N. D. NILSON.

PREPAYMENT METER FOR GAS AND THE LIKE.

APPLICATION FILED DEC. 22, 1913.

**1,234,931.**

Patented July 31, 1917.

2 SHEETS—SHEET 1.

*Fig. 1.*

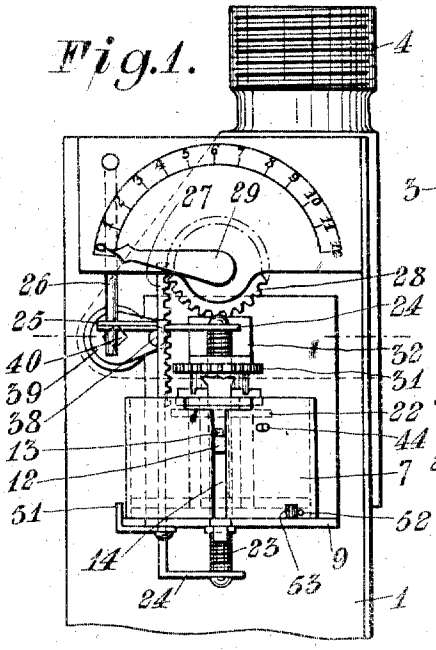


*Fig. 2.*

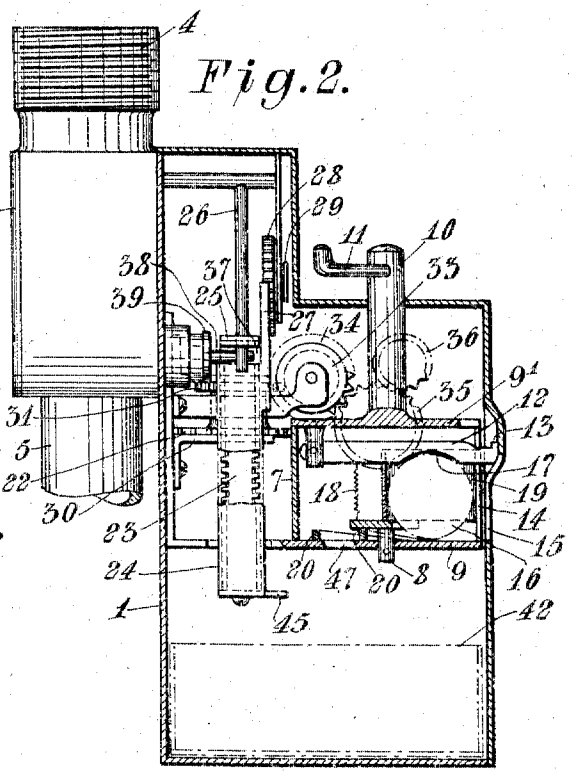


*Fig. 3.*

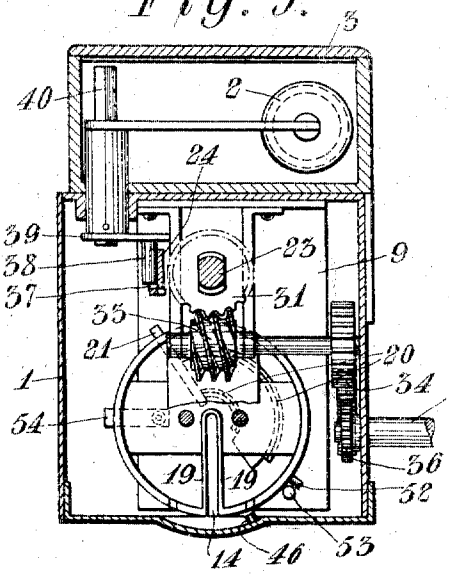


*Fig. 5.*

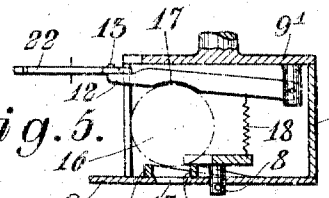
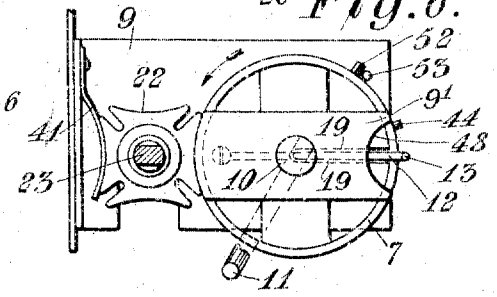


*Fig. 6.*



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2 SHEETS—SHEET 2.

Fig. 4.

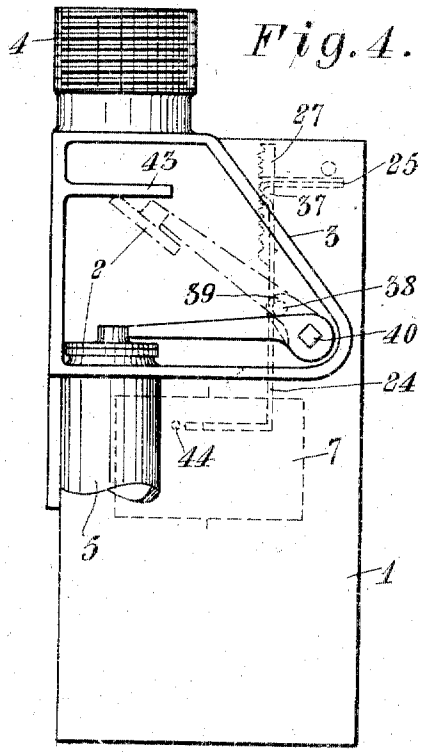



Fig. 8.

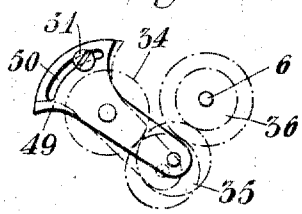



Fig. 9.

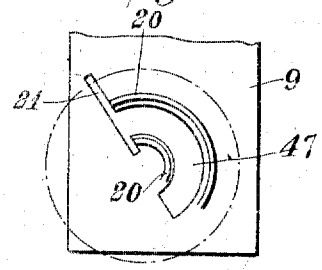



Fig. 7.

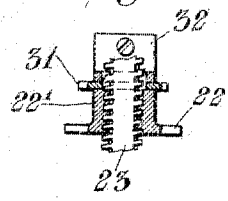



Fig. 10.

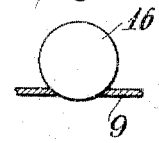
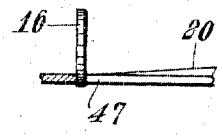



Fig. 11.

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# UNITED STATES PATENT OFFICE.

NILS DAVID NILSON, OF KLINTEN, NEAR STOCKHOLM, SWEDEN.

## PREPAYMENT-METER FOR GAS AND THE LIKE.

1,234,931. Specification of Letters Patent. Patented July 31, 1917.

Application filed December 22, 1913. Serial No. 808,167.

*To all whom it may concern:*

Be it known that I, NILS DAVID NILSON, a subject of Great Britain, residing at Klinten, near Stockholm, in the Kingdom of Sweden, have invented new and useful Improvements in Prepayment-Meters for Gas and the like, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

This invention relates to coin-controlled gas meters, and its principal advantages, compared to previously existing apparatus, consist in its simplicity, accuracy and durability.

The apparatus is of that kind where the coin is introduced in and brought along by a revolving drum or the like, and is mainly characterized by the fact that adjacent to the revolving drum, preferably below the same, is located one or more fixed guides carrying or in other manner supporting the coin and of such shape that the coin, during the turning of the drum, is forced by the guide or guides to an extreme position, meanwhile acting on a lever or the like resting against, preferably on top of the coin and turning with and connected to the drum in such a manner, that said lever at or near the end of the turning of the drum, will assume such a position, that it will engage with and operate the mechanism which opens and closes the piping for the gas.

The accompanying drawings illustrate one form of the invention.

Figure 1 is a front elevation of the apparatus, a portion of the cover being removed.

Fig. 2 is a sectional side view.

Fig. 3 is a top view of a horizontal section.

Fig. 4 is a rear view of the apparatus.

Fig. 5 shows in section the coin-receiving and revolving part of the apparatus, in a position opposite the one shown in Fig. 2.

Fig. 6 shows the coin receiving part of the apparatus and a portion of the gearing viewed from above.

Fig. 7 is a detail view of the intermittent gear and screw.

Fig. 8 is a detail view of the gearing for connecting to the shaft of the main gas meter.

Fig. 9 is a detail view of the slot and guideway.

Fig. 10 is a sectional view of Fig. 9.

Fig. 11 is a sectional view of Fig. 10.

All parts of the apparatus with the exception of the valve for the opening and closing of the gas-piping are arranged within the casing 1.

The gas valve 2 is located in a box-like section 3 at the rear of the casing, into which section the main-pipe 4 opens and from which the pipe 5 leads to the main gas-meter, said pipe being controlled by means of the valve 2. The driving-mechanism of the main gas-meter is connected to the shaft 6 (Figs. 3 and 8), which in hereinafter described manner is geared to the mechanism of the prepayment meter. 7 indicates a cylindrical drum adapted to turn by means of a pivot 8 in a stationary bottom plate 9. The lower edge of the drum rests and slides on said bottom plate, while the upper edge of the drum is entirely or partly closed by a cover or cross-piece $9^1$, to which is secured the spindle 10, which extends through the casing 1 and on the projecting part carries a handle 11 of suitable shape. To the under side of the cover or cross-piece $9^1$ is pivoted one end of a lever 12, the other end of which is provided with a finger 13 which projects through a slot 14 in the drum, said slot extending the entire height of the drum. When the drum is in normal position as shown in Figs. 1, 2, 3 and 6, the slot 14 will be right opposite a similarly shaped slot 15 in the front side of the casing 1. The coin 16 can now be introduced from outside through both openings, at the same moment imparting an upward movement to the lever 12, which has its forward end somewhat below the upper edge of the slot 15 in the casing 1. As the coin is being introduced farther, it is forced below an arc-shaped recess 17 in the under side of the lever, whereby the lever is again lowered, forced thereto by a spring 18, secured to the lever and to a stationary part of the drum.

On account of the recess in the lever 12 the coin is being kept firmly in the shown position resting on the bottom 9, and at the same time supported on both sides by two plates 19, projecting into the drum from the edges of the slot 14 and rigidly secured to the drum. When the drum is then turned by means of the handle 11, in the direction indicated by the arrow in Fig. 6, the coin is brought along and remains standing on edge, retained by the lever 12 and the plates 19.

In the path which the coin has to pass during the turning of the drum, are located two arc-shaped and concentrical ribs or guides 20 projecting from the bottom 9, which increase in height from the starting position of the coin, as shown in Fig. 2, unto a radial slot 21 in the bottom 9. As the coin is carried around by the movement of the drum 7, in the manner aforesaid, it slides on the two ribs 20, and is in this manner elevated as the ribs increase in height, and consequently the end of the lever 12 provided with the finger 13 is raised. The finger 13 is thereby brought in such position, see Fig. 5, that during the last period of the turning of the drum it will engage with and turn an intermittent gear 22, of the shape shown in Fig. 6. This intermittent gear is connected to the mechanism which opens and closes the gas-valve 2. This mechanism is arranged in the following manner:

The main part consists of a screw 23, the ends of which are pivoted in a frame 24. From this latter extends a rigidly secured arm 25 which is sliding up and down on a fixed guide 26, and a rack 27 meshing with a pinion 28 secured to the shaft of an index hand 29. The hub $22^1$ (Fig. 1) of the above mentioned intermittent gear 22 is shaped to a nut, fitting the screw 23, and the intermittent gear 22 is supported from below by a fixed bracket 30 (Fig. 2), and from above by a worm-wheel 31. This latter wheel which is supported from above by means of another bracket 32 (Figs. 1 and 7) does not mesh with the threads of the screw 23, but the screw can slide longitudinally through the worm-wheel 31. This, however, will when rotating force the screw to turn, on account of the screw being faced off on two sides and inserted in a correspondingly shaped opening in the worm-wheel 31 (Figs. 3 and 6). This worm-wheel meshes with the worm 33, which is connected by means of the gears 34, 35 and 36 with the shaft 6, said shaft as before mentioned being connected to the mechanism in the main gas-meter. The upper part of the frame 24 is provided with a slot 37 (Fig. 4) into which is inserted a stud 38 on a crank 39, secured to the shaft 40 of the valve 2. The relative arrangement operates in the following manner:

As the drum 7 is turned and the lever 12 is being swung upward so that the finger 13 comes in contact with and moves the intermittent gear 22 one step, the gear, which also serves as nut for the screw 23, will raise the screw upward a corresponding distance. The frame 24, connected to the screw, is then carried along (assuming that the frame is in or near its lowermost position), and will by means of the slot 37 lift the stud 38, so that the crank 39 is turned and the gas-valve 2 opened. The gas coming from the main pipe 4 and streaming through the box-like section 3 will then escape through the opened pipe 5 into the main gas-meter, the driving mechanism of which is then put in operation. The shaft 6 is thereby turned and the movement is transmitted to the worm 33, which in turn will move the worm-wheel 31. The screw 23 is then turned in the now stationary nut $22^1$, of the intermittent gear 22. As shown in Fig. 6, the intermittent gear is divided into four sections, each section provided with a profile which lies near to and corresponds to the outside of the drum 7. As long as the intermittent gear and the drum are in the positions indicated in Fig. 6, the gear can not turn, but is rigidly locked, as well as the mechanism connected to the gear. On the other hand, when the finger 13 has come into engagement with the wheel, said wheel is able to turn as the teeth of the wheel can now swing in a recess 48 provided in the cover or cross-piece $9^1$. The gearing is so arranged that as the screw is being lowered by the above-mentioned turning of the worm-wheel 31, the frame 24, connected to the screw, is lowered and returns, by means of the slot 37 and the stud 38, the crank 39, so that the valve 2 again becomes closed. During this time, however, a gas quantity corresponding to a coin has been consumed. In order to rigidly secure the intermittent gear in case that the drum is turned without the lever 12 being raised, there is secured close to the gear a spring 41, which is in engagement with one of the arched recesses in the gear.

When the revolving of the drum 7, and the turning of the intermittent gear 22 one step have been performed, the coin 16 has come right over the slot 21 in the bottom plate 9 and falls through the slot down in the underlying coin-box 42. The lever 12 is then lowered and the finger 13 releases the intermittent gear, whereby the drum 7 can be turned back to its normal position, said returning being performed immediately after the turning of the drum with the coin is completed. If desired another coin can instantly be inserted and the drum can be turned again, whereby the gas-valve 2 is opened one step farther. Repeated introduction of coins can take place three times in succession and the gas valve is opened each time one step, until at the third time it hits the stop 43. Consequently it does not turn farther on repeated insertion of coins, but the frame 24, which by means of the rack 27 actuates the indicating device as the coins are introduced, can nevertheless move farther upward, as the stud 38 on the crank, after the said third movement, has come out of the recess 37 in the frame, and is resting against the side of the frame and sliding alongside the same. Twelve coins can in said manner be introduced in succes-

sion and the hand always indicates the number of coin deposited in the apparatus, and the value of the gas consumed.

To prevent the depositing of more than twelve coins at the same time in the apparatus, whereby it would be damaged, there is secured on the outside of the drum 7 a stud 44 or the like (Fig. 1). As the drum, after the introduction of the twelfth coin, has been turned together with the coin, and the frame 24 has been raised the last step, a projecting piece 45 of the frame will come in the path of the stud 44 on the drum 7, thereby preventing the drum from being turned back. Consequently no coin can be deposited, until the frame 24 after a certain consumption of gas has been lowered so far that the piece 45 has come out of the way of the stud 44.

In order to prevent an unfair use of the apparatus, for instance the raising of the lever and the holding of the same in raised position during the turning of the drum 7 with the assistance of some other object than a coin, so as to force the finger 13 into engagement with the intermittent gear 22, there is secured on the inside of the front wall of the casing 1 a stud or the like 46 (Fig. 3) at such a height that when the lever 12 has been swung upward to its highest position, by other means than by a coin, it will hit the stud 46 and prevent the turning of the drum.

In the case that instead of a coin was introduced a similarly shaped part, for instance a round plate, a button or the like, which would fit in the recess of the lever 12 so that the lever was lowered ready for turning, the arrangement shown in Fig. 9 is provided. The same consists in that between the ribs 20 is an opening 47 of such dimensions that as soon as the coin, or a plate or the like similar to a coin at the turning of the drum has come over the opening 47, the coin or the plate will partly drop down into the opening as shown in Figs. 10 and 11. The returning of the drum 7 can not take place, on account of the coin or plate or the like being wedged in the opening and catching against the edge of the same, but the drum has to be turned completely, by which the false coin or the like is delivered into the coin-box, and the fraud detected. In the event of it being possible to introduce another object than a coin in such a manner that the lever be free for turning, the opening 47 is made so wide that it is difficult for the object to obtain support on the plate 9 for such a time that the turning of the drum can be completed. The object falls through the opening down into the coin-box, and the gas-valve will not open.

As shown in Fig. 8, the wheel 35 of the gearing between the main gas-meter and the apparatus is pivoted to one end of a rocker-arm 49, pivoted to the shaft of the wheel 34. The rocker-arm 49 can be secured in various positions by means of a screw 51 in an arc-shaped slot 50. This arrangement is for the purpose of changing to smaller or bigger gears 36, depending on the speed at which the apparatus has to operate.

In order to limit the turning of the drum 7, the same is provided with a projecting stud 52, which in the extreme positions of the drum coacts with two stops 53 and 54 secured in the bottom 9.

The valve actuating mechanism herein shown and described has been made the subject of a divisional application.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. In a prepayment apparatus, the combination of a gear, a revolving drum adapted to receive the coin, a fixed bottom plate for the drum adapted to support the coin, guides on said bottom plate adapted to direct the movement of and to lift the coin during the turning of the drum, and a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate said gear, substantially as and for the purpose set forth.

2. In a prepayment apparatus, the combination of a gear, a revolving drum adapted to receive the coin, a fixed bottom plate for the drum adapted to support the coin, two ribs on said plate concentric with the drum and with each other and having a helical edge, said ribs being adapted to guide and to engage said coin so as to lift the coin during the turning of the drum, and a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate the said gear, substantially as and for the purpose set forth.

3. In a prepayment apparatus, the combination of a gear, a revolving drum adapted to receive the coin, a fixed bottom plate for the drum adapted to support the coin, two ribs on said plate concentric with the drum and with each other and having a helical edge, said ribs being adapted to guide and to engage said coin so as to lift the coin during the turning of the drum, a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate said gear, and a slot in said bottom plate for discharging the coin, substantially as and for the purpose set forth.

4. In a prepayment apparatus, the combination of a gear, a revolving drum adapted to receive the coin, a fixed bottom plate for

the drum adapted to support the coin, two ribs on said plates concentric with the drum and with each other and having a helical edge, said ribs being adapted to guide and to engage said coin so as to lift the coin during the turning of the drum, a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate said gear, and an opening in said bottom plate between the ribs of such width that the coin may partly drop down into the same and thus prevent the drum from being turned back to initial position as long as the coin remains in the drum, substantially as and for the purpose set forth.

5. In a prepayment apparatus, the combination of a gear, a casing provided with a coin slot, a revolving drum within said casing adapted to receive a coin through said coin slot, a fixed bottom plate for the drum in said casing adapted to support the coin, two ribs on said plates concentric with the drum and with each other and having a helical edge, said ribs being adapted to guide and to engage said coin so as to lift the coin during the turning of the drum, a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate said gear, and a stop in said casing located in a position to be engaged by said lever if at the beginning of the turning of the drum this lever is placed in its position for operating the said gear, substantially as and for the purpose set forth.

6. In a prepayment apparatus, the combination of a gear, a revolving drum adapted to receive the coin, a fixed bottom plate for the drum adapted to support the coin, two ribs on said plates concentric with the drum and with each other and having a helical edge, said ribs being adapted to guide and to engage said coin so as to lift the coin during the turning of the drum, a lever pivoted to the drum and resting against the coin and adapted during the last period of the turning of the drum to be brought into engagement with and to operate the said gear, and a stud on the drum located so as to be brought in the path of a movable member of the apparatus when a certain number of coins have been inserted in the apparatus, thus preventing the drum from being turned back to initial position, substantially as and for the purpose set forth.

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