuated one step in one direction by an entering train and one step back by a departing train.

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