To all whom it may concern:

Be it known that I, Frederick Smith, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Slot Gas-Meter; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus designed to contain and supply vendible articles or material, arranged upon the deposit upon or in adjacency to certain mechanism of a coin of predetermined dimensions to permit the delivery or release of a given quantity thereof, and relates particularly to an apparatus constructed to operate in connection with fluids such as gas.

The invention comprises the production of means for receiving and registering gas as the same flows through the apparatus, and mechanism that is designed to be operated by a coin of a predetermined dimension for permitting the measuring mechanism to operate.

The invention further comprises the production of an improved mechanism formed of a plurality of gears that are designed to be rotated upon the insertion of a coin of a predetermined dimension, and has connected therewith means for opening and closing a valve according to the position of the operating mechanism.

The object in view is the production of a meter that is designed to vend gas upon the insertion of a coin of predetermined dimension, and the operating of a lever for starting the mechanism.

Another object in view is the production of a coin receiving mechanism that is designed to receive a predetermined sized coin for connecting the coin receiving mechanism with a valve opening mechanism, so that when the coin receiving mechanism in connection with the valve operating mechanism by a coin, is operated, the valve mechanism is opened a predetermined distance for permitting the flow of gas therethrough until a predetermined amount has escaped.

Another object in view is the production of a mechanism designed to be operated by inserting a coin in the circuit for opening a valve and mechanism connected therewith for rotating said mechanism in a reverse direction for closing the valve during the feeding of the gas from the meter.

A further object in view is the production of a prepaid gas meter permitting the purchase and supply of a considerable quantity of gas at one time, by means of the introduction of several coins successively.

With these and other objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter more fully described and claimed.

In the accompanying drawings:—Figure 1 is a top plan view of a device formed according to the present invention, the top of the meter being removed to disclose the mechanism thereof. Fig. 2 is an end view of Fig. 1. Fig. 3 is a section through part of Fig. 1 showing the coin operating mechanism and the valve operating mechanism, the same being taken on line 3—3. Fig. 4 is a section through the valve operating mechanism taken at a right angle to the section shown in Fig. 3. Fig. 5 is a section through Fig. 3 on line 5—5. Fig. 6 is a section through Fig. 3 on line 6—6. Fig. 7 is a section through a modified form of valve operating mechanism, the section being taken at right angle to the section shown in Fig. 5.

In constructing a device according to the present invention, I provide the usual casing 1, having a valve cover 2 of any usual or desired construction, through which passes a shaft 3 for operating the valve mechanism therein. A second valve 4 is provided for regulating the amount of gas supplied to the meter, and is designed to be opened by the operation of mechanism hereinafter described, and it is designed to be closed by the passage of gas from the meter during the course of the use thereof. A pair of links 5 and 6 are connected in the usual way to a diaphragm which is provided for rotating shaft 3 in the usual way. Shaft 3 has secured thereto a worm 7 which has inter geared therewith a gear wheel 8 which is designed in turn to rotate shaft 9. Shaft 9 is designed to operate a suitable dial mechanism contained in housing 10, the dial mechanism being of any usual or preferred construction. Rigidly secured to shaft 9 near housing 10 is a worm 11 meshing with a gear 12 and rigidly secured to shaft 13. Shaft 13 is journaled in bearings 14 and 15.
and carries a worm 16 near bearing 15. Worm 16 meshes with gear wheel 17 which is rigidly secured to a sleeve 18 which in turn has rigidly secured at one end thereof a beveled gear 19. Beveled gear 19 is designed to mesh with a gear 20 which in turn meshes also with another beveled gear 21 so that when beveled gear 19 is rotated shaft 22 also is rotated. Sleeve 18 and beveled gear 20 are loosely mounted upon a shaft 22, but the bearing of gear 20 is keyed or otherwise rigidly secured to shaft 22, so that when gear 20 is rotated shaft 22 will also be rotated. Secured to shaft 22 near one end thereof is a comparatively small gear 23 meshing with a second gear 24 which in the particular apparatus shown is twice the size thereof, but which may be any desired number of times the size thereof, as explained hereafter. Gear 24 is provided with an elongated gear or tooth 25 that is designed to prevent the rotation of gear wheel 23 when the same comes in contact therewith, and as gear 23 is keyed or otherwise rigidly secured to shaft 22, shaft 22 will be prevented from rotating when tooth 25 engages the gear 23. As gear wheel 24 is twice the size of gear 23, gear 23 will be permitted to make two revolutions before engaging tooth 25 and when so engaged the further rotation of the wheel is prevented, and the mechanism must be rotated backward for further use. The tooth 25 is designed to engage gear 23 only at the time that valve 4 has been either fully opened or closed so that in either case, the other operation of the mechanism will cease. rigidly secured to shaft 22 in any convenient manner is a cam disk 26 which has ways 27 formed therein on a spiral, as clearly seen in Fig. 3. The spiral slots or cam ways are given in the apparatus shown two turns upon plate 26 so as to permit shaft 22 to revolve twice. meshing with cam slot 27 is a pin 28 which is rigidly secured to an arm 29 which in turn is rigidly secured to a shaft 30 to which is rigidly secured the operating part of valve 4 by means of arm 31. Shaft 32 is journaled in any convenient manner in a frame 32 which has also journaled therein a shaft 33 which is designed to transmit motion from the valve mechanism above explained to coin operated mechanism hereinafter more fully described. The spiral slots or cam ways in the disk 22 may if desired, be given more than two turns so as to permit further revolution of the shafts 22 and 30 and consequent further elevation or depression of the arm 31, carrying the valve stop 4. In this case the size of gear wheel 24 in relation to gear wheel 23, will be correspondingly increased so as to permit of a similar increase in the number of revolutions of gear 23.

By providing shaft 9 with worm 11 which is designed to revolve shaft 13 and valve operating mechanism connected therewith a structure is provided which will gradually close valve 4 as gas passes through the meter and at the same time permit shaft 9 to operate the dial mechanism contained in housing 10 in the usual manner. The valve 4 will remain open until pin 28 has passed into the end 34 of cam slot 27, and the rotation of disk 26 will cease by reason of the ceasing to flow of gas through the valve, and consequently a ceasing to operate the diaphragm. Tooth 25 also will positively prevent any further rotation of the valve operating mechanism in the direction to further close the valve. When pin 28 is in end 34 of the tooth slot 27, the mechanism is in its extreme closed position and cannot be operated any further in that direction. When in this position it is necessary to further operate the mechanism, to insert a coin of the proper dimension in the coin operating mechanism hereinafter described and then operate the same which will communicate power from shaft 33 and gear wheel 21 and to the remaining mechanism of the valve operating mechanism in a reverse direction, so as to gradually open valve 4. At each insertion of a coin of the proper dimension and moving of the coin operating mechanism will be rotated backward for further raising valve 4 off its seat. This rotating backward may be continued by the insertion of successive coins until pin 28 has reached its innermost position at the inner end 35 of cam slot 27. When in this position the same cannot be rotated backward any further nor valve 4 opened any further as the end of the slot 27 will not permit the further movement of pin 28, nor will the tooth 25 permit a further reverse rotation, as the gear wheel upon which the same is formed has been rotated once, and gear wheel 23 rotated a sufficient number of times to cause the same to engage gear wheel 23. Shaft 22 is designed to extend to the exterior of housing 1 or to any convenient point where the same may be seen, and has secured thereto an arm or pointer 36 which is designed to move over a suitable dial 37 so as to indicate the amount of gas that has been purchased. When the valve operating mechanism is rotated backward, shaft 22 will be also rotated backward together with arm 36. When the valve operating mechanism has been operated backward to any desired degree, arm 36 will show exactly how much gas has been purchased, and as the gas is used, shaft 22 will rotate so as to cause arm 36 to gradually resume its first or zero position, so as to show that all the gas purchased has been used. In this way when the valve operating mechanism is being operated by the coin operated mechanism, arm 36 will show the amount of gas being purchased, and when
the gas is being used arm 36 will rotate in a reverse direction and show the amount of gas still remaining to the purchaser. It will be observed that when gear wheel 21 is operated for rotating cam plate or disk 26 for opening the valve 4, that gear wheel 19 is stationary. Of course, if gas is being used at the same time that gear wheel 21 is rotated by the coin controlled mechanism, wheel 19 will slightly rotate but the speed of the same will be comparatively nothing in contradistinction to the speed of rotation of wheel 21. After wheel 21 has been rotated by the coin operating mechanism, it remains stationary, while gear wheel 19 operates for moving gear 20 and its bearing, which in turn moves shaft 22 to which the same is rigidly secured in any convenient manner.

20 Referring to the coin operated mechanism, the same is provided with a housing 38 in which is mounted a ring 39 which has formed thereon or rigidly secured thereto a member 40 which is designed to project beyond housing 38 and be engaged by a suitable lever 41 so that when lever 41 is moved, ring 39 will also be moved correspondingly. Formed on the outer surface of housing 38 is a pair of stops 42 and 43 which are designed to limit the movement of lever 41 so as to permit the same only a partial rotation. Ring 39 is formed with slots or apertures 44 and 45 of different sizes. Positioned within ring 39 is a disk 46 which has a slot formed therethrough that is larger at each end than at the center so that a coin, as, for instance, a quarter, may enter the same and pass part way through the aperture or passageway, but not entirely through so that a considerable portion of the coin will project above disk 46 so as to engage ring 39. When a coin is inserted through aperture 47 of housing 38 and through aperture 44 the same will drop into slot or aperture 45 in member 46 and project above the same so that when ring 39 is rotated member or disk 46 will also be rotated. In operation ring 39 is rotated until aperture 44 comes opposite aperture 49 in housing 38, and is loosened by a slightly backward movement of ring 39 so as to permit the same to drop by gravity into a coin receptacle 50. The aperture 48 is of the same size at each end, but smaller centrally so that either end may register with aperture 44 for receiving the coin for connecting ring 39 and disk 46. Ring 39 however, is provided at its lower end with an aperture 45 that is comparatively much smaller than aperture 44 so that if the same should be uppermost and a small coin placed therein it will drop entirely through and into pocket 50 without connecting ring 39 and disk 46. The aperture 45 is also made smaller so as to always compel the person operating the same to operate the same in the correct direction. As the device will not operate unless a coin of the proper size to pass through aperture 44 and into aperture 48 is used, the disk 46 and ring 39 will not be connected or operated. By this structure if a coin of the proper size has been placed in slot 48, lever 41 is thrown over and coin permitted to escape from aperture 48. Aperture 45, when the lever 41 has been thrown over as just described will be uppermost and the proper sized coin cannot be forced into aperture 48 because of the comparatively small size thereof. This will prevent the rotation of disk 46 in the wrong direction as no coin that will pass through aperture 45 will be stopped in its passage through aperture 48. In order to further operate the device, lever 41 is brought back to its original position, and then another coin inserted and thrown over.

The second coin is released as above described and then the lever is thrown back again and the third coin inserted and the lever thrown over and after this is thrown back again, and this operation is continued until the purchaser has secured all the gas desired, or until the pin 25 has reached end 34 of cam slot 27.

Formed integral with or rigidly secured to disk 46 by sleeve or connecting member 51 is a second disk 52 formed with two slots therein as 53 and 54. Slots 53 and 54 are on line with the center of slots 44 and 45, and it is designed to always retain that position or relationship to the same. Extending from the disk 52 is a shaft 55 that has a reduced portion 56 and is provided with shoulder 57 resting against plate 58 which is rigidly secured to housing 38 by any suitable means as screws 57'. Shoulder 57 is adapted to rest against plate 58 and reduced portion 56 is designed to be journaled in said plate and project a slight distance thereby. Reduced portion 56 carries a washer 60 and a spring 61 together with a gear wheel 62. The gear wheel 62 is held in position in any convenient manner as by nut 63. It will be observed from Fig. 3 of the drawings that the spring 61 is designed to press against gear wheel 63 and washer 60 so as to take up any lost motion of shaft or reduced member 56, and to also assist in always holding members 55 in correct position.

Pivoted mounted at 64 is a locking member 65 which is rigidly secured to a lid or cover 66, which is designed to cover slots 47 during the operation of the device and prevent the rotation of the ring 39 and disk 46 by the insertion of a knife blade or other similar instrument. Locking member 65 is provided with an extension 67 which is designed to project through a slot 68 in plate 58 when lid 66 is in its lowered or closed position, and is designed to engage disk 52 by 130
entering slots 53 or 54 when lid 66 is in its opened position. When projection or extension 67 is engaging slot 68 it is disengaged from either of the slots 53 and 54, but 5 immediately upon disengaging with slot 68 it engages either slot 53 or 54. If disk 52 were not in the correct position for permitting extension 67 to enter one of the slots 53 or 54, lid 66 could not be raised and consequently projection 67 could not be moved out of slot 68. When projection 67 is in slot 68 disk 52 and disk 46 may operate freely for rotating said gear 62, but when lid 66 is open, extension 67 of locking member 65 will engage one of the slots 53 or 54, and consequently prevent the rotation of disk 52 and 46. By this structure it is necessary to place a coin in slot 47 and permit the same to drop into aperture 48 and then close lid 66, afterwards members 46 and 52 may be rotated together with gear wheel 62. The locking device on the cover is disposed at substantially right angles to the flat under side of the cover and projects rearwardly, the device being moveable by the cover through the arc of a circle and laterally through the slots in the disk 52.

For the purpose of providing for changes in the price of gas and the consequent increase or decrease in the quantity to be supplied for a given coin, gear wheel 62 is designed to mesh with a removable gear 69 called the price wheel, which may be varied in size and which is carried by an adjustable supporting member 70, which is held in place by a screw or bolt 71 and a set screw 72. Member 70 is provided with a slot 73 through which bolt 71 is designed to pass. Member 70 is constructed with slot 73 in this manner in order that when it is desired to change the position of the pivot point of gear 69 in order to place larger or smaller gear wheels thereon, all that will be necessary will be to loosen bolt 71 and set screw 72, and move member 70 to the correct position either pivotally or in a reciprocating manner. After having placed the member 70 in the position desired, bolt or screw 71 is tightened and set screw 72 is forced against the rear of housing 38 so as to firmly hold member 70 in its adjusted position. Gear wheels 69 carried by member 70 is designed to mesh with gear 74 which is rigidly secured to shaft 33, which in turn carries a gear 33' for meshing with gear 21. By this construction when gear wheel 62 is rotated, power is transmitted through gear 69, gear 74, shaft 33, gear 33', beveled gear 21 and to the other mechanism as heretofore set forth.

By this construction of coin operated device or valve operated mechanism coin may be placed in slot 47 and be permitted to drop into slot 48. This forms a connection between ring 39 and disk 46. Lid 66 being lowered and extension 67 in the position shown in Fig. 3, lever 41 may be rotated which will in turn rotate ring 39, disk 46, shaft or member 65, reduced portion 56, gear wheel 62, gear 69, gear 74, shaft 33, gear 33', bevel gear 21, gear 20, rod or shaft 22, cam plate or disk 26, and cam plate 26 acting upon pin 28 will move lever 29 and shaft 30 so as to open valve 4. Every time a coin of the proper dimension is placed in slot 48 this operation takes place and valve 4 is raised a short distance. After valve 4 has been raised to the proper distance which will be shown on dial 37 by arm 36, the meter is ready for permitting gas to pass therethrough and to register the amount thereof. Worm 16 revolved by mechanism heretofore described will revolve gear 17 during the flow of gas through the meter. The revolving gear 17 will also revolve sleeve 18 and gear 19 which meshes with beveled gear 20. The revolving gear 19 will in turn revolve gear 20 which will gradually rotate its bearing which is rigidly secured to shaft 22 and will consequently rotate shaft 52 in a reverse direction to the rotation thereof caused by the revolving of gear 21 by the coin operated mechanism. The rotating of shaft 22 in the reverse direction, as will be evident, will rotate disk 26 in a reverse direction, and will gradually force through pin 28, arm 29, shaft 30 and arm 31, valve 4 closed. As will be evident when valve 25 is rotated in a reverse direction for closing valve 4, arm 36 will be also rotated in a reverse direction for bringing the same back to zero on dial 37.

Referring to Figs. 7, 8, and 9, will be seen a slightly modified form of valve operated mechanism. In this form a plurality of gears that may be rotated in one direction for permitting gas to flow through the valve 4, and are adapted to be rotated in a reverse direction by a worm 75 for closing valve 4. Worm 75 is designed to be operated by the shaft 13 and connecting mechanism as seen in Fig. 1 of the preferred construction. Worm 75 is designed to rotate gear 76 which is rigidly secured to or formed integral with sleeve 77 which in turn has rigidly secured to or formed integral therewith a second gear 78. Within sleeve 77 is loosely journaled shaft 30 which has secured near its outer end a bearing 79 which is formed with a projection 80 that is designed to carry a gear wheel 8. Loosely mounted upon sleeve 77 is a gear wheel 82 that is formed with a beveled gear on its periphery and is internally geared at 83. The gear teeth 83 are designed to be in line with the gear teeth of wheel 78 so that gear wheel 81 will mesh with the gears of wheel 78 and the gear teeth 83, so that in case either wheel 78 or wheel 82 is rotated gear 81 will also be rotated in one direction or the other as the case may be. Meshing with the beveled gear on the periphery of gear wheel 82 is a gear 130.
The valve operated mechanism shown in Figs. 7 and 8 is designed simply to be substituted in any desired case for the preferred structure of valve operated mechanism as disclosed in Fig. 1, and when substituted the beveled gear 52 is designed to mesh with gear 33' that is connected to the coin operated mechanism heretofore described. When the coin operated mechanism is moved to cause gear wheel 33' to rotate, the same will rotate gear 82, which in turn will rotate gear 81, extension 80, bearing 78, shaft 30, disk 26, and consequently open valve 4, as heretofore described. During this operation gear 78 and gear 76 are held stationary by worm 75 so that when gear wheel 81 is rotated it will press against gear wheel 76 and consequently rotate shaft 30. As will be evident gear wheel 82 will be rotated as much as may be desired until valve 4 has been raised to any desired height, and arm 36' will show dial 37' how much gas has been purchased and consequently how wide open valve 4 has been raised. After the coin operated mechanism is left stationary the same will hold stationary gear 82, which will form a brace for gear wheel 81 when worm 75 causes wheel 76 and 78 to rotate in a reverse direction. This, of course, will rotate wheel 81 in a reverse direction, and consequently shaft 30 in a reverse direction for closing valve 4. This reverse rotation will continue until valve 4 is closed which will shut off gas from the meter, and when the gas has thus been shut off by valve 4, the mechanism that operates shaft 13 will cease to move and consequently the downward pressure upon the valve 4 will discontinue.

What I claim is:

1. The combination of a coin carrier and housing provided with slots adapted to register, the slot in the carrier extending in the direction of the rotation thereof, a ring between said carrier and housing, and having slots on opposite sides registering with the slots above mentioned, the slot in the ring larger at one side than at the other, and the slot in the carrier contracted at one portion, a shaft extending from said carrier, a washer thereon, a gear also on said shaft, a spring located between the washer and gear, a slotted disk on the carrier, a cover for the housing and a device on the cover arranged to engage the slotted disk.

2. The combination of a coin carrier and housing, provided with slots adapted to register, the slot in the carrier extending in the direction of the rotation thereof, a ring between said carrier and housing, and having slots on opposite sides registering with the slots above mentioned, a shaft extending from said carrier, a plate forming a part of the housing, said shaft being mounted to rotate in said plate, the latter being provided also with a slot above the shaft, a washer on the shaft adjacent to said plate, a gear on the shaft, a spring located between the washer and gear, a slotted disk on the carrier, a cover for the housing, said cover arranged when in its closed position to lie parallel with the shaft, a right angled bracket on the cover engaging the slot in the plate when the cover is closed and engaging one of the slots of the disk when the cover is opened.

3. The combination of a coin carrier and housing provided with slots adapted to register, the slot in the carrier extending in the direction of the rotation thereof, a ring between said carrier and housing, and having slots on opposite sides registering with the slots above mentioned, a shaft formed on the carrier, a plate forming a part of the housing and having a thickened central portion constituting a bearing for the shaft, said plate also provided with a slot above the shaft, a washer on said shaft, a gear thereon, adjustable means engaging said gear and controlling the delivery of merchandise, a spring between the gear and the washer arranged to hold the parts in correct operative position, a cover for the housing, said cover closed lying in a plane parallel with the shaft, a right angled bracket affixed to the cover and arranged to engage the slot in the plate when the cover is closed, a slotted disk on the carrier, the aforesaid bracket engaging one of the slots of said disk when the cover is opened.

4. The combination of a coin carrier, a housing, a locking device for the carrier, and a slotted ring between the carrier and housing, said carrier consisting of a body portion, flanges thereon spaced apart and extending laterally from the body portion, one of said flanges having a slot extending through said body portion and in the direction of the rotation of the latter, and the other of said flanges provided with slots extending substantially at right angles to the slot in the first flange and arranged to be engaged by the locking device.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK SMITH.

Witnesses:
EDWARD C. BLISS,
WILLIAM S. ATCHISON.