No. 722,876. PATENTED MAR. 17, 1903.

C. L. NELSON.

GAS REGULATOR.

APPLICATION FILED MAY 5, 1902.

NO MODEL

Fig. 1

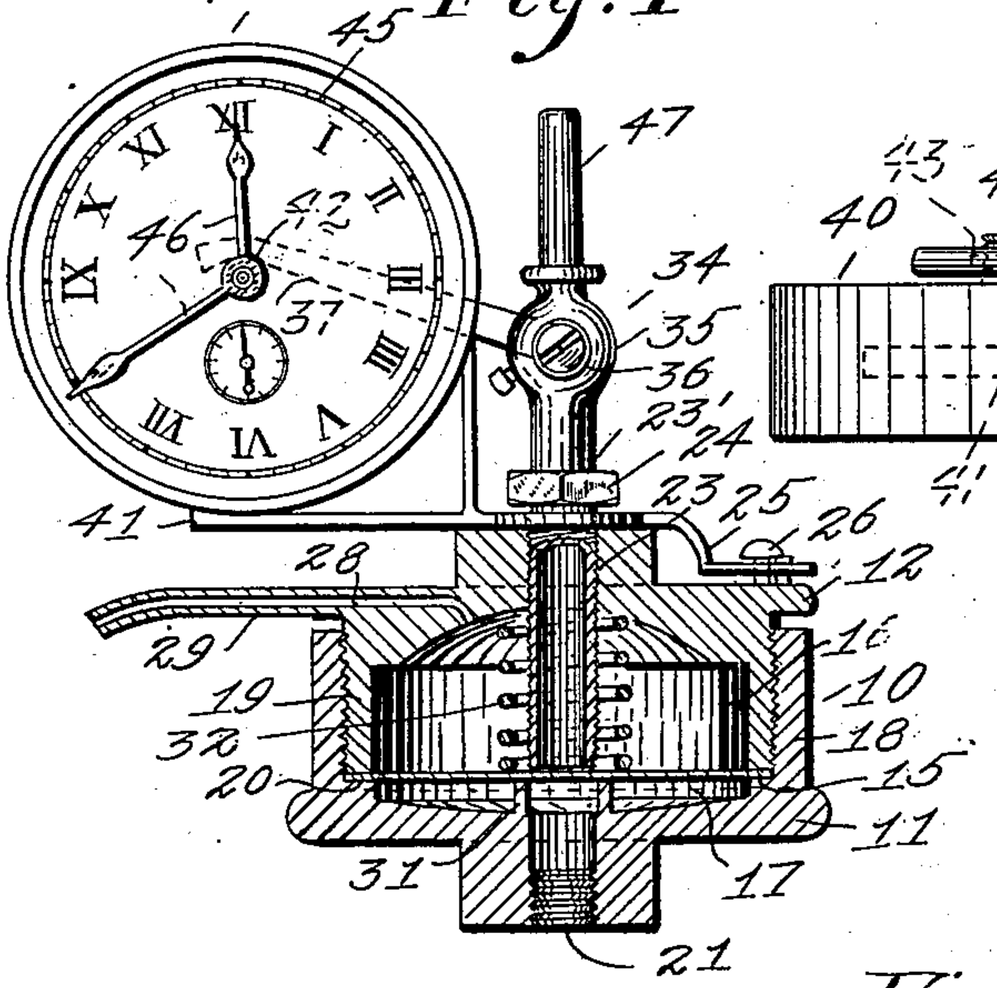


Fig. 2

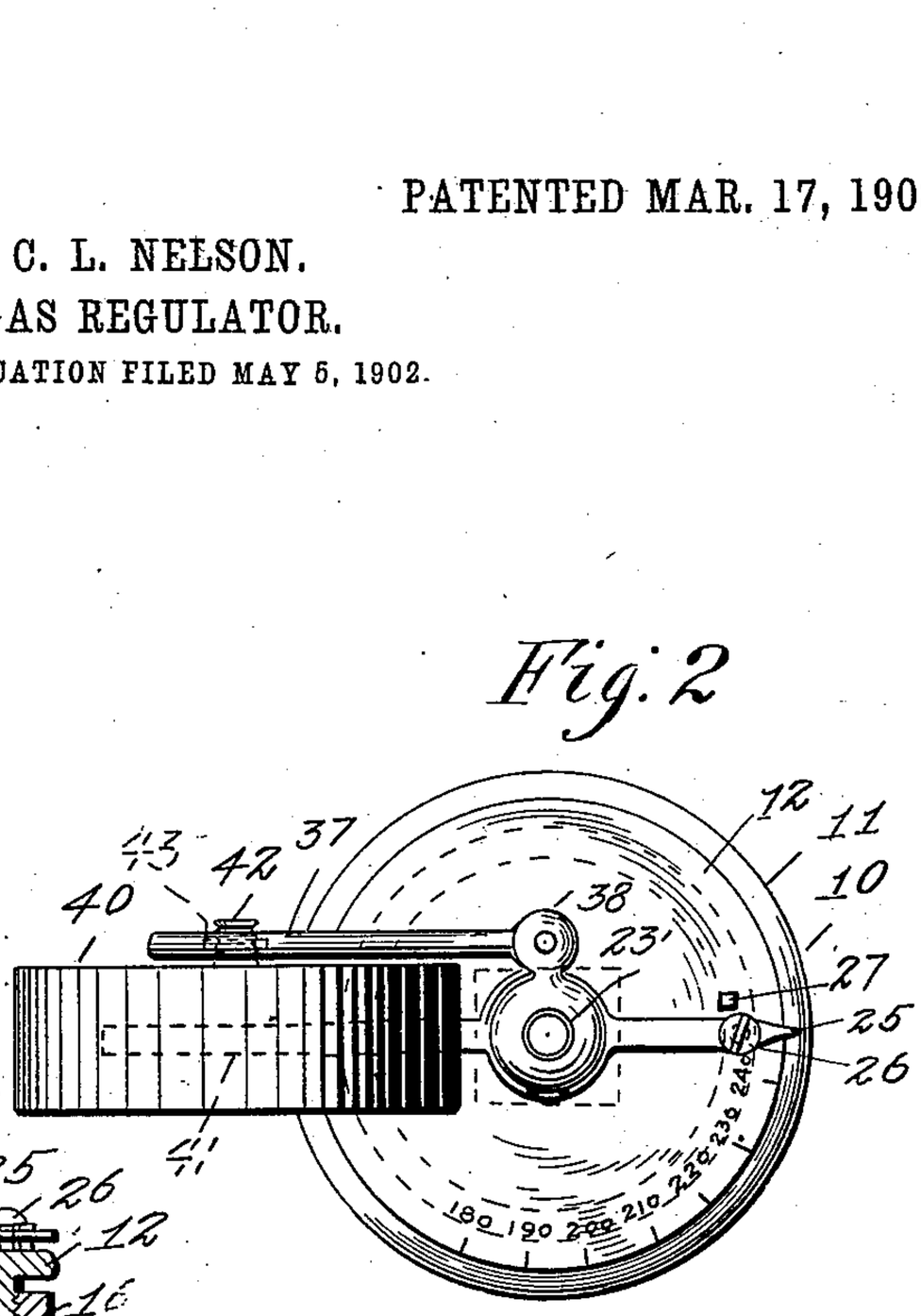
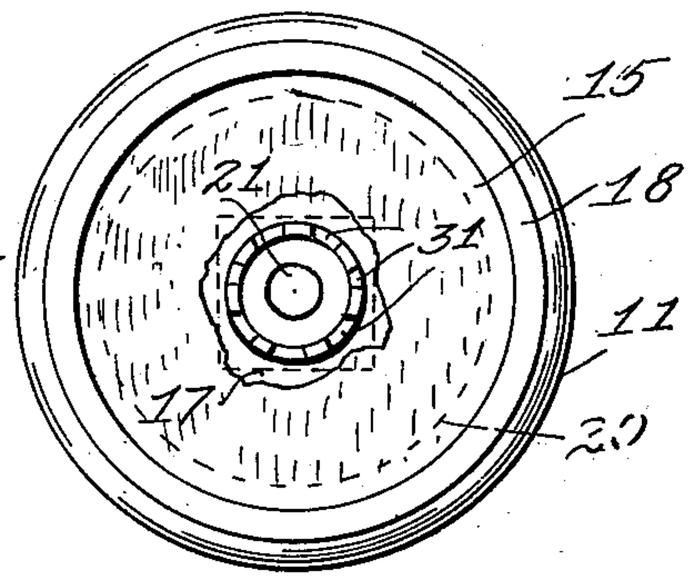


Fig. 3



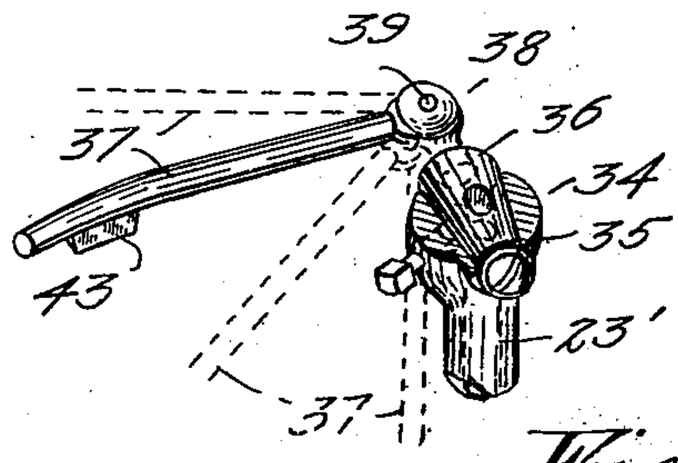


Fig. 4

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UNITED STATES PATENT OFFICE.

CARL LUDVIG NELSON, OF SEATTLE, WASHINGTON.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 722,876, dated March 17, 1903.

Application filed May 5, 1902. Serial No. 106,080. (No model.)

To all whom it may concern:

Be it known that I, CARL LUDVIG NELSON, a citizen of the United States of America, and a resident of the city of Seattle, county of King, and State of Washington, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification.

My invention relates to improvements in devices adapted to regulate the flow of gas to the burner of a vulcanizer, such as employed by dentists, and has special reference to a combined time and gas regulator of this nature.

Among numerous objects attained by this invention and readily understood from the following specification and accompanying drawings, included as a part thereof, is a production of a combined time and gas regulator embodying essential features of utility, durability, and general efficiency and which is inexpensive in construction, simple of adjustment, and compactly arranged.

The above-mentioned and numerous other objects equally as desirable are attained by the constructions, combinations, and arrangements of parts as disclosed on the drawings, set forth in this specification, and succinctly pointed out in the appended claims.

With reference to the drawings filed herewith and bearing similar reference characters for corresponding parts throughout the several views, Figure 1 is a vertical section of the casing of the gas-regulator with the time-regulator. Fig. 2 is a plan view of the device. Fig. 3 is a plan view of the casing with the cap removed and the diaphragm indicated therein, with a portion broken away to better disclose the step therebeneath. Fig. 4 is a perspective view of the valve adapted to control the flow of gas and indicates the body thereof in horizontal transverse section taken at the seat of the plug.

This invention includes a casing 10, which, as now considered, is rendered of cylindrical form and comprises a base part, as 11, and a cap 12, which are each formed with a substantially wide annular flange, as 18 and 19, respectively, on one side surface, the former of which is provided with screw-threads on the periphery and is rendered of suitable size to fit within the latter and engage suitable screw-threads formed in the bore thereof, whereby the base and cap are conveniently secured together. Within the casing 10 a suitable diaphragm 15 is conveniently seated, so as to divide the bore thereof into two chambers, as 17 and 16, which are respectively termed the "steam-chamber" and the "gas-chamber," and the seat for this diaphragm is preferably arranged at the base of flange 18 and comprises an annular ridge 20 of a width equal to the thickness of flange 19, the end surface of which is adapted to force and hold the margin of the diaphragm on said seat when the base and cap are screwed together, and thereby conveniently effect a tight joint between the said chambers. This diaphragm consists of a circular disk of thin flexible plate metal, preferably of resilient nature and which will spring upwardly when subjected to the pressure of steam admitted to the chamber 17, and thereby regulate the volume of gas admitted to chamber 16, as hereinafter set forth. In the present embodiment steam is admitted to chamber 17 through a suitable port 21, arranged in the lower end of base 11 and formed with screw-threads in the outer portion, by which a suitable conduit (not shown) adapted to convey steam is conveniently connected. In the end portion of cap 12 an aperture, as 23, is formed concentric with flange 19, and screw-threads are formed in the wall of this aperture to conveniently afford adjustable connection of a nozzle 23′, which is embodied in a suitable gas-induction conduit and preferably consists of a tubular section of suitable length to extend inwardly in casing 10 to the diaphragm 15 and provided with screw-threads throughout its length adapted to fit like threads in aperture 23, whereby the discharge end of this nozzle can be moved or adjusted relatively to the diaphragm by suitable rotation and the volume of gas which will pass to chamber 16 when the diaphragm is under a given pressure thus readily predetermined. As now considered, a shouldered portion, as 24, is formed on nozzle 23′ exterior to casing 10 and to which a wrench or the like may be applied to facilitate the adjustment of the nozzle, and a suitable indicator, as a laterally-projecting pointer 25, is rigidly connected to this nozzle, so as to turn therewith,

and is arranged to carry a screw, as 26, with the end thereof in close proximity to the top surface of cap 12 and whereby upon proper manipulation of the screw said end can be brought to impinge upon the casing, and thereby secure the pointer, and consequently the nozzle, at any desired point of adjustment. Suitable marks and figures can be placed on the casing 10 relatively to the nose of pointer 25 to indicate the resultant pressure of a predetermined adjustment of the nozzle, and a lug 27 is secured to the top of the casing in the path of movement of this pointer at a suitable point to prevent extreme outward adjustment of the nozzle, and consequently excessive pressure in the vulcanizer. The gas passes from chamber 16 through a suitable duct, as 28, at the outer end of which a nipple 29 is arranged on the casing for the connection of a conduit (not shown) adapted to convey gas from the regulator to the burner of the vulcanizer.

In the present embodiment of my invention a suitable lug is arranged on the bottom of chamber 17 to offer support to diaphragm 15 when brought to normal or inactive position, and as now considered this lug comprises a series of lugs, as 31, arranged concentric with nozzle 23′, whereby they are made to prevent depression or rupture of the diaphragm should the end of the nozzle be brought forcibly against same. The diaphragm is conveniently reinforced by a spring, as 32, which in the present embodiment comprises a cylindrical spiral disposed about the nozzle 23′ and confined between the under surface of cap 12 and the diaphragm, and thus made to act to normally yieldingly hold the diaphragm upon the lugs 31 and to insure the return thereof to normal position when released from steam-pressure, thus insuring uniform and positive action of the diaphragm regardless of the state of its own resiliency and prolonging its usefulness. These lugs provide channels for the passage of the steam or pressure fluid.

To control the flow of gas to the nozzle 23′, a valve, as 34, is connected at the outer end thereof, and this valve comprises a suitable body 35, having a port of ingress and a port of egress at opposite points, and a horizontally-disposed plug 36, having a single transversely-disposed passage-way and rotatably fitted in a suitable seat in said body, which body is formed with a nipple 47, arranged at the port of ingress, for the connection of a conduit (not shown) adapted to convey gas to the regulator. The valve-plug 36 is conveniently operated by an arm, as 37, which is connected to the stem thereof by a suitable knuckle-joint 38, including a vertically-disposed pivot 39, which allows the arm to swing in a horizontal plane, and this arm is rendered of sufficient weight to rotate the plug, and thereby close the valve when permitted to fall from a horizontal position. In the present instance a time-regulator is combined with this gas-regulator and comprises a clock, as 40, which is suitably mounted to move, with nozzle 23′, by means of a bracket 41, which is fixed to said nozzle, and this clock consists of the usual time mechanism, including a dial, as 45, and hands 46, and the minute-arbor 42 thereof is conveniently extended from the clock-case and is formed with suitable screw-threads, which are adapted to engage a tooth, as 43, arranged on the arm 37 adjacent its free end, so that rotations of the arbor will cause the arm to move therealong and finally fall from the end, and thereby close the valve. Thus the time required to make one revolution of the arbor 42 is the finest adjustment attainable. The time-regulator being mounted to move with the nozzle of the gas-regulator, the arm 37 and arbor 42 are always in position for engagement irrespective of the position of the nozzle, and the device is thus compactly arranged for ready and convenient adjustment for a higher or lower temperature or for a longer or shorter time, so that complete control is had of the vulcanizing process, and the apparatus once set for a predetermined temperature and time requires no further attention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a nozzle adjustably mounted on the casing relatively to said diaphragm, a valve carried by the nozzle, time mechanism mounted to move with said nozzle as adjusted, and valve-operating means normally operably associated with said mechanism.

2. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a rotatably-adjustable nozzle on the casing and arranged to discharge against said diaphragm, a valve carried by the nozzle, an arm pivotally connected to the stem of said valve and having a tooth at the free end, and time mechanism mounted on said nozzle to move therewith and having a screw-threaded arbor adapted for engagement of said tooth.

3. In a gas-regulator, the combination with a casing formed of two members, a flexible diaphragm seated therein and dividing the bore thereof, a support for the center of the diaphragm provided with channels at its upper end for the passage of the pressure fluid, and a diaphragm-reinforcing spring mounted in said casing to normally yieldingly hold said diaphragm upon said steps.

4. In a gas-regulator, the combination of a cylindrical casing comprising a base part and a cap fitting one within the other, a transversely-disposed flexible diaphragm seated in the casing, a support having a central opening and a series of channels at its top for the diaphragm and a port for ingress for steam in said base, a rotatable gas-inlet nozzle engaged by screw-threads in the cap concentric with the casing with the discharge end lying in

close proximity to the diaphragm and a diaphragm-reinforcing spring held by said cap part to yieldingly hold the diaphragm against said steps.

5. A combined gas and time regulator, comprising a cylindrical casing consisting of a base part and a cap fitting one within the other, a transversely-disposed flexible diaphragm seated therein, a steam-inlet arranged in the head of the base part and lugs on said head about said inlet to support the diaphragm, a rotatable gas-inlet nozzle engaged by screw-threads in the cap concentric with the casing with the discharge end lying in close proximity to the diaphragm, a cylindrical spiral spring seated on the diaphragm about the nozzle and confined by said cap, a valve carried by the nozzle, an arm pivoted to the stem of the valve, time mechanism mounted to travel with said nozzle and having a screw-threaded arbor adapted for engagement of said arm.

6. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a nozzle adjustably mounted on the casing relatively to said diaphragm, a conduit leading to the casing, a valve in the conduit in close proximity to said casing, time mechanism mounted on the casing and valve-operating means operable to said mechanism.

7. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a nozzle adjustably mounted on the casing relatively to said diaphragm, a valve carried by said nozzle, time mechanism mounted to move with said nozzle and valve-operating means operably related to said mechanism.

8. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a nozzle adjustably mounted on the casing relatively to said diaphragm, a valve carried by said nozzle, time mechanism mounted on said nozzle to move therewith and valve-operating means operably related to said mechanism.

9. In a gas-regulator, the combination with a casing, a diaphragm dividing the bore of the casing, a nozzle adjustably mounted on the casing relatively to said diaphragm, a valve carried by said nozzle, an arm pivotally connected to the stem of said valve and having a tooth at the free end, time mechanism mounted on said nozzle to move therewith and having a screw-threaded arbor adapted of reën-gagement of said tooth.

10. In a gas-regulator, the combination of a casing, a flexible diaphragm seated therein and dividing the bore of the casing, a nozzle adjustably mounted in the casing rotatively to said diaphragm and adapted to be brought to contact same, a tubular support, formed integral with the bottom of the casing and provided with a series of channels at its top for the diaphragm, and a pressure-fluid inlet in line with the tubular support.

Signed at Seattle, Washington, this 7th day of April, 1902.

CARL LUDVIG NELSON.

Witnesses:
FRED H. PETERSON,
O. E. WALLS.