A. G. SHAVER.

ELECTRIC GAS LIGHT SIGNAL.

APPLICATION FILED JAN. 11, 1918.

1,410,961.

Patented Mar. 28, 1922.

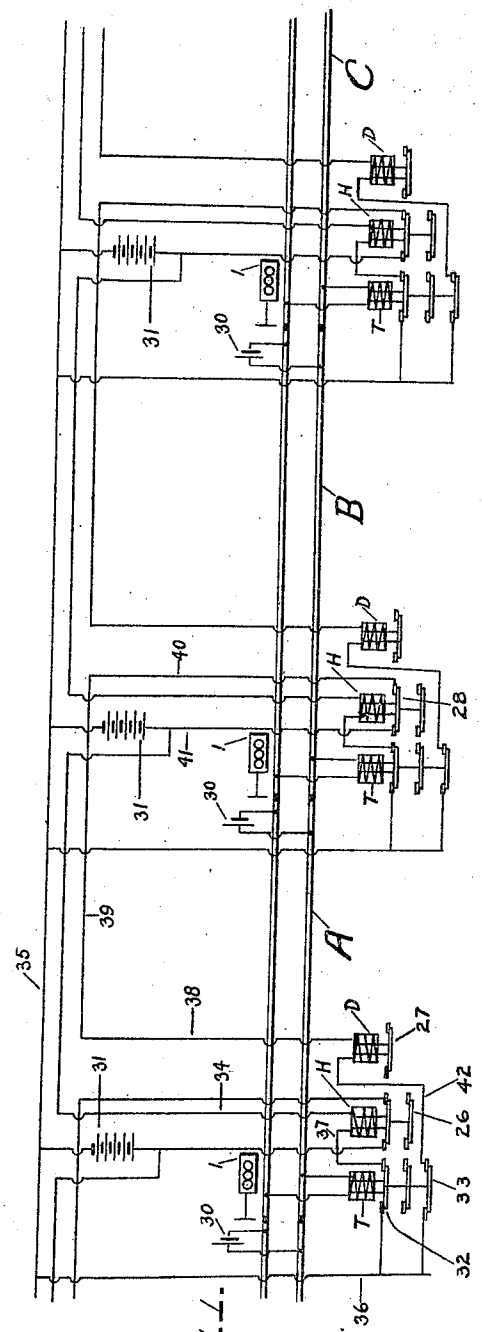

FIG. 1.

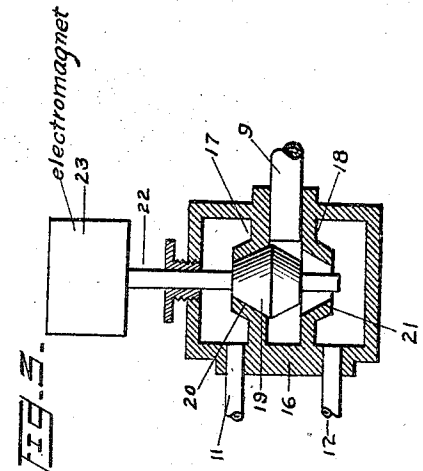

FIG. 3.

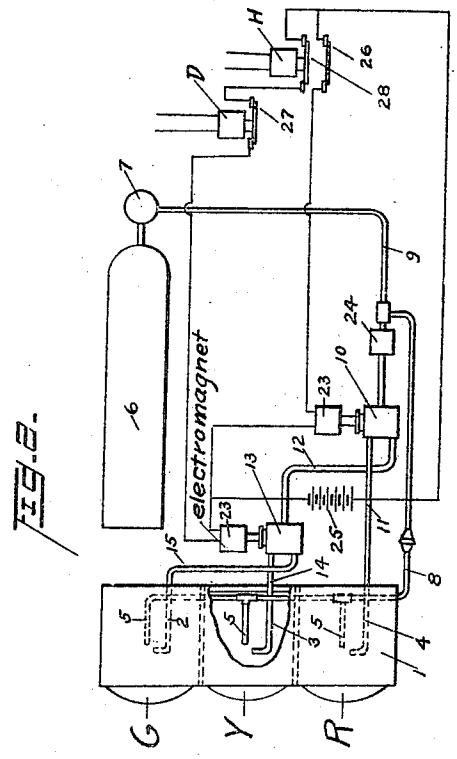

FIG. 2.

Witness:

Harold Stearns

Inventor

A. G. Shaver

UNITED STATES PATENT OFFICE.

ARCHIBALD G. SHAVER, OF CHICAGO, ILLINOIS.

ELECTRO-GAS-LIGHT SIGNAL.

1,410,961. Specification of Letters Patent. Patented Mar. 28, 1922.

Application filed January 11, 1918. Serial No. 211,418.

To all whom it may concern:

Be it known that I, ARCHIBALD G. SHAVER, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Electro-Gas-Light Signals, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the art of signalling and has for its object the creation of a simple and reliable system involving the use of gas to produce illumination and of electromagnetic means for controlling the gas.

In one embodiment of my invention I employ a plurality of gas lamps or burners and a control system including electromagnetic valves for governing the flow of gas to the lamps or burners and therefore, in one of its aspects, my invention may be said to have for its object to produce a simple electromagnetic valve system for controlling the flow of a gaseous medium to a plurality of devices to be supplied therewith.

One of the most important fields of use for my invention is that of railway signalling and therefore, viewed in another of its aspects, my invention may be said to have for its object to produce a simple and reliable railway signal system in which the signals will be gas lights and the control will be electromagnetic.

Viewed in a further aspect my invention may be said to have for its object to produce a system of railway signalling by means of gas lights controlled electromagnetically through circuits which can readily be adapted to many of the usual schemes of block signal circuits.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Figure 1 is a diagrammatic representation of my invention adapted to a common system of railway block signal circuits;

Fig. 2 is an elevation of one of the gas light signals, together with the immediate controlling circuits for the gas valves; and

Fig. 3 is a sectional view of one of the electromagnetic gas valves.

The system illustrated is one in which, whenever there is a train in a block, the first signal to the rear will indicate danger, the second will indicate caution, and the third will give a clear indication, by means of lights which are respectively red, yellow and green. Furthermore the system is one adapted to railroads having two or more tracks and having only one track circuit to a block. For the sake of brevity I shall describe my invention in detail only in connection with the particular system illustrated; but it will of course be understood that I do not wish to limit my invention to this particular use or adaptation.

Referring first to Figs. 2 and 3 of the drawing, G, Y and R represent respectively green, yellow and red lenses in corresponding walls of three light-tight compartments of a lamp casing, 1. Behind each lens is a burner, these being indicated respectively as 2, 3 and 4. Adjacent to each of these burners is a pilot burner, 5, adapted to provide a constantly burning pilot light which serves instantly to ignite gas issuing from the corresponding main burner. Gas is supplied from any suitable source such as a tank or reservoir, 6, adapted to contain gas at a high pressure and deliver it at a lower pressure through a reducing valve, 7. The pilot burners are supplied directly through a branch pipe, 8, leading from the main delivery pipe, 9. The pipe 9 is connected to an electromagnetic valve device, 10, which supplies the burner 4 through a pipe, 11, and which also supplies a second electromagnetic valve device, 13, which supplies the burner, 3, through a pipe, 14, and the burner, 2, through a pipe, 15.

The electromagnetic valve devices 10 and 13 are alike in construction, the structural details being illustrated in Fig. 3. Each valve device comprises a closed casing, 16, having the interior divided into three compartments by means of two partitions, 17 and 18. In the central compartment is a double-acting valve, 19, co-operating with seats, 20 and 21, surrounding openings extending through the partitions 17 and 18, respectively; the arrangement being such that when the valve is engaged with either seat it shuts off communication between the compartment at that end of the valve cas-

ing and the central compartment and opens communication between the central compartment and the other end compartment. The valve is carried upon a stem, 22, which is attached to or forms the core of an electromagnet, 23, located exteriorly of the casing. If the device is arranged in an upright position, as shown, the valve will seat itself by gravity against the lower seat whenever the electromagnet is de-energized and against the upper seat when the electromagnet is energized. The supply pipe, that is the pipe 9 in the one case and the pipe 12 in the other, opens into the central compartment. The delivery pipes, 11 and 12 in the one case and 14 and 15 in the other, open out of the upper and lower compartments respectively.

When the electromagnetic element of valve device 10 is de-energized, gas is delivered from the pipe 9 to the pipe 11, and thence to burner 4 while communication is shut off between pipe 9 and pipe 12, that is between the source of supply and valve device 13. Consequently the red lens will be illuminated and the other two will be dark. When the electromagnetic element of the valve device 10 is energized, communication between the burner 4 and the source of supply is interrupted and the red lens will be left dark. Either the yellow or the green lens will now be illuminated, however, depending on the condition of the valve device 13; for if the electromagnetic element of the latter valve device is de-energized gas will flow from pipe 12 to pipe 14 and the yellow lens will be illuminated and if it is energized the green lens will be illuminated. It will thus be seen that one or another of the three lenses will always be illuminated, but no two can be illuminated at the same time. Furthermore, whenever there is no current flowing through the electromagnetic element of either valve device the red lens will be illuminated.

If desired, there may be placed in the pipe 9 a device, 24 of any well known kind, for causing the light behind the lenses to flash.

For the purpose of permitting the apparatus just described to be utilized as part of a block signal system as will be hereinafter explained, the electromagnetic element of the valve device, 10, is placed in a circuit containing a source of current, 25, and contacts, 26, of a controlling relay, H, while the electromagnetic element of the valve device 13 is placed in a circuit containing the source of current, contacts, 27, of a relay D and contacts, 28, of relay H. With this arrangement the valve in device 13 can be raised only when both relay D and relay H are energized and must remain in its lower position when either of the two relays is de-energized.

Reference being now had to Fig. 1, A, B and C represent three consecutive blocks in a railway track insulated from each other in the usual way. A source of current, such as a battery, 30, is connected across the two rails of each block. A track relay, T, is also connected across the rails of each block whereby, when there is no train on a block the corresponding relay is energized; this being the normal condition. In addition to the track relay each block has also one of the relays D and one of the relays H to which reference has heretofore been made.

The energizing circuit for each of the relays H is through a suitable battery, 31, and through contacts, 32, on the corresponding track relay. The energizing circuit for each of the relays D is through one of the batteries, 31, through contacts, 33, on the corresponding track relay and through the contacts 28 on relay H in the next block ahead. One set of these circuits may be traced as follows: from one terminal of relay H through wire 34, battery 31, wire 35, wire 36, track relay contacts 32 and wire 37 back to the other terminal of relay H; and from one terminal of relay D (at rear end of block A) through wires, 38, 39 and 40, contacts 28 of relay H in block B, wire 41, battery 31, wire 35, wire 36, contacts 33 of track relay in block A, and wire 42 back to the other terminal of relay D.

Whenever a train enters a block, block A for example, the track relay is de-energized and consequently the corresponding relays D and H are de-energized because their circuits are broken at the track relay; and the controlling valves for the signal for the block are placed in such position that a red light will be shown. As the train passes out of one block into the next that is, from A to B, the relays T and H associated with block A are energized, but relay D remains de-energized because it is under the control of relay H in block B. Therefore the signal in block A will be caused to show a yellow light. When the last car of the train passes into block C, so that relay H in block B becomes energized, the circuit through relay D in block A is completed and both of the valves associated with the signal in the latter block will be raised so as to cause a green light to be shown.

It will thus be seen that I have produced a simple and novel arrangement by means of which gas burners of differently colored lights may be turned on and off in automatic succession to give the information which it is the purpose of block signals to convey.

While I have illustrated and described with particularly only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the terms employed in the defi-

nitions of my invention constituting the appended claims.

I claim:

1. In a railway signal system, a group of gas lights, electromagnetic valves for controlling the supply of gas to the lights, and a controlling system including a track circuit for actuating said valves to cause the lights to be lighted in automatic succession.

2. In a block signal system, groups of gas lights, and means for causing the lights of each group to be lighted in automatic succession from the time that group becomes the first group in rear of a train until its number in the series behind the train is equal to the number of lights in a group.

3. In a block signal system, groups of gas lights, valves controlling the flow of gas to said lights, and an electromagnetic controlling system for said valves arranged to cause the lights in each group to be lighted in automatic succession as a train passes such group and reaches predetermined points beyond the same.

4. In a railway signal system, a plurality of groups of gas lights, interlocked electromagnetic valves associated with each group of lights to control the flow of gas thereto, and track circuits for controlling said valves.

5. In a railway signal system, a plurality of groups of gas lights, interlocked valves associated with each group to control the flow of gas thereto, electromagnetic actuating means for each group of valves including local actuating circuits, and groups of train-controlled relays for controlling said actuating circuits.

6. In a railway signal system, a plurality of groups of gas lights, interlocked valves associated with each group to control the flow of gas thereto, electromagnetic actuating means for each group of valves including local actuating circuits, and groups of train-controlled relays for controlling said actuating circuits, certain of the relays being under the control of relays belonging to other groups.

7. In a railway light signaling apparatus, the combination of a signaling lantern having a gas burner and a pilot, a gas conduit for conveying gas to the said burner, an electro-magnetically controlled valve in said conduit for controlling the flow of gas to the burner normally in position to permit the flow of gas to said burner, a controllable circuit within which the valve magnet is included, a track circuit for controlling said controllable circuit, the operation of said track circuit depending upon track conditions, said controllable circuit being unaffected by gas movements, the construction and arrangement of the parts being such that magnet activity to close the gas supply of the said burner will be provided upon change in conditions of the controllable circuit.

8. In a railway light signaling apparatus, the combination of a signaling lantern having a gas burner and a pilot, a gas conduit leading to the said burner for supplying gas thereto, a magnetically controlled valve in said conduit for controlling the flow of gas to the burner and normally operating to permit the flow of gas thereto, a circuit within which the valve magnet is included, and means whereby said circuit is controlled by train movements over tracks with which the apparatus is associated.

9. In a railway light signaling apparatus, the combination of a signaling lantern, comprising a plurality of gas burners and pilots, a gas conduit leading to said gas burners for supplying gas thereto, a plurality of electro-magnetically controlled valves in said conduit for controlling the flow of gas to the said burners, each of said valves controlling the flow of gas to two burners, the first of said valves normally being in position to permit the flow of gas to the first burner and to close the passageway for the gas to the next succeeding burner, and the second valve being in like position, a circuit for controlling the first named valve to close the passageway to the first named burner and to open the passageway to the second named burner, a circuit for controlling the second named valve to close the passageway leading to the second burner and to open the passageway leading to a third burner, and means controllable by train movements upon a track associated with said apparatus for controlling the said two circuits.

In testimony whereof, I sign this specification.

ARCHIBALD G. SHAVER.