

No. 618,802.

Patented Jan. 31, 1899.

T. PHILLIPS.
PREPAYMENT GAS METER.

(Application filed Oct. 10, 1896.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

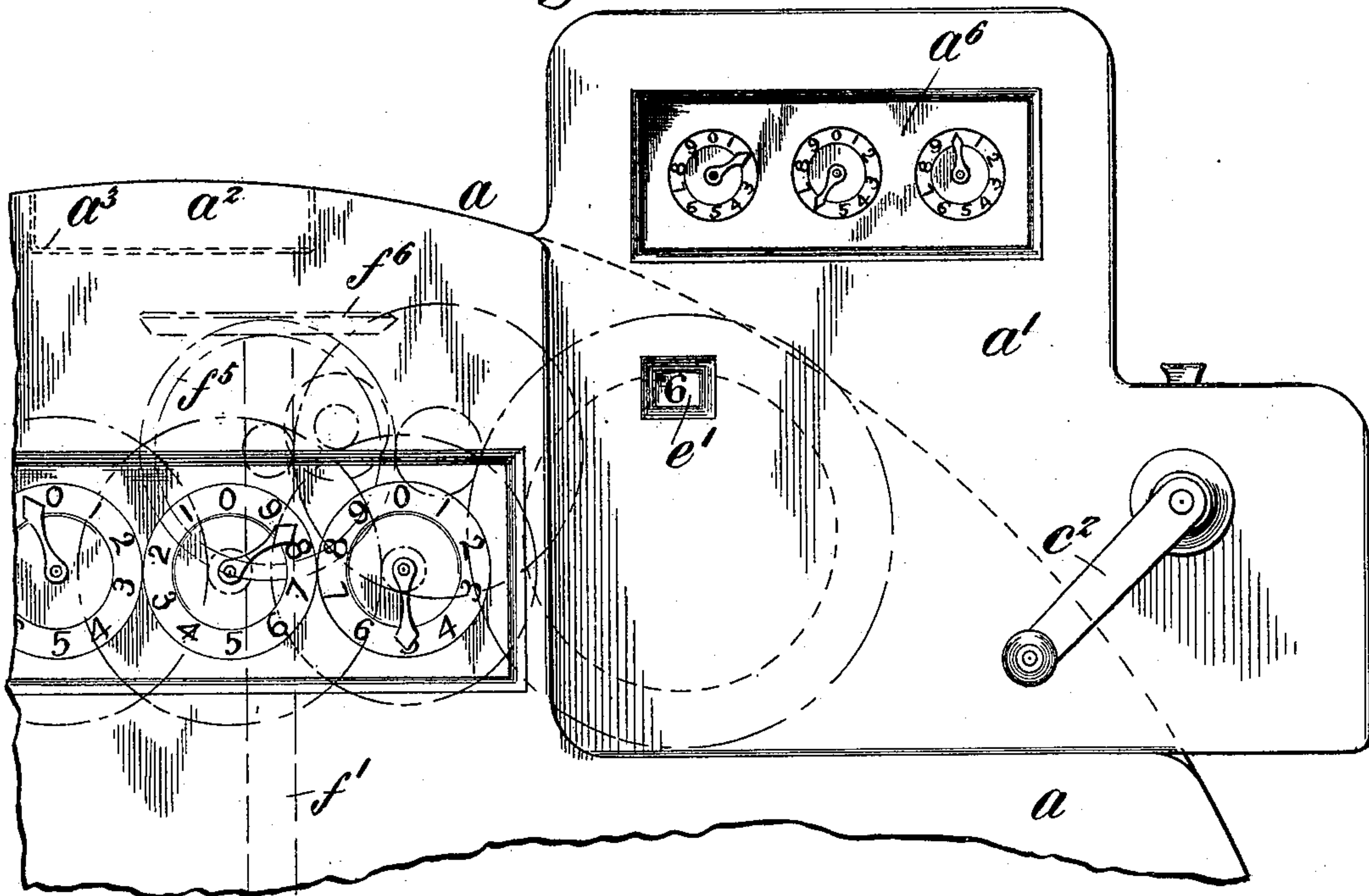
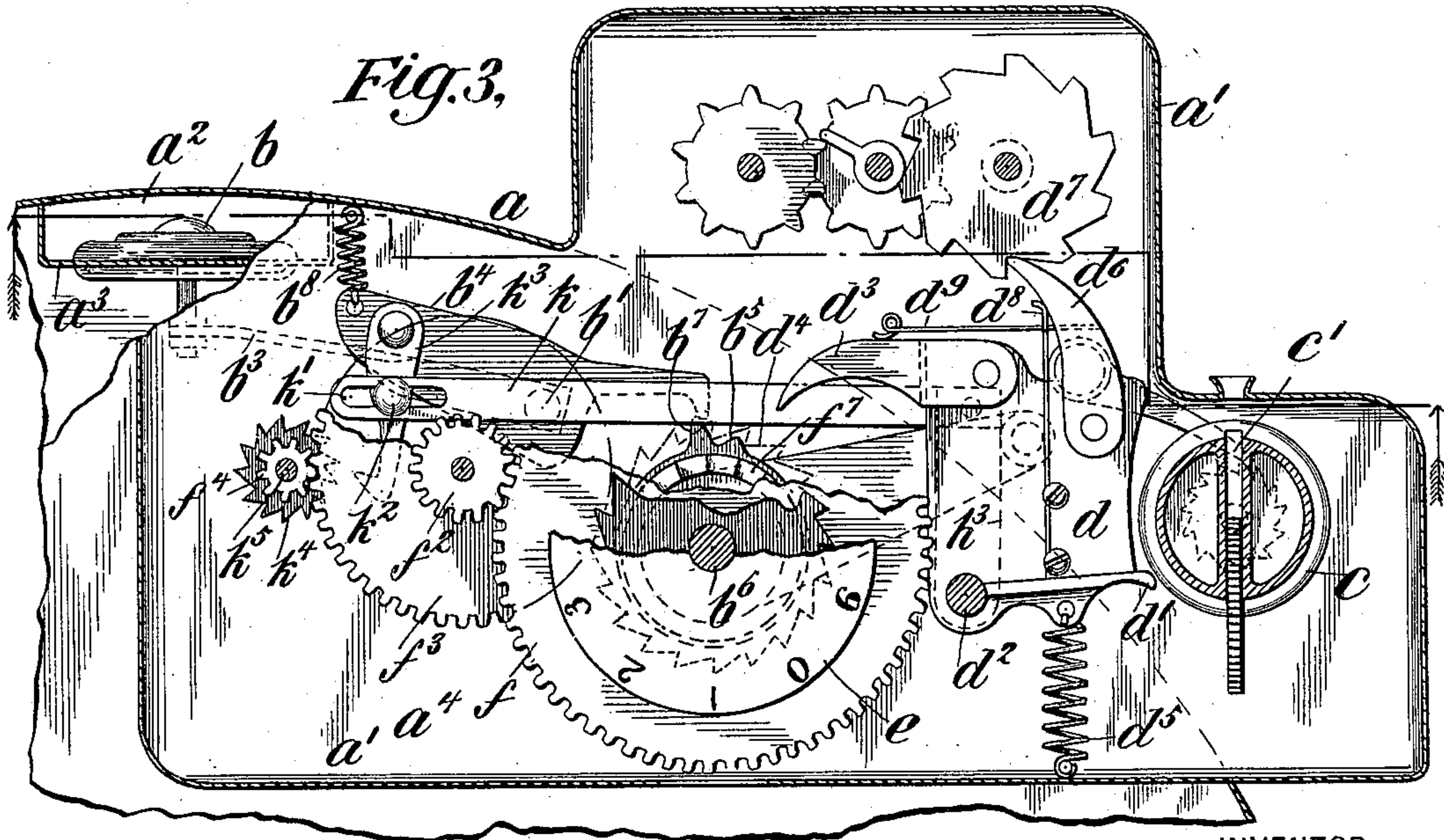


Fig. 3.



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No. 618,802.

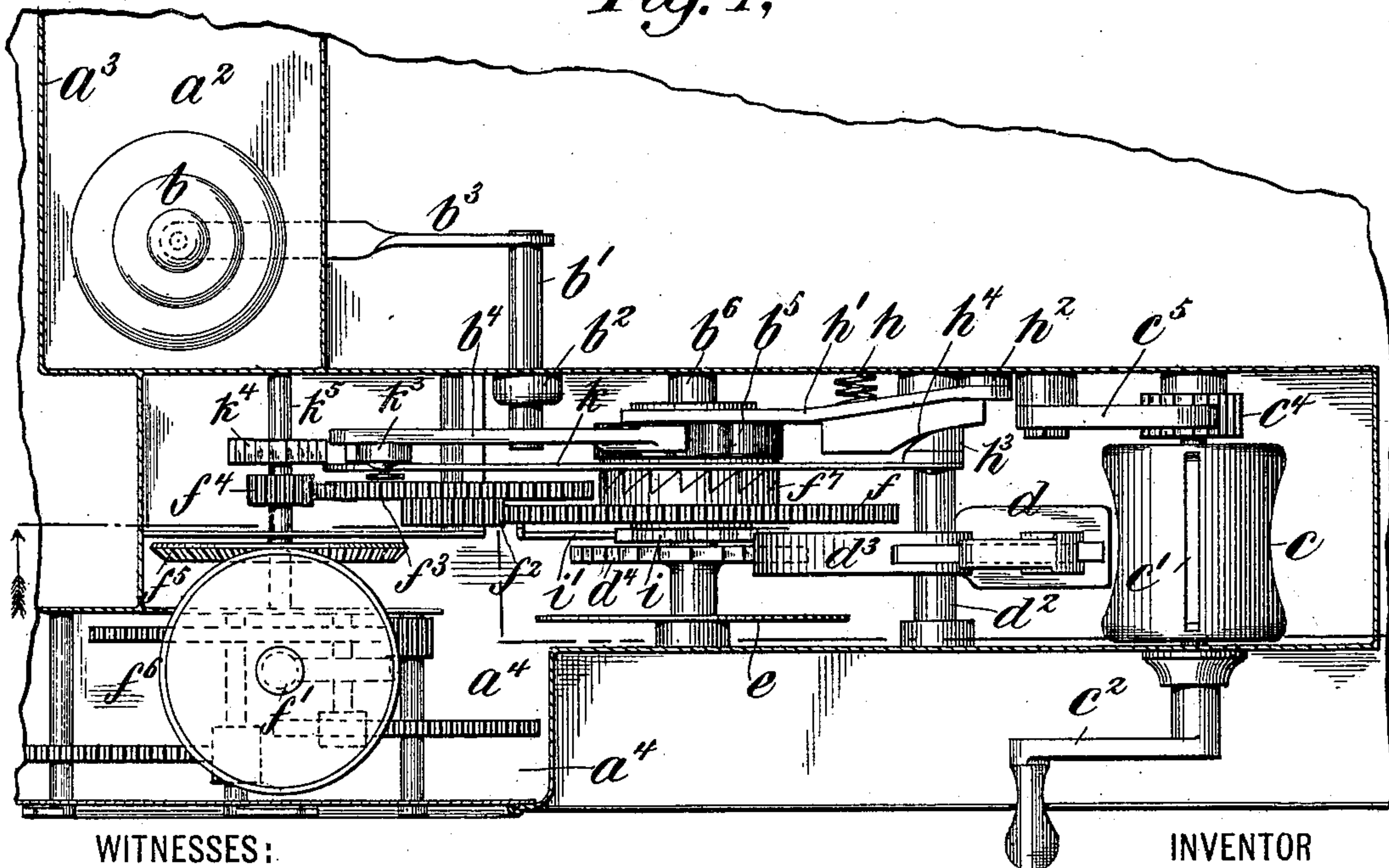
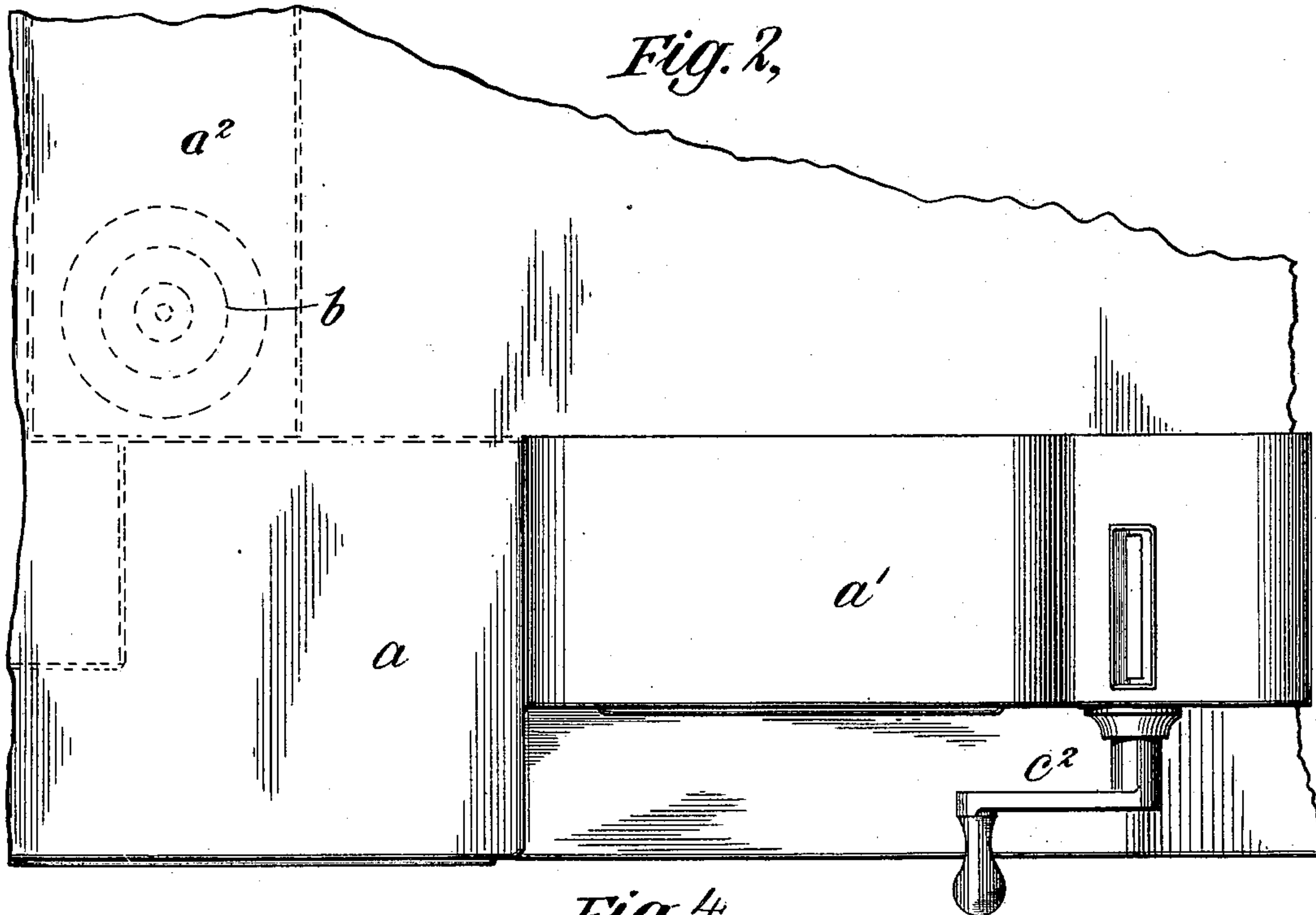
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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

THOMAS PHILLIPS, OF BRUSSELS, BELGIUM, ASSIGNOR OF ONE-HALF TO
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PREPAYMENT GAS-METER.

SPECIFICATION forming part of Letters Patent No. 618,802, dated January 31, 1899.

Application filed October 10, 1896. Serial No. 608,450. (No model.)

To all whom it may concern:

Be it known that I, THOMAS PHILLIPS, a subject of the Queen of Great Britain, residing at 5 Impasse du Sureau, Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Prepayment Gas-Meters, (for which I have obtained a patent in Great Britain, No. 18,891, dated March 5, 1896; in Belgium, No. 120,175, dated March 5, 1896; in France, No. 256,049, dated May 2, 1896, and in Germany, No. 91,792, dated May 12, 1896,) of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

This invention relates to prepayment gas-meters, and has for its object to combine with an ordinary gas-meter a coin-controlled mechanism whereby a user or consumer may obtain by inserting a coin or coins of a predetermined value into a suitable slot a certain predetermined amount of gas, which amount may be varied according to the number of coins inserted into the instrument. This object I secure by means of the construction and arrangement of parts forming my invention, as hereinafter set forth in detail, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a front elevation of a portion of the ordinary gas-meter with a construction embodying my invention applied thereto, certain of the parts, to be hereinafter referred to, being shown in dotted outline. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section through the line denoted by arrows in Fig. 4, with certain of the parts partly broken away to more clearly show the construction and arrangement of the parts located at the rear of the same; and Fig. 4 is a plan view through the line denoted by arrows in Fig. 3.

To explain in detail, a is the shell or casing of an ordinary gas-meter, which latter for the purposes of my invention may be of any desired construction, and a' is a shell or casing which may be formed integral with or connected to the casing a and which forms a chamber a^4 , adapted to inclose and support a portion of the operating mechanism embodying my invention separate from the meter-chamber, as shown.

According to my invention I have provided

a hermetically-closed chamber a^2 , which, as herein shown, is located on the inner side of the meter-casing a and formed by a suitable casing a^3 , which is secured to the latter, as shown. The gas is adapted to pass through this chamber a^2 to the outlet of the meter, and the quantity of such gas passing through or into the same is regulated by a suitable valve b , which latter is automatically operated by a coin-controlled apparatus, as will be described.

The valve b is normally closed, as shown in the drawings, when the meter is not in operation, so as to prevent any gas from passing into or through the chamber a^2 , except by the insertion of a proper coin into the instrument, and thereby setting in operation a train of mechanism, which is as follows: A shaft b' , as more clearly shown in Figs. 3 and 4, is mounted in a suitable bearing b^2 in the chamber a^4 , with one end thereof extending outwardly through the wall of the latter and provided with a fixed arm b^3 thereon, which has connection with the said valve b at a point exterior of the chamber a^2 , as shown, and the inner end of said shaft being provided with a controlling-lever b^4 , having a fixed connection therewith, as shown. This lever b^4 engages at one end thereof with the periphery of a cam or disk b^5 , which is secured upon a shaft b^6 , mounted in suitable bearings in the chamber a^4 , which disk is provided with a raised surface or projection b^7 at a certain point on its periphery, which is adapted to be in a position beneath the engaging end of the lever b^4 when the meter is not in operation, so as to hold the end of said lever in a raised position, as more clearly shown in Fig. 3, and thereby hold the valve b in a lowered closed position. The said disk b^5 is adapted to be rotated so as to move the projection b^7 thereon from beneath the engaging end of the lever b^4 , and thereby allow the latter to be moved by an engaging spring b^8 , so as to give the shaft b' a partial rotation, whereby its arm b^3 will be raised, and consequently open the connecting-valve b , in a manner as follows: A revolving drum c , provided with a coin-receiving slot c' therein, is mounted within the chamber a^4 and provided with a connected handle c^2 , located outside of the said chamber, by which it is op-

erated. The slot or opening c' in this drum c is of greater width at one end thereof (being its receiving end) than the other, so as to allow a coin to be inserted part way through the same and projecting its lower side, as shown in Fig. 3, which projecting coin engages with and operates certain mechanism when the drum is turned, as will be described. If the coin is not of the proper dimensions, it will either not enter the slot or will fall through the same, in which case no action of the mechanism would result.

When a proper coin has been inserted into the drum c , as shown in Fig. 3, the drum is turned and the projecting coin is caused to engage with one end d' of a pivoted lever d and raise such engaging end, so as to tilt the lever forward upon its supporting-shaft d^2 and cause a pawl d^3 , secured thereto, to engage with a ratchet-wheel d^4 , secured upon the shaft b^6 , which carries the disk b^5 , and give the same a partial rotation, thereby moving the projection b^7 on said disk toward the left from beneath the end of the lever b^4 , so that the latter may be operated to open the valve b , as before described. After the drum has been turned sufficiently to operate the lever d , as described, a continued turning of the same brings the slot c' , or the coin therein, in such position relative to the lever d that the latter under the action of the connecting-spring d^5 forces the coin back through the larger end of the slot c' and out of the drum, from which it is adapted to fall into a suitable receiving-receptacle. (Not shown in the drawings.) After the coin has been forced from the drum c the lever d is then returned to its normal position, as shown, under the action of the said spring d^5 .

The drum c is allowed movement in one direction only by means of a connecting-ratchet c^4 and pawl c^5 , as more clearly shown in Fig. 4.

The shaft b^6 , upon which the disk b^5 is mounted, has an operative connection with the spindle of the ordinary index-meter by means as will hereinafter be described, from which the said shaft, and thereby the disk b^5 thereon, is caused to turn toward the right or in a direction opposite that in which it is moved by the lever d during such time as the gas is passing from the meter. Such being the fact, it will be readily understood that as the projection b^7 on the disk b^5 is moved toward the left a certain distance from under the engaging end of the lever b^4 by the insertion of a coin into the drum c and the resulting action of the lever d upon the ratchet d^4 the said projection will be moved a further equal distance in the same direction for each additional coin inserted into the instrument, and consequently secure a proportionate increase in the supply of gas. In this manner the consumer is enabled to secure just such a supply of gas, either in large or small quantities, as he may desire. As the gas is consumed and acts upon the meter-index the action of the latter causes the projection on the

disk b^5 to move toward the right, and according to the distance which the said projection has moved toward the left the time occupied in its moving back beneath the end of the lever b^4 to raise the same and thereby close the valve will be regulated accordingly, as will be obvious. e represents a dial which is secured upon the shaft b^6 so as to rotate therewith and is located thereon in a position adjacent to the front wall of the casing a' , so that the numbers thereon may be visible through an opening e' in the latter, as shown in Fig. 1. The purpose of this disk is as follows: It will be understood that the meter is arranged to receive any number of coins one after the other at one time, and as each coin is inserted into the instrument the shaft b^6 is given a partial rotation through the action of the lever d upon the ratchet d^4 . The numerals upon the dial e are so arranged that for each movement of the disk b^5 toward the left, as caused by the insertion of a coin, the dial e will also be turned to move the proper numeral into position before the opening e' to denote the number of such coin. The dial will thus show the number of coins inserted into the instrument and accordingly the amount of gas due the consumer as based upon its value, and as the dial is turned backward with the disk b^5 , as caused by the supply of gas passing from the meter, the consumer will thereby be enabled to ascertain at any time just how much gas, as denoted by its value, remains unconsumed before the valve closes.

The lever d is provided with a second pawl d^6 , pivotally connected therewith, which engages with a ratchet d^7 , having connection with the first wheel of an index, as clearly shown in Fig. 1. This index, which is also visible from the exterior of the casing through an opening a^6 therein, as shown in Fig. 1, is adapted to register the number of coins put into the slot for any desired length of time and is operated as follows: As each coin is inserted into the drum c and the latter is operated to cause such coin to engage with the lever d and give the same a forward tilting movement for the purpose hereinbefore set forth, such movement of the lever d also causes the pawl d^6 to move the ratchet d^7 one tooth, and thereby registers the insertion of such coin. As the lever d is returned to its normal position by the spring d^5 the pawl d^6 is also moved backward to engage with the preceding tooth of the ratchet d^7 . The said pawl d^6 is movably held in its normal position in engagement with the ratchet d^7 by means of an engaging spring d^8 , which is secured upon the lever d . The other pawl d^3 , as herein shown, is connected with said pawl d^6 by means of a light spring d^9 , so that its end is raised from engagement with the ratchet d^4 upon the return of the lever d to its normal position, so as not to interfere with the return movement of the shaft b^6 and the parts supported thereon.

I will now describe the connection between the ordinary index-spindle of the meter and the disk b^5 , whereby the latter may be operated independently of the former when its projection b^7 is moved toward the left by the lever d and then be automatically connected, so that the said projection b^7 will be moved backward to its position beneath the end of the lever b^4 by the action of said index-spindle and close the valve b . A gear-wheel f is loosely mounted upon the shaft b^6 and is connected with the spindle f' (shown in side elevation by dotted lines in Fig. 1) of the ordinary meter-index through the medium of a train of gearing f^2, f^3, f^4, f^5 , and f^6 , as clearly shown in Fig. 4. The disk b^5 has a clutch connection, as at f^7 , with the gear f , so as to be moved in a direction toward the right with and by the latter and is normally held in such connection by means of a spring h , acting upon a lever h' , which latter is pivotally connected at one end h^2 with the casing a' and at its opposite end is connected with the said disk b^5 . In order that the latter when about to be turned toward the left by the insertion of a coin, as described, may be automatically disengaged from connection with the gear f and so move independently of the same, I have provided the shaft d^2 with a fixed arm h^3 , (shown in dotted lines in Fig. 3,) which latter when the lever d is tilted forward by the engagement therewith of a coin in the drum c is caused to engage with a cam-surface h^4 on the lever h' and force the connected disk b^5 laterally from engagement with the gear f . After such disengagement takes place the continued movement of the lever d then moves the pawl d^3 into engagement with the ratchet d^4 and rotates the same a certain number of teeth, and thereby moves the projection b^7 toward the left from under the end of the lever b^4 , as before described. After such operation and the coin has been forced from the slot c' the shaft d^2 is rotated backward to return the lever d and the arm h^3 to their normal position by the spring d^5 , and the disk b^5 is again moved into engagement with the gear f by the spring h , whereby said disk may be operated by the action of the meter-index to move the projection b^7 thereon backward to a position beneath the end of the lever b^4 . The consumer is thus enabled to insert any number of coins into the instrument one after the other, and the mechanism set in motion by such insertion being disconnected from the meter-index during such operation does not interfere with the regular working of the meter and its index.

The proper timing between the operation of disengaging the disk b^5 and gear f and the moving of said disk b^5 toward the left by the action of the lever d , as described, is secured by providing a lost motion between the pawl d^3 and the ratchet d^4 , as denoted by the space between the same in Fig. 3, which lost motion enables the arm- h^3 to act upon the lever

h' and disk b^5 during the time the pawl d^3 is moving into position to engage with the ratchet d^4 , as will be readily understood.

In order to insure a uniform movement of the disk b^5 for each coin inserted into the instrument, so as to secure a uniform quantity of gas for each of such coins, I have secured a wheel or disk i upon the shaft b^6 , having a series of uniform notches therein, into which one end of a spring i' , secured upon the gear f , is adapted to extend. The distance between the center of each of the notches in the disk i is equal to the distance which the disk b^5 is adapted to move upon each insertion of a coin, and when the disk i is turned toward the left with the shaft b^6 the end of the spring i' on the stationary gear f is caused to engage with the next notch in the disk i and on finding its center move the shaft b^6 , with the parts thereon, relative to said gear f , and thus insure the uniform distance of movement to said disk b^5 , as will be obvious.

The arm h^3 on the shaft d^2 is connected with one end of a rod k , which latter, adjacent to its opposite end, is provided with a slot k' therein, which receives a pin k^2 , located upon one side of a pawl k^3 , which is connected with the lever b^4 , as clearly shown in Fig. 3. The lower end of this pawl k^3 is adapted to engage with a ratchet-wheel k^4 , which is secured upon a shaft k^5 , which carries the gear f^4 , forming part of the connection between the meter-index spindle and the gear f , and is operated as follows: When the lever d has been tilted forward by the engagement therewith of a coin in the drum c and the pawl d^3 thereon is about to engage with the ratchet d^4 and move the projection b^7 from beneath the end of the lever b^4 , the arm h^3 causes the rod k to move the end of the pawl k^3 into engagement with the ratchet k^4 and so prevent the lever b^4 from being moved by the spring b^8 to open the valve until the lever d has been fully returned to its normal position and the coin ejected from the slot in the drum c , at which time the rod k will have disengaged the pawl k^3 from the ratchet k^4 and allowed the valve to be opened.

Having thus set forth my invention as embodied in one practical form, I do not wish to be understood as confining myself to the particular details of construction or arrangement of the parts as described, as it will be obvious that the same may be more or less materially modified without departure from the spirit of my invention. For instance, the chamber a^2 in lieu of being arranged at the outlet of the meter-chamber, as set forth, might be arranged at the inlet to the same and operate in a like manner. Such and similar changes might be made without departure from my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a gas-meter, of a chamber or passage communicating with the meter-chamber, a valve for opening or clos-

ing communication between said chambers, a revolving drum having a tapering coin-receiving slot therein, mechanism having an operative connection with said valve adapted to be operated to open the latter by the engagement therewith of a coin projecting through the lower end of the slot in said drum, and means for closing the valve after a determined amount of gas has passed through said outlet-chamber, substantially as and for the purpose set forth.

2. The combination with the gas-meter having the usual index, of a chamber or passage communicating with the meter-chamber, a valve for opening or closing communication between said chambers, a revolving drum having a tapering coin-receiving slot therein, mechanism having an operative connection with said valve and adapted to be operated to open the latter by the engagement therewith of a coin projecting through the lower end of the slot in said drum, and means forming a connection between the spindle of the meter-index and said valve whereby the latter will be closed, substantially as and for the purpose set forth.

3. The combination in a gas-meter having the usual index, of a chamber communicating with the meter-chamber, a valve for opening or closing communication between said chambers, a revolving drum having a coin-receiving slot therein, a pivoted valve-lever having operative connection with said valve, a rotary shaft having a cam for engaging with said lever to close the valve, means operated by a coin in said drum for successively giving the cam a partial rotation in one direction whereby the said lever may be operated to open the valve, and then ejecting the said coin from the drum, means forming an operative connection between the spindle of the meter-index and the said cam, whereby the latter will be operated to engage with the said pivoted lever and close the valve, and an indicating-dial secured upon said rotary cam-shaft, substantially as and for the purpose set forth.

4. The combination in a gas-meter, of a chamber communicating with the meter-chamber, a valve for opening or closing communication between said chambers, a revolving drum having a coin-receiving slot therein, a lever having operative connection with said valve, a movable cam for engaging with said lever to close the valve, a coin-registering index, means operated by a coin in said drum for successively actuating said coin-registering index and giving said cam a partial rotation in one direction whereby the valves may be opened, and then ejecting said coin from the drum, and means for operating said cam to close the valve, substantially as and for the purpose set forth.

5. The combination in a gas-meter, of a chamber having communication with the meter-chamber, a valve for opening or closing communication between said chambers, a rotating drum having a tapering coin-receiving

slot therein, a lever having operative connection with the valve, a movable cam for engaging with said lever to close the valve, and means operated by a coin in said drum for successively actuating said cam whereby the valve may be opened, and then ejecting the coin from the drum, substantially as described and for the purpose set forth.

6. The combination with a gas-meter, of a chamber having communication with the meter-chamber, a valve for opening or closing communication between said chambers, a drum having a coin-receiving slot therein, mechanism, embodying a cam, adapted to be operated by a coin in said drum for opening said valve, mechanism for closing said valve, and means for automatically securing a connection or disconnection between the valve closing and opening mechanisms, according as to whether the former or latter mechanism is being operated, respectively, whereby the said cam may be operated in one direction independently of the valve-closing mechanism, substantially as and for the purpose set forth.

7. The combination in a gas-meter having the usual index, of a chamber having communication with the meter-chamber, a valve for opening or closing communication between said chambers, a drum having a coin-receiving slot therein, a lever having operative connection with the valve, a movable cam for engaging with said lever to close the valve, means operated by a coin in said drum for moving said cam whereby the valve may be opened, a gear-wheel having a clutch connection with said cam and an operative connection with the spindle of the meter-index, from which latter it is operated to move said cam so as to close the valve, and means for automatically connecting and disconnecting said disk and gear-wheel according as the former is being acted upon either by the valve closing or opening mechanism, respectively, substantially as and for the purpose set forth.

8. The combination with a gas-meter, of a chamber having communication with the meter-chamber, a valve for opening or closing communication between said chambers, a drum having a coin-receiving slot therein, a lever having operative connection with said valve, a rotating shaft having a cam thereon adapted to engage with said lever to close the valve, means operated by a coin in said drum for moving said disk whereby the lever may be operated to open the valve, a gear-wheel loosely mounted upon said rotating shaft, having a clutch connection with said disk and an operative connection with the meter-index, a notched disk secured upon said shaft to rotate therewith, and a spring-arm secured upon said gear-wheel with one end engaging said notched disk, substantially as described and for the purpose set forth.

9. The combination with a gas-meter, of a chamber having communication with the meter-chamber, a valve for opening or closing

communication between said chambers, a rotating drum having a tapering coin-receiving slot therein, a lever having an operative connection with said valve, a shaft having a cam thereon adapted to engage with said lever to close the valve, a pivoted lever adapted to be operated by a coin in said drum and having a pawl for engaging with a ratchet on said shaft to move the cam thereon in a direction whereby the engaging lever may be moved to open the valve, and means for moving the said cam in a direction to close the valve, substantially as and for the purpose set forth.

10. The combination in a gas-meter, of a chamber having communication with the meter-chamber, a valve for opening or closing communication between said chambers, a drum having a coin-receiving slot therein, a lever

having operative connection with said valve, a movable cam for engaging with said lever to close the valve, means operated by a coin in said drum for successively actuating said cam whereby the valve may be opened and then ejecting said coin from the drum, means, embodying a pawl and ratchet, for holding the valve closed during the movement of the parts by the coin and until the latter has been ejected from the drum and then releasing the same, and means for opening the valve after being released by its said holding means, substantially as and for the purpose set forth.

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Witnesses:

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