F. B. DAUGHERTY.

WATER GAS APPARATUS.

APPLICATION FILED JAN. 27, 1910.

960,839.

Patented June 7, 1910.

2 SHEETS—SHEET 1.

Fig. 2.

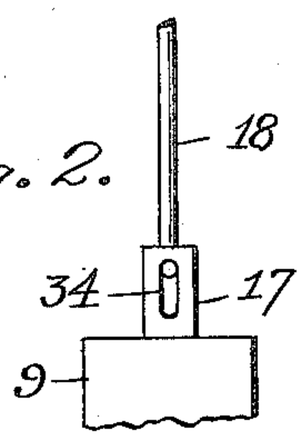

Fig. 1.

Witnesses

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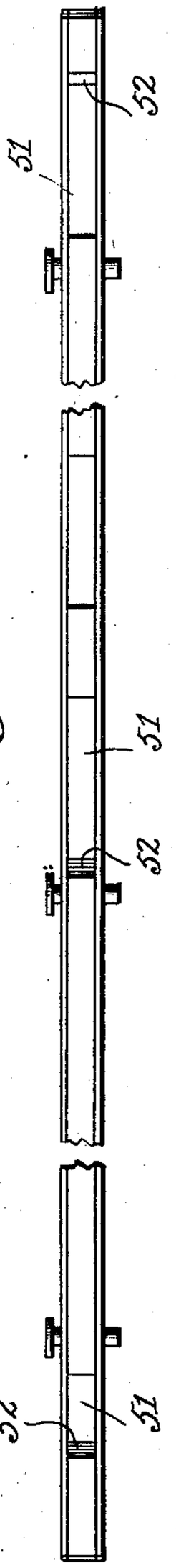

Fig. 3.

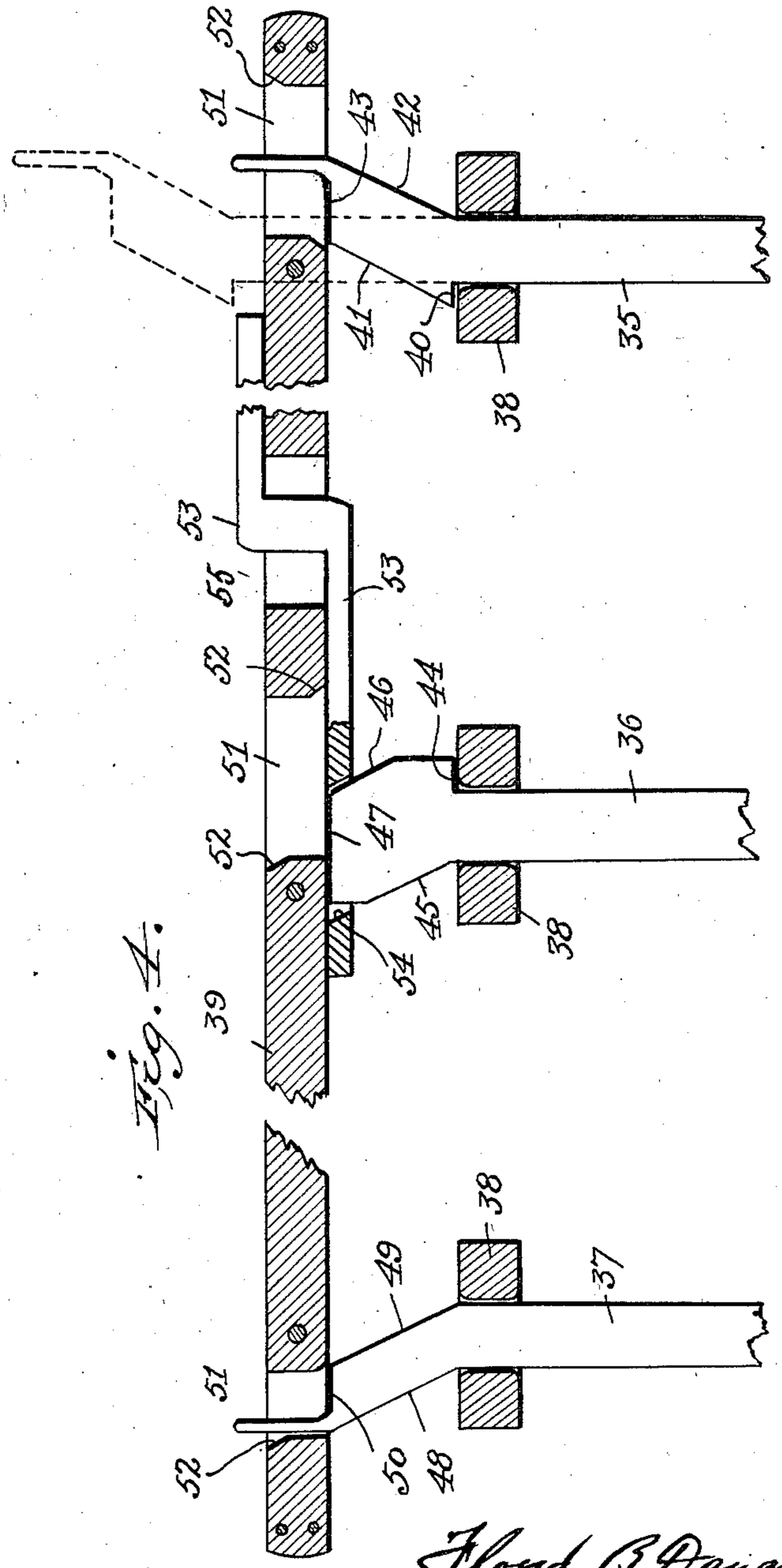

Fig. 4.

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UNITED STATES PATENT OFFICE.

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WATER-GAS APPARATUS.

960,839. Specification of Letters Patent. Patented June 7, 1910.

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To all whom it may concern:

Be it known that I, FLOYD B. DAUGHERTY, a citizen of the United States, residing in the county of Alexandria, State of Virginia, have invented new and useful Improvements in Water-Gas Apparatus, of which the following is a specification.

My invention relates to apparatus used in the manufacture of water gas, and more particularly to means for preventing the formation of an explosive mixture in the apparatus, and has for its main object to provide novel means for interlocking the valve controlling the admission of air to the generator, with the valve controlling the take-off pipe in such manner that when the blast pipe valve pipe is open to admit air to the generator or other parts of the apparatus the take-off valve must also be open and cannot be closed, and also when the take-off valve is closed the blast pipe valve cannot be opened.

A further object of my invention is to provide a connection between the blast pipe valve and its operating rod which will permit of a limited initial movement to said rod before said valve is started in its open movement, whereby the necessity for an accurate fitting of the interlocking mechanism is rendered unnecessary, as hereinafter described.

In the accompanying drawing:—Figure 1 is an elevation of a gas producing apparatus provided with my improved interlocking apparatus. Fig. 2 is a detail view showing the connection between the blast pipe-valve and its operating rod. Fig. 3 is a top plan view of a modified form of interlocking apparatus. Fig. 4 is a longitudinal sectional view of the same.

In the said drawing the reference numeral 1 denotes the generator of a water gas apparatus, 2 the carbureter, and 3 the superheater, all being of any well known type, the superheater 3 being provided with the usual take-off pipe 4 at its top, adapted to be opened and closed by a valve 5, and discharging into the usual stack 6. An air blast pipe 7 leads into the generator 1 through pipe 8, which latter is provided with a gate valve 9 for cutting off the air blast to the generator.

Mounted in any suitable manner, as upon the floor or platform 10, are the brackets 11, through bushings 12 of which passes an interlocking bar 13, the same having free longitudinal movement therein. Near each end said bar is recessed at 14 on one side, one face 15 of said recess being inclined, while the other face 16 is straight. Connected to an ear 17 fixed to the top of the air blast valve 9 is an operating rod 18, the same being guided in its vertical movement by a bracket 19 and by its passage through one of the brackets 11, as shown. Fixed to said rod 18 is a projecting plate 20 having an inclined or cam surface 21 at its upper end which terminates in a flat surface 22. A similar projecting plate 23 on the opposite side of said rod 18, and a little above the plate 20, is provided on its lower surface with a cam or incline 24, said plates 20 and 23 in the vertical movement of rod 18 moving in the recess 14 in bar 13 in a manner hereinafter to be described.

Fixed to the take-off valve 5 is a lever 25, which is in turn in slotted pivotal connection with an arm 26 fixed to the upper end of a vertical rod 27 which is guided in its vertical movement by its passage through the other bracket 11 and through a lower bracket 28. Said rod 27, like rod 18, is provided on one side with a plate 29 having an upper incline or cam 30 and a flat surface 31, and on its other side with a plate 32 having a lower incline or cam 33, said plates 29 and 32 corresponding with the plates 20 and 23 on rod 18.

The operation of my improved construction is as follows: With the parts in the position shown in Fig. 1, both the air blast valve 9 and the take-off valve 5 are open, the rod 18 being in its uppermost position, while the rod 27 is in its lowermost position. In this position the wide portion of plate 20 on rod 18 abuts against the straight face 16 of bar 13, thus preventing any movement of the latter to the left and bringing the face 16 of the other recess 14 in said bar in contact with rod 27 above plate 29, which latter, by reason of the contact of the flat surface 31 thereof with said bar 13 effectually locks rod 27 against upward movement, and thus retains take-off valve 5 in its open position, as shown, whereby the formation of an explosive mixture in the apparatus is prevented. When the rod 18 is forced downward the incline 24 on plate 23, by contacting with incline 15 in recess 14, will shift the bar 13 slightly to the left, thereby unlocking

rod 27 so that it may be raised to close blow-off valve 5. Should this be done the incline 30 will force said bar 13 still farther to the left until said bar in its thickened portion overlies flat surface 22 of plate 20, thereby locking rod 18 against upward movement so long as rod 27 is lifted and take-off valve 5 is closed. It will thus be seen that when take-off valve 5 is open and air blast valve 9 is closed, either of them may be shifted, but the shifting of one will lock the other against movement, so that at no time can the air blast valve 9 be open and the take-off valve 5 closed, which is the position liable to result in an explosive mixture in the apparatus.

Owing to extreme variations in temperature to which the interlocking apparatus is subjected at different seasons of the year, it has been found impracticable in apparatus of this character to have the parts accurately fitted to each other, because of their liability to bind and thus become inoperative under changes of temperature. On the other hand, with anything but an accurate fit of the parts, the air blast valve 9 is liable to be partially opened when the blow-off valve 5 is closed, with the consequent danger of the formation of an explosive mixture in the apparatus. This difficulty I overcome by making the connection between the air blast valve 9 and its rod 18 a loose one, as shown in Fig. 2, wherein the rod 18 is hooked into an elongated slot 34 in the ear 17 of said valve, whereby a limited amount of vertical movement is permitted to said rod 18 before it begins to raise and open the valve 9. With this construction an accurate fitting of the interlocking parts is rendered unnecessary, as a limited movement may thus be permitted thereto without danger of opening initially the air blast valve 9, said limited movement being ample to compensate for changes in temperature without danger of the parts becoming bound.

In many plants the air blast is connected to the carbureter, as well as to the generator, and in Figs. 3 and 4 I have illustrated a slightly modified construction wherein my improved interlocking mechanism is employed for controlling both of said air blast valves. In said construction the mechanism is shown located and supported above the blow-off valve, the numeral 35 denoting the generator air blast valve rod, 36 the carbureter air blast valve rod, and 37 the blow-off valve rod. The upper guides for said rods are shown at 38, and while the principle of operation is the same as in Fig. 1, the upper ends of said rods, where they engage with the interlocking bar 39, are shaped somewhat different. Thus, rod 35 has a shoulder 40, inclined sides 41 and 42, and upper recess 43; rod 36 has shoulder 44, inclined sides 45 and 46, and a flat top 47, which lies beneath bar 39 when said rod 36 is in its lowermost position; and rod 37 has inclined sides 48 and 49, and upper recess 50. The recesses 51 in the interlocking bar 39 receiving said rods are suitably beveled at their edges at 52, and said bar carries a slide 53 lying to the left beneath said bar and apertured at 54 to receive the rod 36, said slide passing vertically through an elongated recess 55 in bar 39 and lying on top thereof to the right.

With the parts in the position shown in Fig. 4 both of the air blast valves are closed and the blow-off valve is open. Should the rod 37 be lifted to close the blow-off valve, the bar 39 will be shifted to the right by inclines 48 and 49 to engage recess 43 in rod 35 and thus lock the latter in its lowermost position, the rod 36 remaining locked. Similarly, an upward movement of rod 35 will shift bar 39 to the left and lock rod 37, but will unlock rod 36, the full upward movement of rod 35 bringing it to the dotted line position. Upon now lifting rod 36 to open the carbureter air blast valve, the inclines 45 and 46 thereon will shift slide 53 to the right, independently of bar 39, and will project that end of the same beneath shoulder 40 on rod 35, thereby locking the latter in its open position. This slide 53 I employ for the reason that it has been found desirable to open the generator air blast valve before the carbureter air blast valve is opened, and also to close the carbureter valve before closing the generator valve. By this construction I provide the same interlock for the blow-off and generator air blast valves as in Fig. 1, and at the same time not only provide for interlocking the carbureter air blast valve, but also to separately interlock the same with the generator valve.

It will be understood that I do not confine myself to the details of construction shown, such, for instance, as the exact construction of the interlocking bars 13 and 39 and their manner of support, as the same may be varied within the scope of my claims without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a gas apparatus, the combination with an air blast valve, a blow-off valve, operating rods connected to each, and cams on said rods, of an endwise movable interlocking bar mounted in operative relation to said rods and provided with engaging surfaces operating in conjunction with the cams on said rods to reciprocate said bar endwise in such manner that it will engage the air blast valve rod to lock said valve closed when the blow-off valve is closed, and will engage the blow-off valve rod to lock said valve open when the air blast valve is open.

2. In a gas apparatus, the combination

with an air blast valve thereon, of means for operating said valve to open and close the same, said operating means having an initial opening movement independent of said valve.

3. In a gas apparatus, the combination with an air blast valve thereon, of a rod for operating said valve to open and close the same, said rod having an elongated slotted connection with said valve to permit an initial independent movement of said rod under the opening movement.

4. In a gas apparatus, the combination with an air blast valve, a blow-off valve, and interlocking mechanism operating to lock the air blast valve closed when the blow-off valve is closed, and to lock the blow-off valve open when the air blast valve is open, the operative connection of said air blast valve having an initial independent movement in its movement to open said air blast valve.

5. In a gas apparatus, the combination with a plurality of air blast valves, and a blow-off valve, of means for locking the air blast valves closed when the blow-off valve is closed, for locking the blow-off valve open when any of the air blast valves are open, and for successively locking and unlocking the air blast valves with respect to each other.

6. In a gas apparatus, the combination with a plurality of air blast valves, and a blow-off valve, of means for locking the air blast valves closed when the blow-off valve is closed, and for locking the blow-off valve open when any of the air blast valves are open, and separate means for successively locking and unlocking the air blast valves with respect to each other.

7. In a gas apparatus, the combination with a plurality of air blast valves, and a blow-off valve, of a sliding bar for locking the air blast valves closed when the blow-off valve is closed, and for locking the blow-off valve open when any of the air blast valves are open, and a separate slide for successively locking and unlocking the air blast valves with respect to each other.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FLOYD B. DAUGHERTY.

Witnesses:

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A. L. MAY.