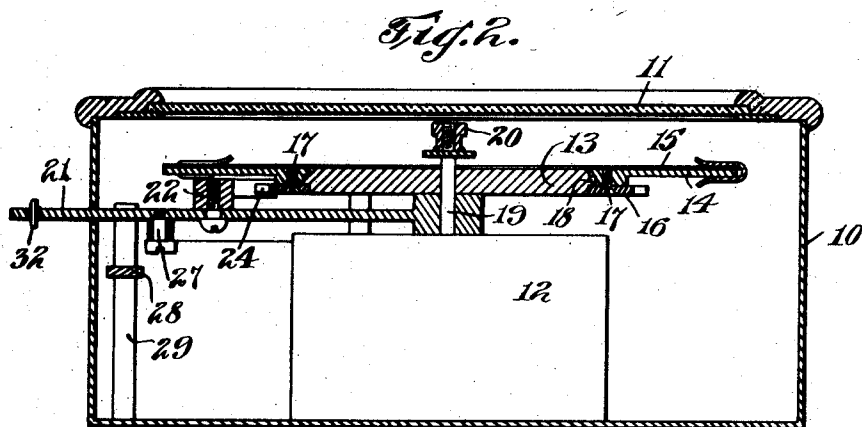
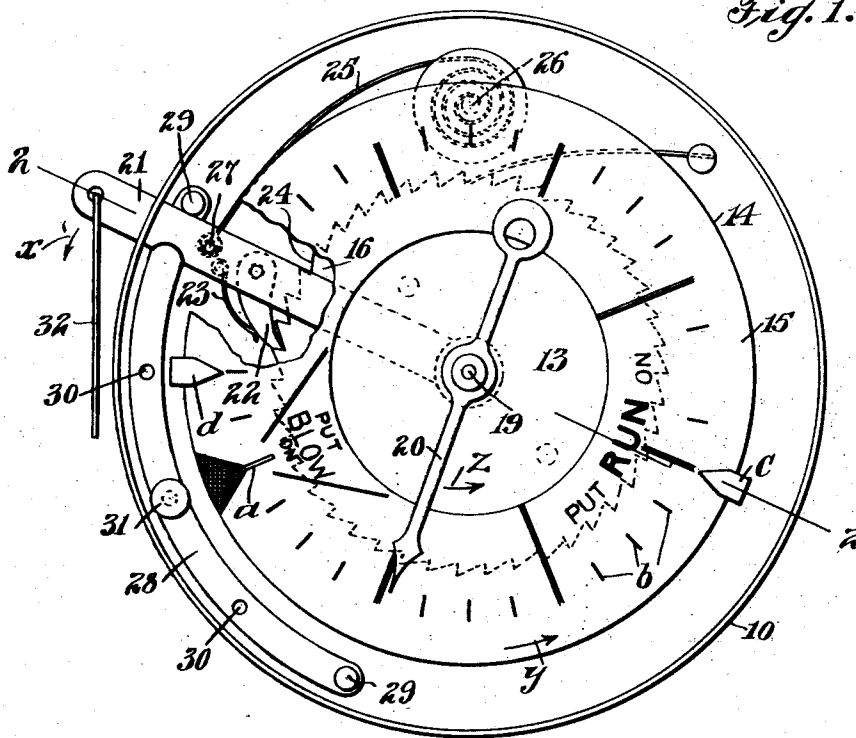


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 APPLIANCE FOR CONTROLLING THE MAKING OF WATER GAS.
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UNITED STATES PATENT OFFICE.

HERBERT N. CHENEY, OF BOSTON, MASSACHUSETTS.

APPLIANCE FOR CONTROLLING THE MAKING OF WATER-GAS.

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To all whom it may concern:

Be it known that I, HERBERT N. CHENEY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Appliances for Controlling the Making of Water-Gas, of which the following is a specification.

The process of making water gas consists of blowing air through a fire until a proper temperature has been reached, then shutting off the air and passing steam through the incandescent fuel, the steam forming with the carbon of the fuel, carbon monoxid, hydrogen and a small percentage of carbon dioxid of which the first two are combustible gases.

This operation is repeated again and again, the only interruption being when it becomes necessary to charge the fire with fresh fuel or to clean out ashes. It is of course understood that during the "blow", or time when air is passed through the fire, no steam is passed through and the products of combustion escape to the atmosphere, and that during the "run", or time when steam is passed through the fire, no air is passed through and the products resulting from the combination of steam and coal are sent into the gas mains after having been enriched in another part of the apparatus.

It has come to be common practice to make one cycle of operations, that is one run and one blow, in about eight minutes. Usually the blow is somewhat shorter than the run. Possible and common divisions are three minutes blow, five minutes run, and four minutes blow, five minutes run. Sometimes attempts are made to split minutes, but usually not with satisfactory results owing to the added burden of calculation thrown on the gasmakers, so that running by an ordinary clock the duration of the runs and blows is practically limited to even minutes or at the finest to half minutes.

The economy of operation is influenced very greatly by the rate of blowing air through the fire, and it is obvious that if there is a certain quantity of air to be passed through the fire and a certain desirable rate at which to pass it through, the division of the quantity by the rate would seldom if ever fall on an even number of minutes or half minutes.

My invention contemplates division of the cycle into the proper proportions, and to provide an appliance or means for dividing

the time of one cycle in any proportion required. To do this practically it is essential that no additional burden of competition shall be thrown on the gasmaker. And it is also preferable that there shall be a ready method of conveying to the gasmaker an indication of when the change shall be made from the blow to the run in order to vary the division of the cycle, such changes being frequently advisable on account of changes in the quality of the fuel. It is also to be borne in mind that after three or four cycles of the operation it becomes necessary to charge the fire with fresh fuel. This means stopping both the steam and the air, and causes a break in the operation which must be allowed for in the time mechanism used. Not only is there actual time lost in putting in the fuel, but it is sometimes desirable that after charging with fuel, the first or "coaling" blow shall be a little longer than the blow of the ordinary cycle. This extra blowing depends largely upon the quantity of moisture contained in the fuel, often a very variable quantity, so that in the time mechanism employed it is desirable that provision shall be made whereby the gasmaker can easily control his actions to add a variable amount of time to every coaling blow. That is, variable in the sense that the amount of time to be added can be fixed, after the proper examination of the conditions of the fuel.

Of the accompanying drawings,—Figure 1 is a plan view partly broken out of an appliance which I have invented for use in carrying out in an improved manner some of the steps of the process of making water gas. Fig. 2 represents a section on line 2—2 of Fig. 1.

It is to be understood at the outset that I do not limit myself to the particular appliance or means illustrated, my invention so far as it broadly concerns the appliance comprising two co-acting time-indicating elements of which, in the appliance illustrated, the hand 20, is one element and the dial 15 the other. One of these elements, the dial in the illustrated embodiment, is adjustable relatively to the other so that the period of time to be indicated for the blow may be lengthened any predetermined amount. Any form of appliance of this nature, having any kind of motor capable of imparting uniform movement to a pointer or a dial, one of said elements being

adjustable independently of the operation of the motor, may be employed in carrying out the improved method described and claimed herein.

5 In the embodiment of the appliance illustrated, a suitable casing is indicated at 10, said casing having a glass front portion 11. A motor such as clock mechanism is indicated conventionally at 12. Since any suitable type of motor might be employed, I have not attempted to illustrate the same in the drawings.

Suitably mounted within the casing is a fixed disk 13, around which a circular platform 14 is adapted to be moved. Mounted to rotate with said platform is a dial 15 having indications as hereinafter described. A ring 16, secured to the platform 14 by screws 17, provides for holding the platform in place, the disk 13 being formed with a peripheral rib 18, the upper and lower sides of which are engaged respectively by the inner edges of the members 14 and 16. For convenience of description I shall refer to the members 14, 15 and 16 as the dial.

A motor-actuated spindle 19 passes through the disk 13 and is provided with a hand or pointer 20 secured to its upper end. A lever 21 is freely mounted at its inner end on said spindle 19 and carries a pawl 22 which, by means of a suitable spring 23, is held in engagement with ratchet teeth 24 formed on the outer edge of the ring 16, the structure being such that movement of the lever 21 in the direction of the arrow *x* will rotate the dial in the direction of the arrow *y*. A spring 25 which is shown as of a coiled type having one end secured to a fixed post 26 and the other end connected with a pin 27 carried by the lever, serves to return the lever to its normal position which is that illustrated in Fig. 1.

Concentric with the axis of the lever and pointer, is a segment 28 mounted on end posts 29 and provided with a series of holes 30 in either one of which a stop pin 31 may be set. A suitable chain or a cord 32 may be connected to the end of the lever to enable the lever to be actuated from a more or less distant point.

The dial is provided with a fixed indicator *a* which may simply be a printed pointer. Adjacent said indicator are the words "Put Blow On". The dial is also marked with time divisions which in this particular embodiment consist of eight minutes, each minute being sub-divided into quarters. The heavy radial lines indicate the minute divisions and the small radial lines the quarter minute divisions. In the space between the second and fourth minute divisions to the right of the indicator *a*, the quarter minute indications are indicated at *b* and in this space are the words "Put Run On". An adjustable indicator *c* which may

consist of a simple clip having one end sharpened to a point, is employed in a manner hereinafter described. A second and similar adjustable indicator is shown at *d*.

In the use of an appliance such as illustrated, the gasmaker starts the blow when the hand or pointer reaches the indicator *a*. The hand is supposed to rotate once in substantially eight minutes. If the gasmaker is ready and does not wish to wait for the hand to reach the indication *a*, the lever can be actuated one or more times to shift the dial around until the indication *a* and the tip of the hand are in alinement. He then puts the blow on. It may be supposed, for instance, that the length of blow shall be exactly three minutes. In that case, the adjustable indicator or clip pointer *c* is placed on the dial in about the position shown in Fig. 1. Then when the hand has reached the indicator *c*, the gasmaker shuts off the air and turns on the steam, thus putting the run on.

It will now be readily understood that whenever, for any reason whatever, it is desired to change the relationship of the lengths of a blow and its succeeding run, it is only necessary to place the adjustable indicator *c* at the proper point and then shift from blow to run when the hand reaches the indicator *c*. When the indicator *c* has been placed in the proper position for the ordinary proportioning of the time, it is always possible to add time to either the blow or the run by simply advancing the dial in the direction of the arrow *y*, by means of the lever and pawl and ratchet. It is to be understood that the pointer or hand moves in the direction of the arrow *z*. Whenever said hand is in the division or spacing for either the blow or the run, a shifting of the dial in the direction of the arrow *y*, practically increases the length of that division and consequently adds to the time before the gasmaker would shut off the blow or the run. A particular time when it is desired to add to the time period is the coaling blow. Supposing the parts are in the position shown in Fig. 1 and it is desired that the coaling blow shall be four minutes instead of three. The blow having been put on and the hand 20 of course traveling but not having yet reached the indicator or pointer *c*, the gasmaker pulls the chain or cord 32 and this actuates the lever until it strikes the stop 31, said stop being in a hole in the segment which will permit the lever to actuate the dial a distance of one minute of the time period indicated thereon. It will therefore be a minute longer before the hand 20 will be in alinement with the pointer *c*. If the coaling blow should be five minutes, the stop 31 can be removed and then the lever actuated until it strikes the lower post 29. Of course the stop can be placed any-

where along the segment to determine the amount of movement which can be given to the lever to advance the dial in the manner indicated. A second adjustable pointer *d* may be employed to indicate the instant when the steam is to be reversed, to make the change from a down run to an up run or vice versa.

It will now be understood that my improvement in the process of making water gas consists in starting and closing a blow, (which may be a coaling blow) in accordance with two indications of time mechanism, these two indications being illustrated as the indicators *a* and *c*, their relationship, however, to the moving hand 20 being changed to increase the length of time that must elapse between the starting and closing periods, whereby the ordinary unchanged operation of the time mechanism will serve for indicating the time relationship of succeeding blows and runs.

I claim:

1. An appliance for use in controlling the relative time of the blow and run in making water gas, comprising two co-acting time-indicating elements, one of which has an actuating motor, means for directly adjusting one element relatively to the other independently of said actuating motor, and a stop for positively determining the amount of adjustment to a predetermined degree.

2. An appliance for use in controlling the relative time of the blow and run in making

water gas, comprising a movable dial having a fixed indicator for the blow-starting period, a series of indications for the run-starting period, a pointer adjustable along said series, a motor actuated pointer, means for adjusting the dial, and a stop for positively limiting the degree to which the dial can be adjusted.

3. An appliance for use in controlling the relative time of the blow and run in making water gas, comprising a movable dial having a fixed indicator for the blow-starting period, a series of indications for the run-starting period, a pointer adjustable along said series, a motor-actuated pointer, the movable dial having ratchet teeth, and a lever and pawl for shifting the dial.

4. An appliance for use in controlling the relative time of the blow and run in making water gas, comprising a movable dial having a fixed indicator for the blow-starting period, a series of indications for the run-starting period, a pointer adjustable along said series, a motor-actuated pointer, the movable dial having ratchet teeth, a lever and pawl for shifting the dial, and stops for said lever one of said stops being adjustable.

In testimony whereof I have affixed my signature, in presence of two witnesses.

HERBERT N. CHENEY.

Witnesses:

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P. W. PEZZETTI.