No. 765,380. PATENTED JULY 19, 1904.

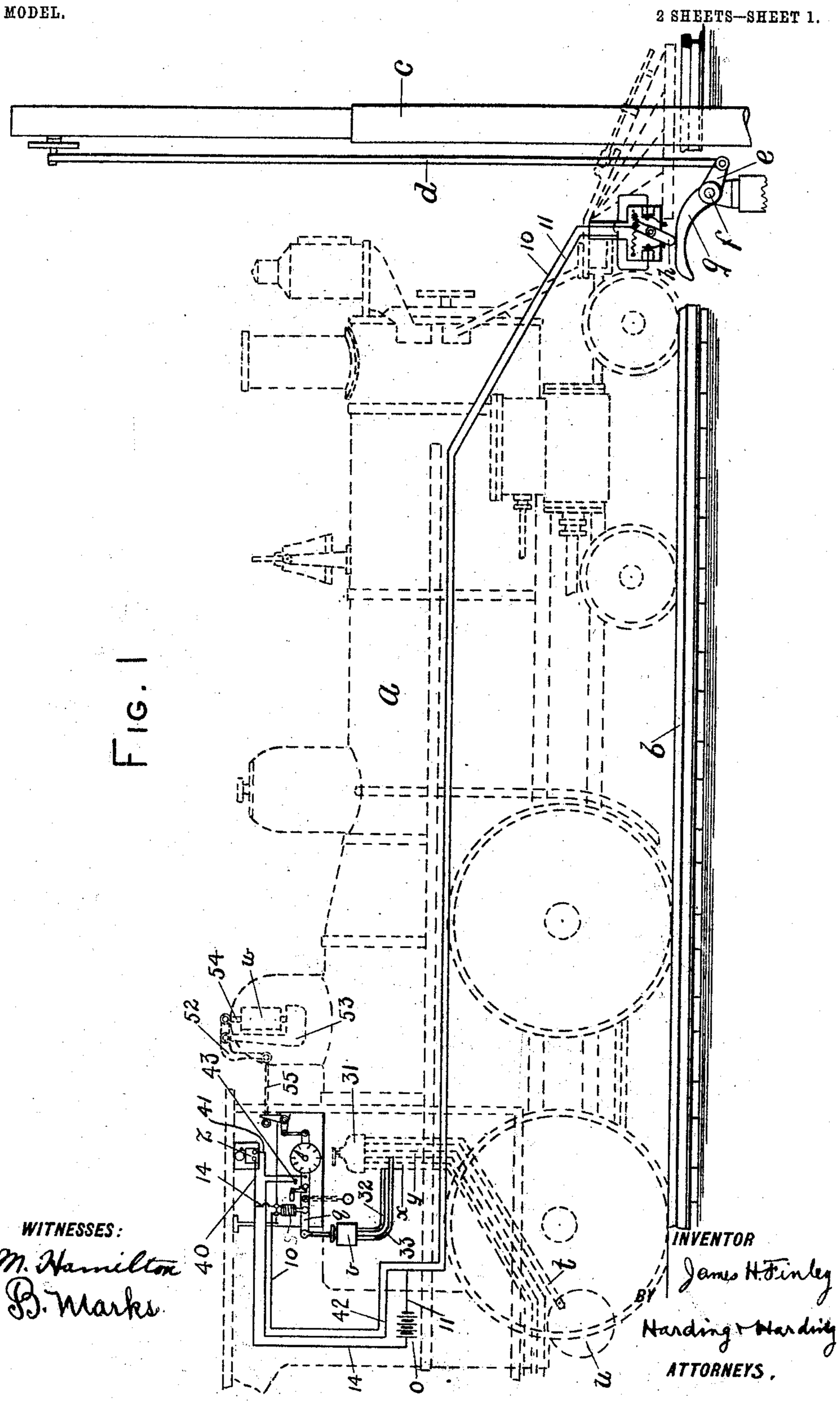
J. H. FINLEY.

RAILROAD SAFETY APPLIANCE.

APPLICATION FILED JULY 7, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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NO MODEL. 2 SHEETS—SHEET 2.

FIG. 2

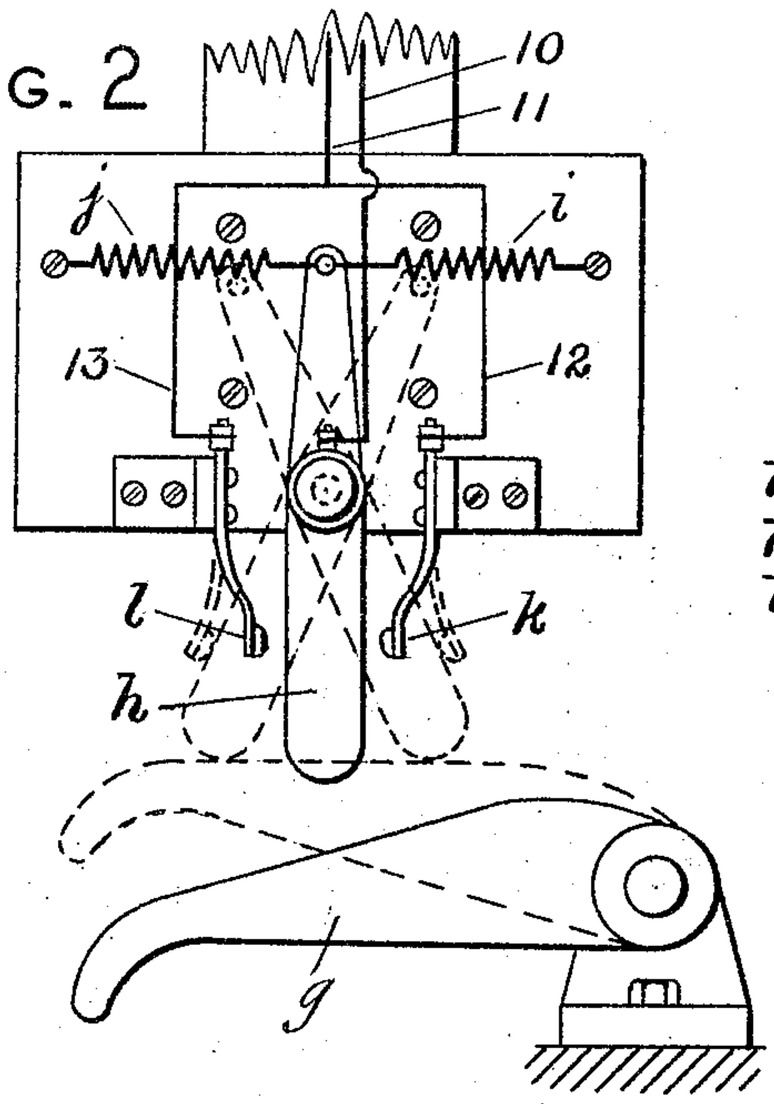


FIG. 3

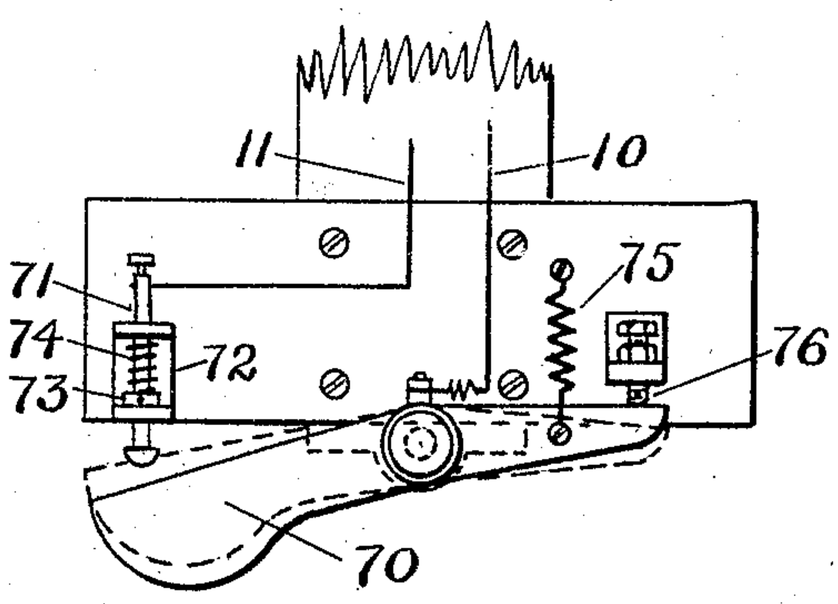


FIG. 5

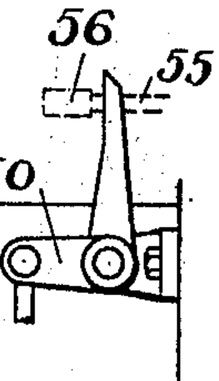
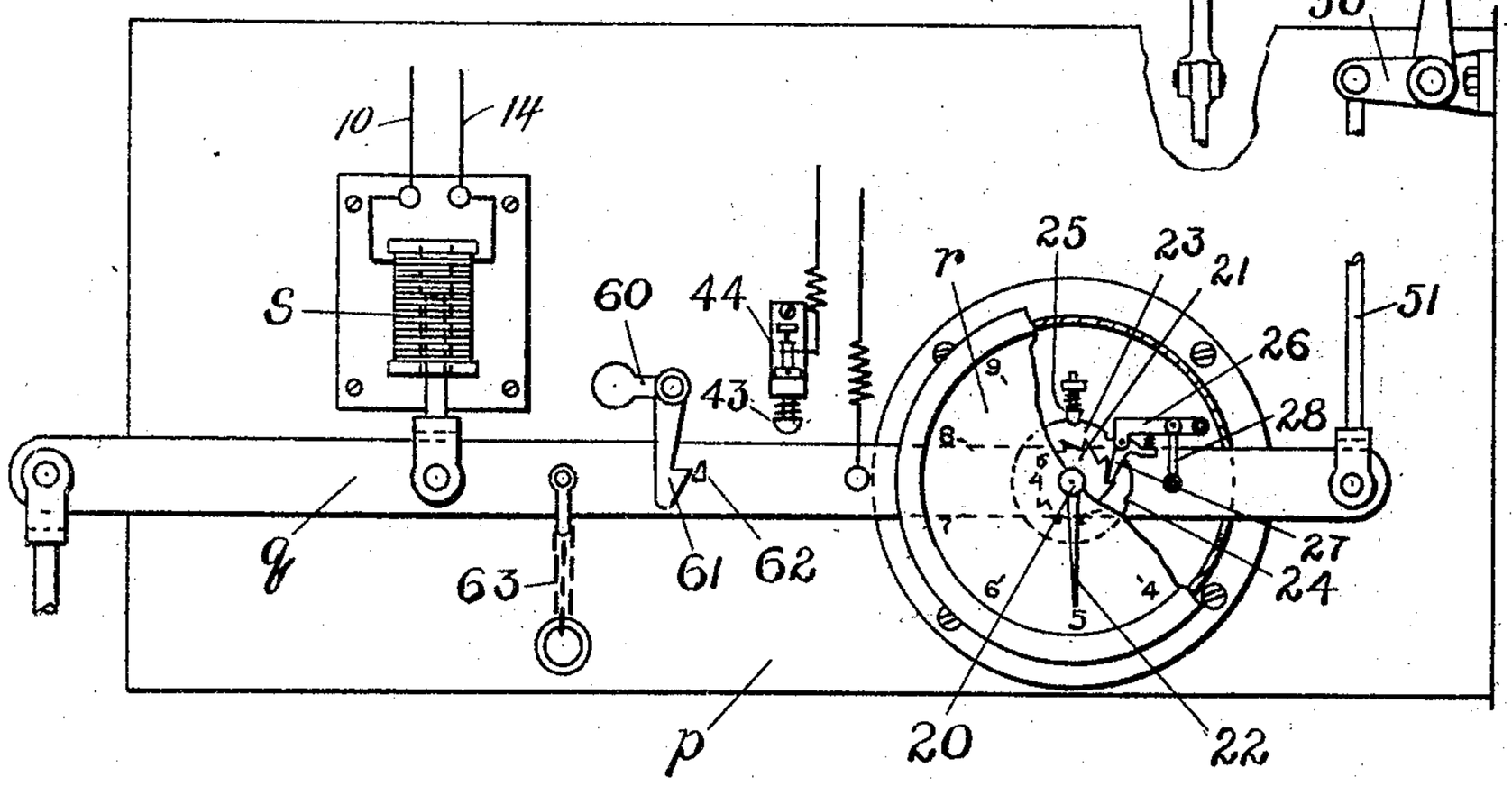


FIG. 4



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UNITED STATES PATENT OFFICE.

JAMES H. FINLEY, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO HIMSELF, ROBERT C. MILLER, AND JOHN J. FLOYD, OF NORRISTOWN, PENNSYLVANIA.

RAILROAD SAFETY APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 765,380, dated July 19, 1904.

Application filed July 7, 1903. Serial No. 164,552. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. FINLEY, a citizen of the United States, residing at Norristown, county of Montgomery, and State of Pennsylvania, have invented a new and useful Improvement in Railroad Safety Appliances, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates generally to that class of devices having for their object the prevention of accidents on railroads due to the failure of the engineer to heed danger-signals.

The objects of the invention are to automatically stop a train when it runs past a danger-signal, to sound an alarm in or close to the cab of the engine as soon as a danger-signal has been passed, and to operate an indicator for the purpose of making a permanent register of each failure on the part of the engineer to observe and obey the signal.

The invention also has for its object to control the mechanism that directly accomplishes the foregoing objects from a single magnet or equivalent device.

In the drawings, Figure 1 is a side view of the apparatus for accomplishing the foregoing purposes, the view also showing the application of the same to a locomotive and the attachments to the signal for actuating said apparatus. Fig. 2 is a detail view, in side elevation, of the contact device on the locomotive that is directly actuated by the signal and its attachments. Fig. 3 is a view in side elevation of a modified form of contact device. Fig. 4 is a view in side elevation of the portion of the apparatus located in the cab. Fig. 5 is an end view of the bell-crank lever in the chain of mechanism connected to the steam-whistle.

a is the locomotive; *b*, the track-bed and track; *c*, the signal; *d*, a rod extending from the signal to a lever *e*, secured to a rock-shaft *f*, to which is secured a lever *g*. The lever *g* may be located between the rails or at the side of the track close to the rail. When the signal is set to "safety," the rod *d* is pulled up, causing the lever *g* to be depressed in such position as not to actuate the contact device hereinafter described carried by the locomotive. When the signal is set to "danger," the rod *d* is moved down, elevating the lever *g* into position to actuate the contact device.

The contact device shown in Figs. 1 and 2 consists of an intermediate pivoted lever *h*, oppositely-acting springs *i* and *j*, tending to hold the lever *h* in a central position, and springs or spring-contacts *k* and *l*, with one or the other of which the lever *h* makes contact when it is moved from a central position. The contact device is carried on any convenient part of the locomotive-frame. 10 is a wire conductor the end of which is secured to lever *h*. 11 is a wire conductor having branches 12 and 13 secured, respectively, to springs *k* and *l*. These conductors 10 and 11 are connected with opposite poles of a battery or other source of electrical energy, as will hereinafter be described. It will therefore be understood that normally the circuit is open; but when the lever *h* swings against spring-contact *k* or *l* the circuit will be closed. The lever *g* when raised is in line of travel of lever *h*, so that the latter is actuated by the former to close the circuit on the locomotive whenever the signal is set to "danger."

o is a battery carried in the cab.

s is a solenoid secured to a plate *p* in the cab. Any form of electromagnet may be used in place of the solenoid.

14 is a conductor leading from one pole of the battery to the solenoid. The conductors 10 and 11, before referred to, lead, respectively, to the solenoid and to the other pole of the battery. When, therefore, the contact-lever *h* engages either of the springs *k* or *l*, the following circuit is established: from the battery *o* through conductor 14 to solenoid *s*, through conductor 10 to contact-lever *h*, to contact-spring *k* or *l*, and through conductor 12 or 13 and conductor 11 back to the battery.

The solenoid *p* controls the different por-

tions of the apparatus that stop the train, sound an alarm, and make a register of the passage of a signal. The portion of the apparatus that registers the passage of a signal will first be described.

q is a lever pivoted on the stud 20 on the plate *p*. The register consists of a record disk or dial *r*, secured to the stud, and a pointer 22, pivoted on the stud.

21 is a ratchet-wheel, and 23 a holding-disk, both of which are secured on the axis of the pointer.

24 represents notches in the periphery of the holding-disk.

Secured to the indicator *r* is a spring-pressed dog 25, engaging one of the notches in the holding-disk 23, and thereby normally holding said disk and the ratchet and pointer secured thereto from turning.

Pivoted to the disk *r* is a lever 26, to the free end of which is pivoted a spring-pressed pawl 27. A link 28 connects the lever 26 with the lever *q*. When the solenoid is energized as before described, the left-hand end of lever *q* is raised and the right-hand end lowered, thereby, through link 28 and lever 26, causing the pawl 27 to turn the ratchet 21 a distance of one tooth, thereby moving the pointer 22 from one figure to another on the dial of the register. This makes a permanent record of the fact that the engineer has failed to observe or has ignored the signal.

The apparatus for automatically stopping the train when a signal is passed will now be described.

Pivoted to the left-hand end of the lever *q* is the stem of a valve *v*. This valve is adapted to normally close the connection between pipes 32 and 33, which are connected, respectively, with the usual automatic pipe *x* and non-automatic pipe *y* of the air-brake system.

u is the usual air-reservoir, *t* the pipe leading therefrom, and 31 the usual engineer's valve for opening connection from pipe *t* to the non-automatic pipe *y*. By opening the connection between the automatic and non-automatic pipes, as is well known, the emergency-brakes are applied. This is accomplished by opening the valve *v*, which occurs whenever the solenoid is energized to lift the lever *q*.

The apparatus for sounding an alarm in the cab will now be described.

z is an ordinary electric alarm.

40 is a conductor extending from conductor 14 to the alarm.

41 is a conductor extending from the alarm and connected to lever *q*.

42 is a conductor extending from conductor 11 to the spring-pressed pin-contact 43, movable in a bracket 44.

When the solenoid is energized, the lever *q* contacts with the pin 43 and the following circuit is established: from the battery *o* through conductors 11 and 42 to contact-pin 43, lever *q*, through conductor 41 to alarm *z*, and through conductors 40 and 14 back to the battery.

The following means for sounding an alarm may be used in place of or in addition to the alarm just described:

50 is a bell-crank lever pivoted to the plate *p* and connected, by means of link 51, with the right-hand end of lever *q*.

52 is a lever pivoted between its ends to the bracket 53. Connected to one end of lever 52 is a rod 54, controlling the usual steam-whistle *w*. 55 is a rod pivoted to the other end of lever 52 and extending through the bifurcated end of one arm of the bell-crank 50 and having an enlarged end 56. When the solenoid is energized, the right-hand end of lever *q* is depressed, whereby, through bell-crank 50, rod 55, and lever 52, the steam-whistle is operated.

60 is a bell-crank lever pivoted to the plate *p*. One arm is weighted, the other arm having a hook or catch 61, adapted when the left-hand end of lever *q* is raised to drop under and engage a stop 62, secured to lever *q*. Thus the rod is held in the position to which it has been raised after the lever *h* has passed out of contact with the lever *q*. To restore the lever *q* to its normal position, the catch 61 is disengaged from the stop 62 and the left-hand end of lever *q* pulled down by means of the chain 63.

By means of the foregoing apparatus every necessary safeguard against accident is provided. If the air-brakes should fail to work, the engineer or fireman is notified by the alarm that a danger-signal has been passed. If the alarm should fail to work, the train is nevertheless stopped by the automatic application of the emergency air-brakes. Moreover, the engineer will have every motive for keeping the closest watch on the signals, as any failure to observe them will result in a permanent record thereof being made. Thus the chances of an engineer running past a signal are much reduced and the danger resulting from doing so eliminated.

In Fig. 3 I have shown a modified form of contact device. The lever 70 is substituted for the lever *h*. The conductor 10 is connected to lever 70, and the conductor 11 is connected to a pin 71, sliding in guides in a frame 72. 73 is a collar on pin 71, and 74 is a spring confined between the collar and the frame. When the lever 70 contacts with lever *g*, the circuit is closed through conductor 10, lever 70, pin 71, and conductor 11. 75 is a spring normally holding lever 70 out of contact with pin 71. 76 is a stop limiting the extent of movement of lever 70.

It will be understood that in place of the

lever *g* connected with the signal any other signaling means, such as a fusee or torpedo placed on the track, may be used for operating the contact device carried by the locomotive.

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

1. In a locomotive safety appliance, the combination, with a battery, an electromagnet, a contact device, an electric circuit including the same, and means exterior to the car for operating the contact device and thereby closing the circuit, of a lever adapted to be moved by said electromagnet when said circuit is closed, an air-brake-controlling valve, connections from said lever to said valve, an electric alarm, an electric connection therefrom to the battery-circuit, a contact adapted to be connected with said lever when the same is moved by said electromagnet, an electric connection from said contact to said alarm, an electric connection from the battery-circuit to said lever, a register, and mechanism for operating said register connected with and adapted to be actuated by said lever.

2. In a locomotive safety appliance, the combination, with a battery, an electromagnet, a contact device, an electric circuit including the same, and means exterior to the locomotive for operating the contact device and thereby closing the circuit, of a lever pivoted between its ends adapted to be moved on its pivot by said electromagnet when the circuit is closed, an air-brake-controlling valve, connections from one end of said lever to said valve, an alarm, an electric connection from the alarm to the battery-circuit, a fixed contact located adjacent to that part of the lever between its pivot and the connections to said valve, an electric connection from said fixed contact to the alarm, an electric connection from the battery-circuit to said lever, a dial, a pointer movable on said dial, a ratchet secured to said pointer, a pawl adapted to operate said ratchet, a connection from the other end of said lever to said pawl, means whereby said lever, when moved by said electromagnet, is sustained in its operative position independently of said magnet, and a device to restore said lever to its normal inoperative position.

3. In a locomotive safety appliance, the combination with a battery, an electromagnet, a contact device, an electric circuit including the same, and means exterior to the car for operating the contact device and thereby closing the circuit, of an air-brake-controlling valve, a register, a lever, connections therefrom to said magnet adapted when said magnet is energized to move said lever from its normal position, means to restore said lever to its normal position, connections from said lever to said valve adapted to operate it when said lever is so actuated by said magnet and restore it to its normal inoperative position when said lever is so returned to its normal position, and means actuated by said lever during its movement by said magnet to operate said register, but inoperative to operate said register during the return movement of said lever.

4. In a locomotive safety appliance, the combination with a battery, an electromagnet, a contact device, an electric circuit including the same, and means exterior to the car for operating the contact device and thereby closing the circuit, of an air-brake-controlling valve, a register, an alarm, a lever, connections therefrom to said magnet adapted when said magnet is energized to move said lever from its normal position, means to restore said lever to its normal position, connections from said lever to said valve and alarm adapted to operate them when said lever is so actuated by said magnet and restore them to their inoperative positions when said lever is so returned to its normal position, and means actuated by said lever during its movement by said magnet to operate said register but inoperative to operate said register during the return movement of said lever.

In testimony of which invention I have hereunto set my hand, at Norristown, Pennsylvania, on this 3d day of July, 1903.

JAMES H. FINLEY.

Witnesses:
HARRY W. AKINS,
CHAS. V. FINLEY.