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APPLICATION FILED DEC. 20, 1919.

1,434,072.

Patented Oct. 31, 1922.

3 SHEETS—SHEET 1.

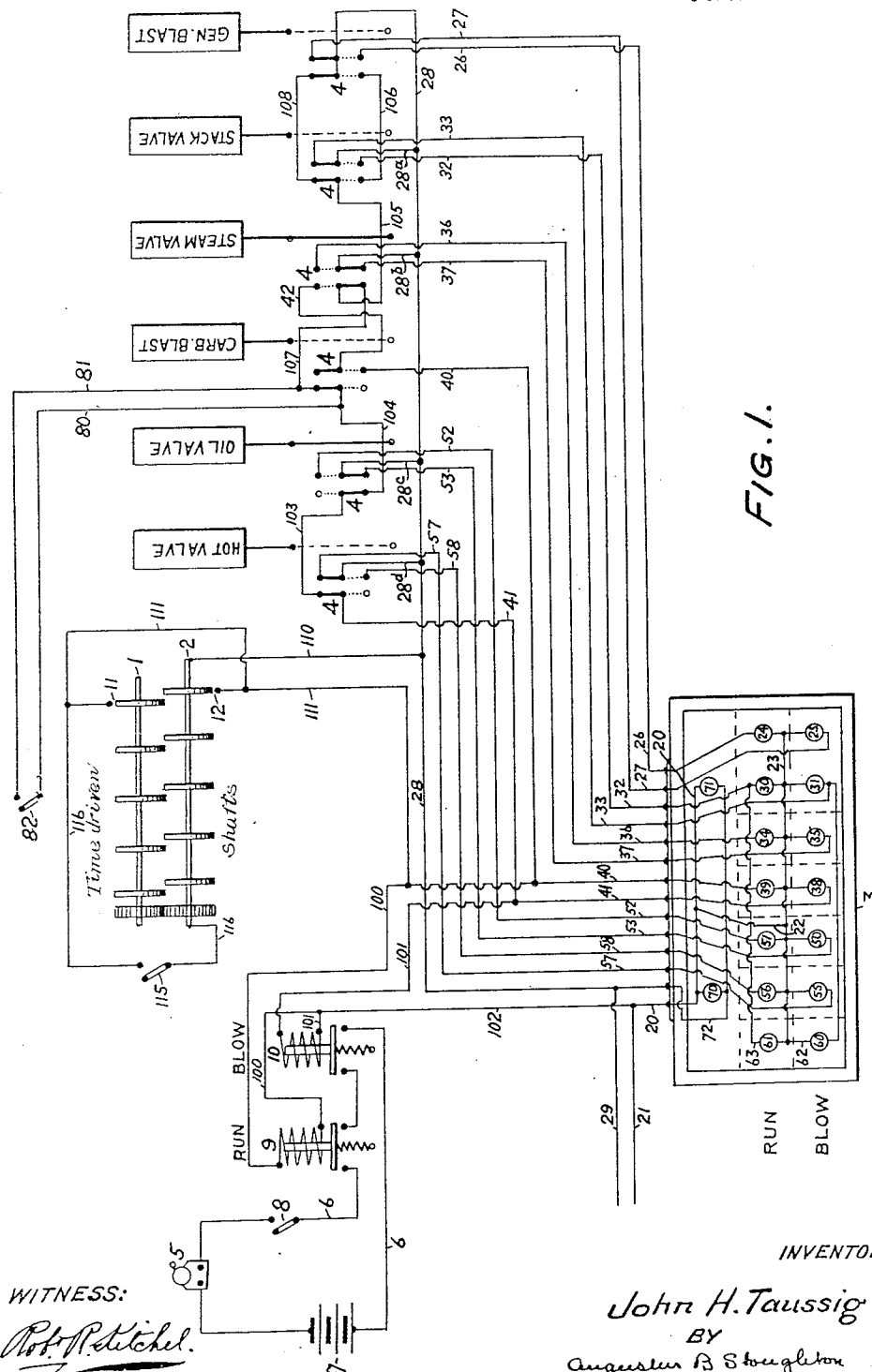


FIG. 1.

INVENTOR

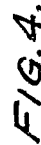
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3 SHEETS—SHEET 2.



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ALARM SIGNAL SYSTEM FOR AUTOMATIC WATER GAS SET CONTROLS.

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3 SHEETS—SHEET 3.

FIG. 5.

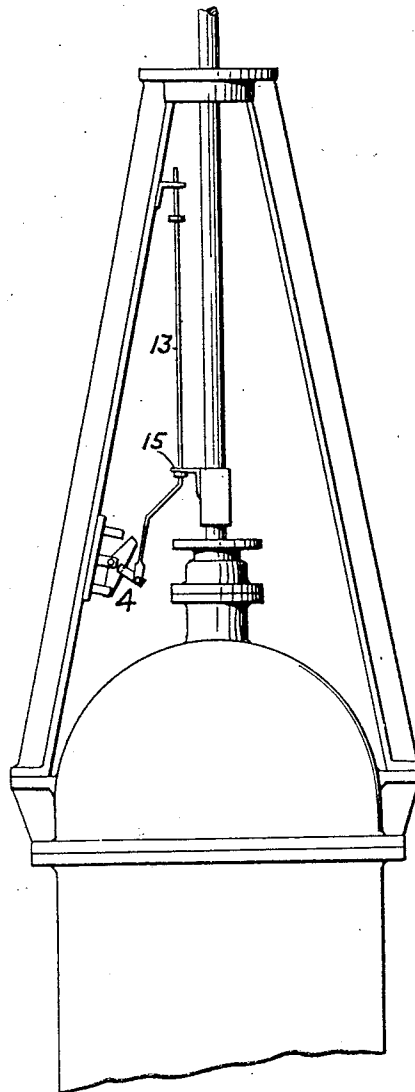
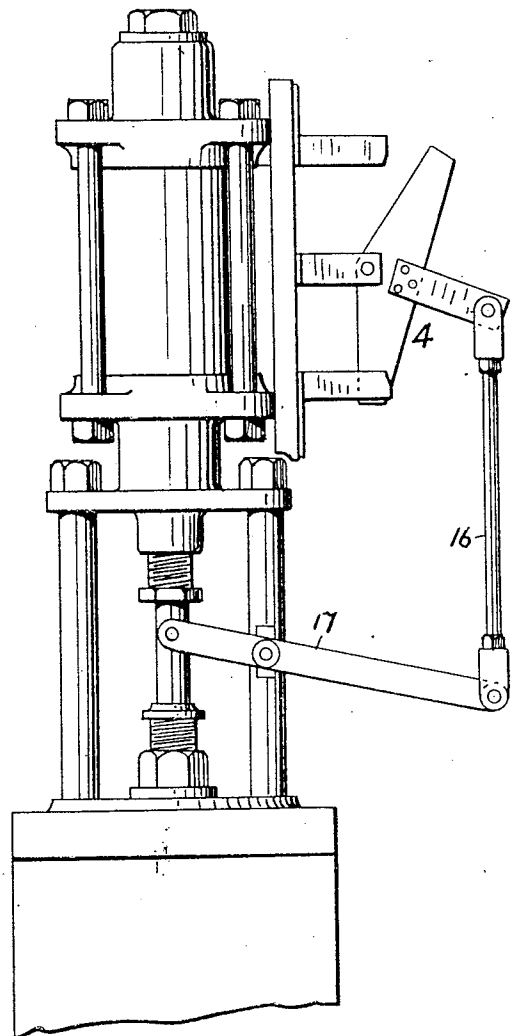


FIG. 6.



WITNESS:

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Patented Oct. 31, 1922.

1,434,072

UNITED STATES PATENT OFFICE.

JOHN HAWLEY TAUSSIG, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE UNITED GAS IMPROVEMENT COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ALARM-SIGNAL SYSTEM FOR AUTOMATIC WATER-GAS-SET CONTROLS.

Application filed December 20, 1919. Serial No. 346,401.

To all whom it may concern:

Be it known that I, JOHN HAWLEY TAUSSIG, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Alarm-Signal System for Automatic Water-Gas-Set Controls, of which the following is a specification.

In my Patent No. 1,119,472 of December 1st, 1914, there is shown and described an automatic water gas set and that patent will serve to facilitate an understanding of the present invention, although the latter is not limited to the particular automatic water gas set described in that patent but is applicable to water gas sets generally. In an automatic water gas set there is an automatic control mechanism for opening and closing the apparatus valves in certain groups and at intervals called the "blow" and the "run," and such mechanism usually includes a master element or elements, as a time driven shaft, the movement of which acting through various kinds of relay apparatus effects the actual movement of the apparatus valves which are usually designated according to their functions. In the operation of a water gas set it is important that the apparatus valves should be opened and closed in the proper combination for effecting the "run" and the "blow," and at the proper intervals and without delay in operation of any of the valves, but it is possible that automatic water gas sets, from some outside cause or another may on rare occasions be caused to fail in one or more of these respects to function properly. This condition of affairs in practice results in the attendant's wasting a considerable part of his time, which might be usefully employed about the works, in watching the automatic water gas set which, as a rule, functions properly and only needs attention at long intervals.

The principal objects of the present invention are, first, to give the gas maker notice of the failure of any valve to function properly and to show which valve or valves, if any, has failed to operate properly; second, to enable the gas maker or operator in charge of an automatic water gas set to perform duties other than watching it, with certainty that he will be called if anything goes wrong in the automatic operation and

promptly advised just which valve or valves has gone wrong; third, to show at all times and in a convenient place that the valves are operating properly and are in the right rest positions for the "run" or "blow" as the case may be, but without giving an alarm under these conditions and when the valves are moving from one rest position to the other rest position in proper combinations. Other objects of the invention will appear from the following description.

The invention will be claimed at the end hereof but will be described in connection with the embodiment of it chosen from other embodiments for illustration in the accompanying drawings forming part hereof and in which—

Figure 1, is a diagrammatic view illustrating an alarm signal system embodying features of the invention and showing schematically apparatus valves and parts of their automatic control mechanism.

Fig. 2, is a front view drawn to an enlarged scale of an indicator for showing the rest position of apparatus valves at the "run" and at the "blow."

Fig. 3, is a cross section of Fig. 2 on the line 3—3.

Fig. 4, is a diagrammatic view, partly in section, of carry over mechanism operated by the automatic control mechanism for silencing the alarm during proper movement of the valve, and

Figs. 5 and 6, are views illustrating valve operated appliances for controlling the rest position indicators and the alarm.

An explanation of the invention may be facilitated by a few general statements involving reference to operation, followed by a more detail description of electric circuits, since they are employed in the embodiment of the invention shown on the drawings. In the drawings 1 and 2, are the synchronously time driven elements which, through apparatus not shown, respectively position the apparatus valves in rest open or closed, positions for the "run" or for the "blow." The number of valves may vary but in the case selected for the sake of description the apparatus valves are designated on Fig. 1, as Hot valve, Oil valve, Carb. blast, Steam valve, Stack valve, and Gen. blast, and the parts so marked on the drawings may be

assumed to be the cylinders which operate them, and the piston rods of these cylinders may be assumed to show by full and dotted lines the rest positions of the apparatus valves whether open or closed. The full line positions of these piston rods correspond to a "blow" and the dotted line positions correspond to a "run." 3, generally are lamps for indicating the rest positions of the apparatus valves for the "blow" and for the "run," and, as indicated in Fig. 1, the lower row of lamps is for indication during the "blow" and the next upper row of lamps is for indication during the "run." The top row of lamps is for indicating that the current is on the circuit or that the circuit is alive. There are circuit connections for connecting the pair of lamps appertaining to the valves in separate branches from one side or sign of the circuit and these will be hereafter traced. 4, are double pole double throw switches or other appropriate switch provisions for connecting either of the lamp branches to the opposite side or sign of the circuit to light appropriate lamps for indicating the rest position occupied by the valves. 5, is an alarm interposed in a local circuit 6, including an electric battery or source of energy 7, a hand switch 8, and two relays 9 and 10, arranged when de-energized to close the circuit 6, and sound the alarm. There are circuit connections, to be hereafter traced, for connecting the relays 9 and 10, in branches from one side or sign of the circuit. Valve operated switch provisions, which may be parts of the switches 4, are arranged in series in the relay branches for connecting one or the other of the relay branches to the other side of the circuit when apparatus valves are in opened or closed rest positions in desired groups to silence the alarm by breaking the local circuit 6, by thus energizing the appropriate relay. If any of the apparatus valves fails to function properly and does not come to closed or open position as it should do in combination with the other valves for a "run" or a "blow," neither of the relays 9 and 10, is energized and the local circuit 6, is closed and the alarm is sounded. There is a circuit to be described for shunting the relays 9 and 10, to keep them closed and the alarm 5, silent during appropriate or intended movement of the apparatus valves, and this shunt circuit connection is controlled by carry-over mechanism 11 and 12, responsive to the elements 1 and 2, of the automatic control mechanism. In Fig. 5, the double pole double throw switch 4, is operated by a tappet rod 13, acted upon by a tappet 15, carried by the valve stem or piston rod, as the valve is reaching its open and closed rest positions. In Fig. 6, the double pole double throw switch 4, is acted upon through a link 16, and by the long arm of

a lever 17, pivoted intermediate of its ends, and having its short arm pivoted to the valve stem or piston rod. The arrangement of Fig. 6, is well adapted to steam and oil valves and the arrangement of Fig. 5, is well adapted to the other apparatus valves. In Fig. 4, is shown one of the carry over mechanisms and it consists of a contact 19, which closes the circuit during an interval of rotation of the cam 18, provided on the element 2. The circuit is shown as grounded through the cam because in the present instance the circuit used is the neutral and one side or wire of an alternating current three-wire system although the use of such a circuit is not necessary to the invention. A lead 20, from one wire 21, of the circuit is connected by wire 22, to a bus connection 23, so that this bus 23, may be said to be one side of the circuit. The pair of lamps 24 and 25, appertaining to the Gen. blast valve and arranged under "Gen." in Fig. 2, is connected in branches 26 and 27, to two of the contacts (at the right in Fig. 1) of the switch 4, of the "Gen. blast" valve. The arm or tongue of this switch is connected by a lead 28, to the neutral wire 29, constituting the other side of the circuit so that the position of the arm or tongue determines which of the branches 26 and 27, is connected to wire 28, and so determines which of the lights 24 and 25, is lighted. The position of the switch depends upon the rest position of "Gen. blast" valve and so the lamps 24 and 25, indicate, according to which is lighted, the position of the "Gen. blast" valve. The wiring of the other pairs of lights in respect to the switch of their valves is substantially the same as has been described. The lamps 30 and 31, arranged under S. V. in Fig. 2, relate to the stack valve. Fig. 1, and are disposed in branches 32 and 33, which lead to the two right hand contacts of the switch 4, of the stack valve. The position of the arm of this stack valve switch 4, determines which of the lamps 30 and 31, is lighted for this arm is connected by conductor 28^a, with conductor 28. The lamps 34 and 35, arranged under "Steam" in Fig. 2, relate to the steam valve, Fig. 1, and are disposed in branches 36 and 37, which lead to the two right hand contacts of the switch 4, of the steam valve. The position of the arm of this steam valve switch 4, determines which of the lamps 34 and 35, is lighted for this arm is connected by a conductor 28^b, with the conductor 28. The lamps 38 and 39, arranged under "Carb." Fig. 2, relate to the Carb. blast valve. Fig. 1, and are disposed in branches 40 and 41, of which 40, leads to one of the right hand contacts of the switch 4, of the "Carb. blast" valve and relates to the "off" position of that valve. When the "Carb. blast" valve is "off" or closed, the lead 40, is connected to wire 130

28, through arm of switch 4, of "Carb. blast" valve, lead 42, left hand arm of switch 4, of stack valve, lead 105, left hand arm of switch 4, of stack valve, lead 106, left hand arm of switch 4, of "Gen. blast" valve, and lead 28. When the "Carb. blast" valve is "on" or open, lead 41, is connected through left hand arm of switch 4, of Hot valve, lead 103, left hand arm of switch 4, of oil valve, lead 104, left hand arm of switch 4, of "Carb. blast" valve, lead 107, left hand arm of switch 4, of steam valve, lead 105, left hand arm of switch 4, of steam valve, lead 108, and left hand arm of switch 4, of "Gen. blast" valve to lead 28. The lamps 50 and 51, arranged under oil in Fig. 2, relate to the oil valve, Fig. 1, and are disposed in branches 52 and 53, which lead to the two right hand contacts of the switch 4, of the oil valve. The position of the arm of this oil valve switch 4, determines which of the lamps 50 and 51, is lighted for this arm is connected by conductor 28, with conductor 28. The lamps 55 and 56, arranged under H. V. in Fig. 2, relate to the Hot valve, Fig. 1, and are disposed in branches 57 and 58, which lead to two right hand contacts of the switch 4, of the Hot valve. The position of the arm of this Hot valve switch 4, determines which of the lamps 55 and 56, is lighted for this arm is connected by a conductor 28, with the conductor 28. The lamps 60 and 61, relate to the "run" and "blow" and they are in branches 62 and 63, from the conductor 23, to the branches 32 and 33, of the lamps 30 and 31. The lamps 60 and 61, are in parallel with the lamps 30 and 31, and are therefore controlled by the Stack valve, the position of which determines the "run" and the "blow." The lamps 70 and 71, are in parallel across the circuit by lead 20, and lead 72, and they show whether or not the circuit is energized. The number of lamps 70 and 71 is not important. Where two lamps are used the illumination is better than where only one is used.

The wiring for the "Carb. blast" lamps 38 and 39, in the particular instance illustrated in the drawings, differs from the wiring of most of the other pairs of lamps, but the difference does not change the principle and is due to conditions of the particular layout. As a practical matter if the lamps 38 and 39, indicate a wrong position of the carbureter blast valve, the indication is correct, but if the lamps 38 and 39, and the lamps of another valve make such an indication, the meaning is the last mentioned valve is out of time. The circuit 80—81, is provided with a snap switch 82, which is closed when blowing with the carbureter blast shut off and in that case this circuit

is a shunt for the left hand arm of the switch 4, of the "Carb. blast" valve.

The relays 9 and 10, are in branches 100 and 101, from one side of the circuit 21, by conductor 102. Branch 101, reaches the other side of the circuit or conductor 28, as follows: by 41, left hand arm of switch 4, of Hot valve, conductor 103, left hand arm of switch 4, of Oil valve, conductor 104, left hand arm of "Carb. blast" valve, conductor 107, left hand arm of switch 4, of Steam valve, conductor 105, left hand arm of switch 4, of Stack valve, conductor 108, left hand arm of switch 4, of "Gen. blast" valve, to 28. Thus all of the switches 4, are closed in series with the relay 10, and the relay 9, being de-energized, is closed, so that relay 10, is open and by breaking circuit 6, silences the alarm. If any one of the switches 4, is open by reason of defective functioning of its valve, the circuit through the relay 10, is broken, and relay 10, is de-energized, closing circuit 6, and sounding the alarm. When the valves are in the combination not shown in the drawings and appropriate for a "run," the branch 100, is closed by 40, right hand arm of the switch 4, of "Carb. blast" valve, lead 42, left hand arm of switch 4, of Steam valve, lead 105, left hand arm of switch 4, of Stack valve, lead 106, left hand arm of switch 4, of "Gen. blast" valve and conductor 28. Thus the switch provision 4, of "Carb. blast" valve, Steam valve, Stack valve, and "Gen. blast" valve are in series with the energized run relay 9, and the "blow" relay 10, is de-energized closing the path of circuit 6. If any of the valves last mentioned is out of proper position, the circuit through relay 9, is broken and in closing it completes circuit 6, and sounds the alarm. In the particular layout shown and during the "run" the alarm is not responsive to the Hot valve down position nor to the oil on position, but this is a matter of details in that particular layout. Even if the Hot valve is not down during each run or if the oil is not on during each run, no particular harm is done, but if any one thinks otherwise, alarm connections can be applied to the switches 4, of those valves in the manner fully described above.

When the controlling elements 1 and 2, are turning normally to position the apparatus valves for a run or a blow, it is desirable that the alarm remain silent. This is done by establishing a shunt circuit which keeps one or the other of the relays 9 and 10, energized and the energized relay keeps the local circuit broken and the alarm silent. The shunt circuit is from one side of the circuit 28, by 110, through one of the carry over devices 11 or 12, by 111, to lead 100, which connects by lead 102, with 21, the other side

of the circuit 115, is a shut down switch and it is interposed in the circuit 116, and adapted to short circuit the entire equipment during the interval when water gas set is shut down.

It will be obvious to those skilled in the art to which the invention relates that modification may be made in details of construction and arrangement without departing from the spirit of the invention which is not limited as to such matters or otherwise than as the prior art and the appended claims may require.

I claim:

1. An alarm signal system for automatic control water gas sets comprising the combination of apparatus valves and automatic control mechanism for opening and closing the valves in certain desired groups and at intervals, position indicating lamps for the valves, circuit connections for connecting the lamps of the valves in separate branches from one side of the circuit, valve operated switch provisions for connecting either branch to the opposite side of the circuit to light appropriate lamps for indicating the positions of the valves, an alarm, alarm controlling relays, circuit connections for connecting the relays in branches from one side of the circuit, valve operated switch provisions arranged in series in the relay branches for connecting one or the other of the branches to the other side of the circuit when the valves are in opened and closed positions in desired groups to silence the alarm, a shunt circuit for the relays, means responsive to the control mechanism for closing the shunt circuit during movement of the valves to silence the alarm, and a local alarm circuit open when either relay is energized and closed when both relays are de-energized.

2. An alarm signal system for automatic control water gas sets comprising the combination of apparatus valves and automatic control mechanism for opening and closing the valves in certain desired groups and at

intervals, position indicating lamps for the valves, circuit connections for connecting the lamps of the valves in separate branches from one side of the circuit, valve operated switch provisions for connecting either branch to the opposite side of the circuit to light appropriate lamps for indicating the positions of the valves relays, circuit connections for connecting the relays in branches from one side of the circuit, valve operated switch provisions arranged in series in the relay branches for connecting one or the other of the branches to the other side of the circuit when valves are in opened and closed positions in desired groups, alarm provisions responsive to the interruption of current through both relay branches, and means responsive to the control mechanism for silencing the alarm during intended movement of the valves.

3. An alarm signal system for automatic control water gas sets comprising the combination of apparatus valves and automatic control mechanism for opening and closing the valves in certain desired order and at intervals, signals for showing the positions of the valves, an alarm for indicating that a valve is stopped out of its proper limit position, switch provisions responsive to movement of the valves and circuit connections controlled by the switch provisions for operating the signals and the alarm, and means for controlling the circuit connections to silence the alarm so long as the valves are moving between their limit positions.

4. An alarm signal system for automatic control water gas sets comprising the combination of apparatus valves and their automatic control mechanism for opening and closing the valves in certain desired order and at intervals, an alarm, means controlled by the valves for silencing the alarm in the proper limit positions of the valves, and devices for silencing the alarm while the valves are moving between their limit positions, substantially as described.

JOHN HAWLEY TAUSSIG.