No. 748,454. PATENTED DEC. 29, 1903.

R. WRIGHT & C. J. SIDDALL.

FEED DEVICE FOR FLASH GAS BURNERS OR LAMPS.

APPLICATION FILED MAY 11, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

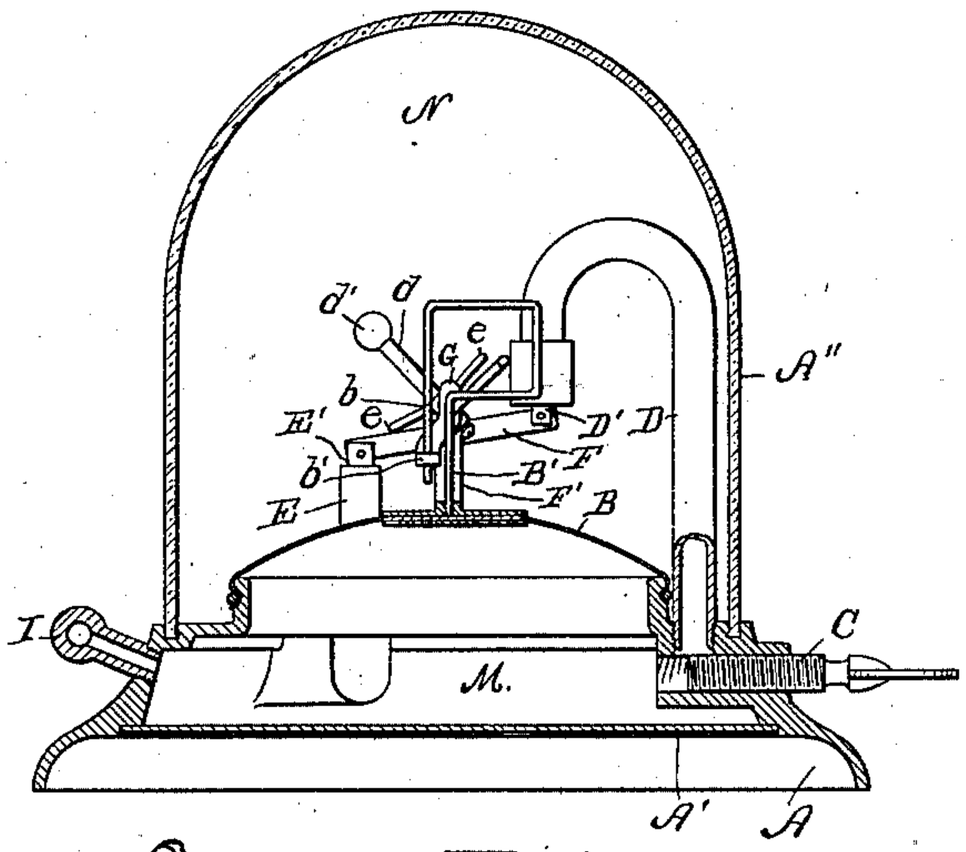

Fig. 1

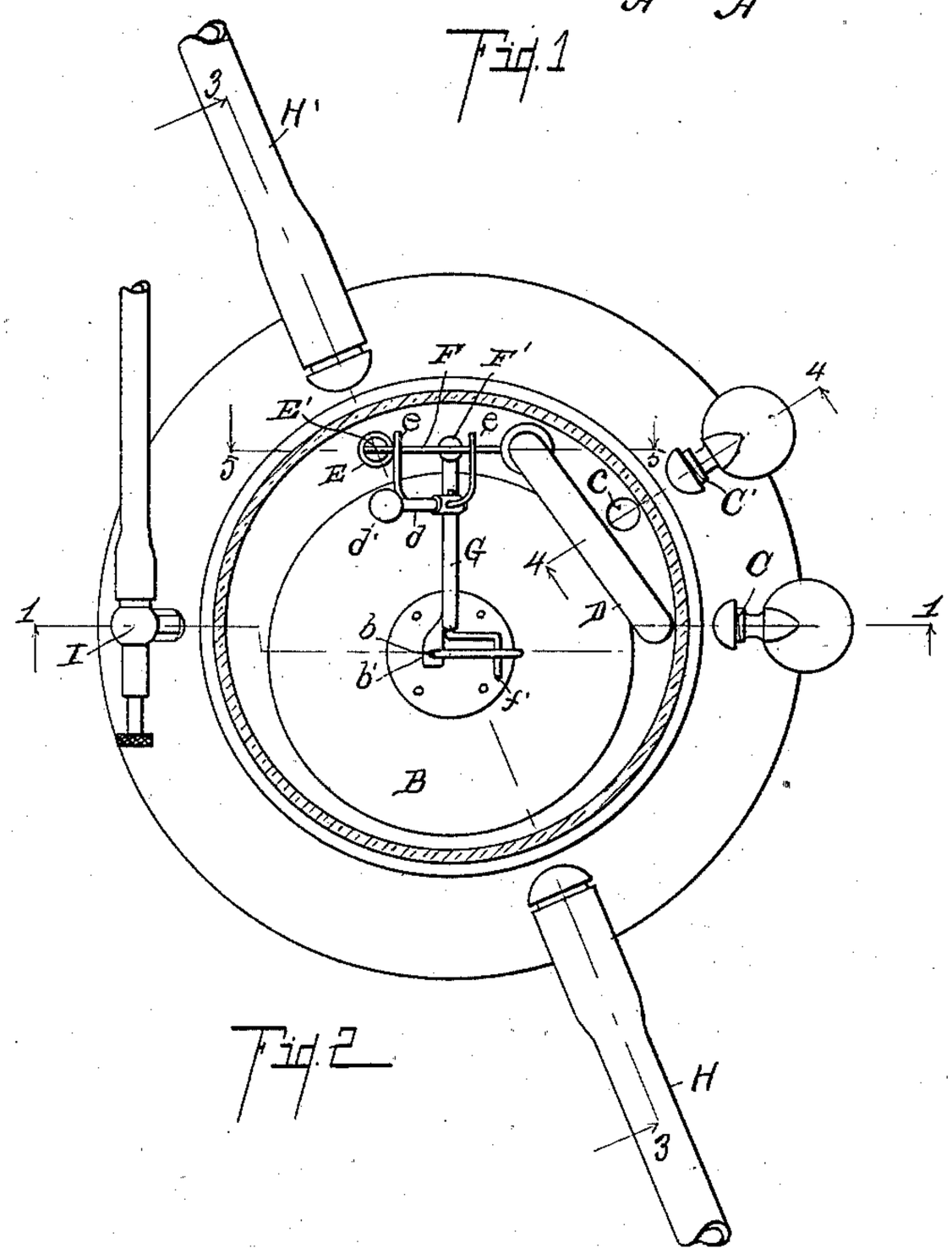

Fig. 2

Witnesses:

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Otis A. Earl

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NO MODEL. 2 SHEETS—SHEET 2.

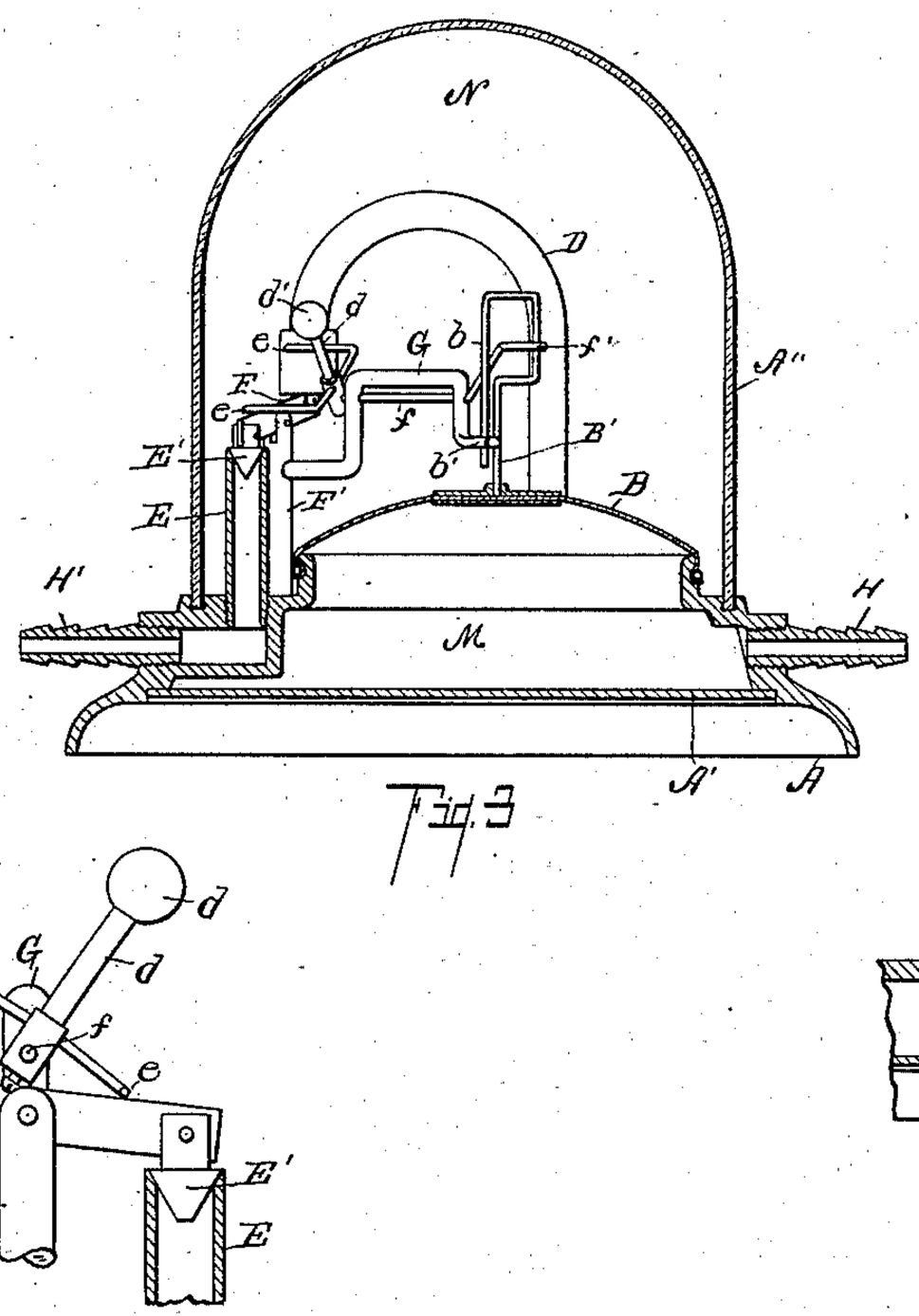

Fig. 3

Fig. 5

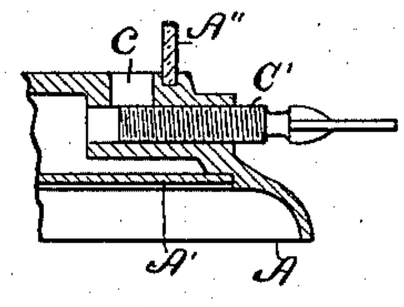

Fig. 4

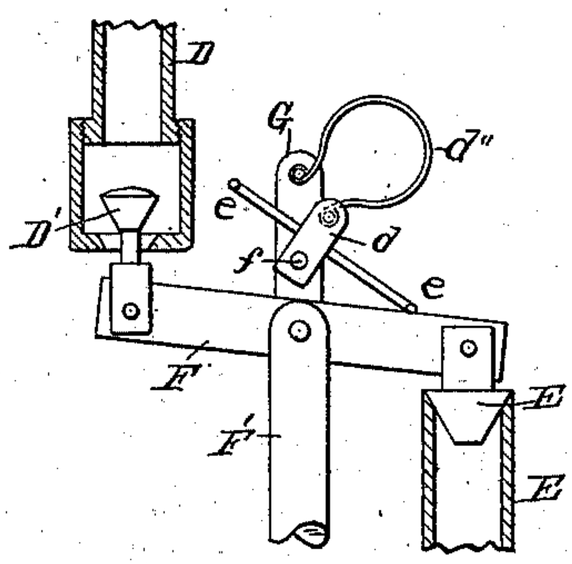

Fig. 6

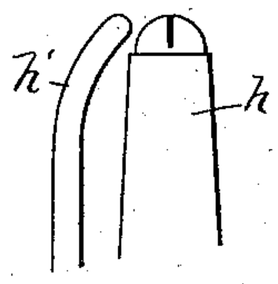

Fig. 7

Witnesses:

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Att'y.

No. 748,454. Patented December 29, 1903.

UNITED STATES PATENT OFFICE.

REGINALD WRIGHT AND CHARLES J. SIDDALL, OF KALAMAZOO, MICHIGAN.

FEED DEVICE FOR FLASH GAS BURNERS OR LAMPS.

SPECIFICATION forming part of Letters Patent No. 748,454, dated December 29, 1903.

Application filed May 11, 1903. Serial No. 156,638. (No model.)

To all whom it may concern:

Be it known that we, REGINALD WRIGHT and CHARLES J. SIDDALL, citizens of the United States, residing at the city of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Feed Devices for Flash Gas Burners or Lamps, of which the following is a specification.

This invention relates to improvements in feed devices for flash gas burners or lamps.

The objects of this invention are, first, to provide an improved feed device for flash gas burners or lamps by which the gas is intermittently delivered to the burners; second, to provide an improved automatic feed device for flash gas burners or lamps by which the quantity of gas delivered and the interval of operation can be regulated and automatically controlled; third, to provide an improved feed device for flash gas-burners which operates satisfactorily under varying conditions of gas-pressure; fourth, to provide an improved feed device for intermittently delivering gas to the burners which is simple, compact, and economical to produce and not liable to get out of repair. Further objects and objects relating to structural details will definitely appear from the description to follow.

The objects of this invention are accomplished by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of our invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical sectional view, taken on a line corresponding to line 1 1 of Fig. 2, of a structure embodying the features of our invention. Fig. 2 is a plan view of the structure appearing in Fig. 1. Fig. 3 is a vertical sectional view taken on a line corresponding to line 3 3 of Fig. 2. Fig. 4 is an enlarged detail view taken on a line corresponding to line 4 4 of Fig. 2. Fig. 5 is an enlarged detail view taken on a line corresponding to line 5 5 of Fig. 2. Fig. 6 is an enlarged detail view of a modification of our improved valve-controlling mechanism corresponding to the view shown in Fig. 5. Fig. 7 is a detail view of a gas-jet with pilot in proximity as used in a gas flash-light.

In the drawings the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, the base A is preferably in a shell open at the top and bottom, the bottom being sealed by a plate A′. A receiver A″ is supported upon the base A. The top of the base A, which extends upwardly within the receiver A″, is closed by a diaphragm B, of leather or other suitable flexible material, thus forming a receiving-chamber M below the diaphragm and a storage-chamber N above. The receiving-chamber M is connected to the storage-chamber N by a pipe D, also by an auxiliary passage *c*, (see Fig. 2,) which is controlled by a screw-valve C′.

The delivery-opening into the pipe D from the chamber M is controlled by the valve C. At the delivery end of the pipe D, which is gooseneck in form, so that it opens downwardly, is a valve D′, which is supported upon one end of the pivoted arm F. A suitable post F′ is provided for the support of this arm. On the opposite end of the arm F is a valve E′ for the delivery-pipe E of the storage-chamber N. The valve D′ is arranged within the pipe D, (see Fig. 5,) moving downwardly to close the opening. With this arrangement the gas-pressure assists in closing the valve.

Projecting from the post F′ over the diaphragm B is an arm G, which serves as a support for the rock-shaft *f*, which is formed into a crank *f′* at one end and carries the upwardly-projecting arm *d* at the opposite end. On the end of the arm *d* is a counterbalance-weight *d′*. Projecting from the arm *d* are arms *e e*, adapted to engage the ends of the pivoted arm F alternately.

The shaft *f* is controlled by an upwardly-projecting standard B′, carried by the diaphragm. This standard, which is preferably of wire, is formed into a loop at its upper end to allow the crank *f′* of the shaft *f* considerable freedom of movement independently thereof. The free end of the wire B′ is turned

downwardly at *b* to engage a perforation in the end *b'* of the arm G, which serves as a guide therefor, so that the parts can be formed of comparatively light material. This is, in effect, a trip device, the upper and lower part of the loop serving the functions of arms or fingers.

In operation the gas is delivered to the receiving-chamber M by the supply-pipe H. From the receiving-chamber M the gas is delivered into the storage-chamber N through the pipe D, which is controlled by the valve D' on one end of the pivoted arm F. The gas is delivered from the chamber N to the delivery-pipe H' by the pipe E, which is controlled by the valve E' on the other end of the arm F, so that when the valve D' is closed the valve E' is open, and vice versa. The parts are so adjusted that the valve D' is closed when the apparatus is in its initial position. The pressure of the gas in the chamber M raises the diaphragm to its highest position, which shifts the weighted arms *e* and reverses the position of the valves D' and E', closing the delivery-pipe E of the storage-chamber N and opening the supply-pipe D. This permits the gas to flow from the receiving-chamber M, and as soon as the pressure is equalized in the chambers M and N the diaphragm drops of its own weight, and through its connections the weighted arms *e e* are again shifted and the delivery-pipe D closed and the pipe E opened. The pressure in the receiving-chamber M again raises the diaphragm, and the operation is repeated. The auxiliary passage *c* is adjusted to permit a small amount of gas to pass therethrough, so that the frequency of the operation of the device is regulated and controlled thereby—that is, if a considerable quantity of gas passes through the auxiliary port or passage the diaphragm moves less frequently than when the greater portion is forced through the delivery-pipe D. The valve C for the pipe D may also be adjusted, which also affects the frequency of the operation. The device is therefore capable of complete adjustment for all practical purposes.

In the modified structure shown in Fig. 6 a spring *d''* is substituted for the counterbalance-weight *d'* for overcoming the dead-center and insuring a prompt and positive action of the valves. The counterbalance-weight is, however, preferred, as the spring requires considerable care in adjusting the tension and is liable to deteriorate with use by contact with the gas. The connection I is made to the receiving-chamber M to supply gas to the pilot of the burners. This connection could, however, be made directly with the supply-pipe of the receiving-chamber. This forms, however, a very convenient connection for the pilot. The main burner appears in Fig. 7 as *h* and the pilot as *h'*.

We have illustrated and described our invention in the form preferred by us on account of the economy of manufacture and durability in use. We are aware, however, that it is capable of very great variation in structural details without departing from our invention, and we desire to claim the same specifically as well as broadly.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. The combination of a receiver, a flexible diaphragm dividing said receiver into chambers M and N; a supply-pipe for said chamber M; a pipe D connecting said chamber M to said chamber N; a valve C for controlling said pipe D; an auxiliary passage *c* from said chamber M to said chamber N; a valve C' therefor; a delivery-pipe E for said chamber N; a pivoted arm F; an inwardly-opening valve D' for said pipe D carried on one end of said pivoted arm F; an outwardly-opening valve E' for said pipe E carried on the opposite end of said pivoted lever F; a rock-shaft *f;* arms *e e* on said rock-shaft, adapted to engage said pivoted arm F alternately; a projecting arm *d* having a weight *d'* on said rock-shaft; a crank *f'* on said rock-shaft; a standard B' carried by said diaphragm, adapted to engage said crank *f'*, whereby said rock-shaft is controlled, all coacting for the purpose specified.

2. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; a supply-pipe for said chamber M; a pipe D connecting said chamber M to said chamber N; a valve C for controlling said pipe D; a delivery-pipe E for said chamber N; a pivoted arm F; an inwardly-opening valve D' for said pipe D carried on one end of said pivoted arm F; an outwardly-opening valve E' for said pipe E, carried on the opposite end of said pivoted lever F; a rock-shaft *f;* arms *e e* on said rock-shaft, adapted to engage said pivoted arm F alternately; a projecting arm *d* having a weight *d'* on said rock-shaft; a crank *f'* on said rock-shaft; a standard B' carried by said diaphragm, adapted to engage said crank *f'*, whereby said rock-shaft is controlled, all coacting for the purpose specified.

3. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; a supply-pipe for said chamber M; a pipe D connecting said chamber M to said chamber N; a valve C for controlling said pipe D; an auxiliary passage *c* from said chamber M to said chamber N; a valve C' therefor; a delivery-pipe for said chamber N; a pivoted arm F; an inwardly-opening valve D' for said pipe D carried on one end of said arm F; an outwardly-opening valve E' for said pipe E carried on the opposite end of said pivoted lever F; a rock-shaft *f;* connections from said rock-shaft to said pivoted arm; a counterbalance on said rock-shaft; a crank *f'* on said rock-shaft; a standard B' carried by said diaphragm, adapted to engage said crank *f'*, all coacting for the purpose specified.

4. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; a supply-pipe for said chamber M; a pipe D connecting said chamber M to said chamber N; a valve C for controlling said pipe D; a delivery-pipe for said chamber N; a pivoted arm F; an inwardly-opening valve D′ for said pipe D carried on one end of said arm F; an outwardly-opening valve E′ for said pipe E carried on the opposite end of said pivoted lever F; a rock-shaft *f;* connections from said rock-shaft to said pivoted arm; a counterbalance on said rock-shaft; a crank *f′* on said rock-shaft; a standard B′ carried by said diaphragm, adapted to engage said crank *f′*, all coacting for the purpose specified.

5. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; means for supplying gas to said chamber M; a passage from said chamber M to said chamber N; a valve therefor; a pivoted lever by which said valve is controlled; a delivery-pipe for said chamber N; a valve therefor controlled by said lever; a rock-shaft adapted to control said lever; a counterbalance for said rock-shaft; connections from said rock-shaft to said diaphragm; an auxiliary passage connecting said chambers, and an adjustable valve therefor; all coacting for the purpose specified.

6. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; means for supplying gas to said chamber M; a passage from said chamber M to said chamber N; a valve therefor; a pivoted lever by which said valve is controlled; a delivery-pipe for said chamber N; a valve therefor, controlled by said lever; a rock-shaft adapted to control said lever; a counterbalance for said rock-shaft; connections from said rock-shaft to said diaphragm, all coacting for the purpose specified.

7. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; means for supplying gas to said chamber M; a passage from said chamber M to said chamber N; a valve therefor; a pivoted lever by which said valve is controlled; a delivery-pipe for said chamber N; a valve therefor, controlled by said lever; a rock-shaft adapted to control said lever; connections from said rock-shaft to said diaphragm; an auxiliary passage connecting said chambers, and an adjustable valve therefor, all coacting for the purpose specified.

8. The combination of a receiver; a flexible diaphragm dividing said receiver into chambers M and N; means for supplying gas to said chamber M; a passage from said chamber M to said chamber N; a valve therefor; a pivoted lever by which said valve is controlled; a delivery-pipe for said chamber N; a valve therefor controlled by said lever; a rock-shaft adapted to control said lever; connections from said rock-shaft to said diaphragm, all coacting for the purpose specified.

9. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a delivery-passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage from said storage-chamber; a valve therefor; a pivoted lever on which said valves are mounted; a counterbalance for said lever; connections from said diaphragm to said lever, whereby the same is rocked; an auxiliary passage connecting said receiving-chamber to said storage-chamber; an adjustable valve therefor; and connections from said diaphragm to said valve-operating means, for the purpose specified.

10. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a delivery-passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage from said storage-chamber; a valve therefor; a pivoted lever on which said valves are mounted; connections from said diaphragm to said lever, whereby the same is rocked; an auxiliary passage connecting said receiving-chamber to said storage-chamber; and connections from said diaphragm to said valve-operating means, for the purpose specified.

11. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a delivery-passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage from said storage-chamber; a valve therefor; a pivoted lever on which said valves are mounted; a counterbalance on said lever; connections from said diaphragm to said lever, whereby the same is rocked; and connections from said diaphragm to said valve-operating means, for the purpose specified.

12. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a delivery-passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage from said storage-chamber; a valve therefor; a pivoted lever on which said valves are mounted; connections from said diaphragm to said lever, whereby the same is rocked; an auxiliary passage connecting said receiving-chamber to said storage-chamber; an adjustable valve therefor; and connections from said diaphragm to said valve-operating means, for the purpose specified.

13. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a delivery-

passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage from said storage-chamber; a valve therefor; a pivoted lever on which said valves are mounted; connections from said diaphragm to said lever, whereby the same is rocked; and connections from said diaphragm to said valve-operating means, for the purpose specified.

14. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage for said storage-chamber; a valve therefor; connections from said valves to said diaphragm, whereby they are operated alternately; an auxiliary passage connecting said receiving-chamber to said storage-chamber; an adjustable valve therefor; for the purpose specified.

15. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage for said storage-chamber; a valve therefor; connections from said valves to said diaphragm, whereby they are operated alternately; an auxiliary passage connecting said receiving-chamber to said storage-chamber, for the purpose specified.

16. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a passage from said receiving-chamber to said storage-chamber; a valve therefor; a delivery-passage for said storage-chamber; a valve therefor; connections from said valves to said diaphragm, whereby they are operated alternately, for the purpose specified.

17. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a connecting-passage for said chambers; a valve therefor; connections from said diaphragm to said valve whereby said valve is opened when said diaphragm is in its distended position; an auxiliary passage connecting said receiving-chamber to said storage-chamber; and an adjustable valve for said passage, for the purpose specified.

18. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a connecting-passage for said chambers; a valve therefor; connections from said diaphragm to said valve whereby said valve is opened when said diaphragm is in its distended position; an auxiliary passage connecting said receiving-chamber to said storage-chamber, for the purpose specified.

19. The combination of a receiving-chamber; a storage-chamber; a flexible diaphragm between said chambers; means for supplying gas to said receiving-chamber; a connecting-passage for said chambers; a valve therefor; connections from said diaphragm to said valve whereby said valve is opened when said diaphragm is in its distended position, for the purpose specified.

20. In a flash-light apparatus, the combination of a receiving-chamber; a storage-chamber; a yielding partition between said chambers; means for supplying gas to the said receiving-chamber; a connecting-passage between said chambers; a valve therefor; a connection from said yielding partition to said valve, whereby said valve is operated by the movement of the partition; an auxiliary passage connecting said receiving-chamber to said storage-chamber; and an adjustable valve for said passage, for the purpose specified.

21. In a flash-light apparatus, the combination of a receiving-chamber; a storage-chamber; a yielding partition between said chambers; means for supplying gas to the said receiving-chamber; a connecting-passage between said chambers; a valve adapted to be operated by the movements of the yielding partition; an auxiliary passage connecting said receiving-chamber to the said storage-chamber; and an adjustable valve for said passage, for the purpose specified.

22. In a flash-light apparatus, the combination of a storage-chamber; a passage leading therefrom to a flash-light apparatus; means of intermittently controlling the passage from said storage-chamber; and means of supplying gas constantly to the storage-chamber, at a lesser rate than it is discharged therefrom, for the purpose specified.

In witness whereof we have hereunto set our hands and seals in the presence of two witnesses.

REGINALD WRIGHT. [L. S.]
CHARLES J. SIDDALL. [L. S.]

Witnesses:
OTIS A. EARL,
ETHEL A. TELLER.