

R. W. GALLAGHER.
BILL DELIVERY MECHANISM FOR METERS.
APPLICATION FILED FEB. 7, 1905.

990,125.

Patented Apr. 18, 1911.

6 SHEETS—SHEET 1.

Fig. 1.

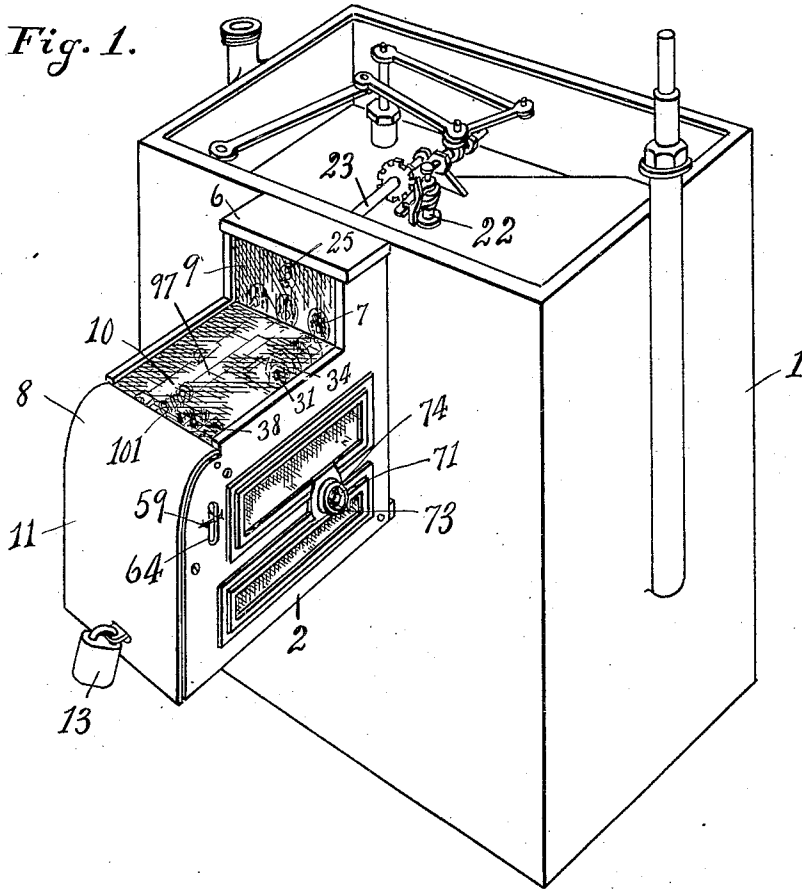
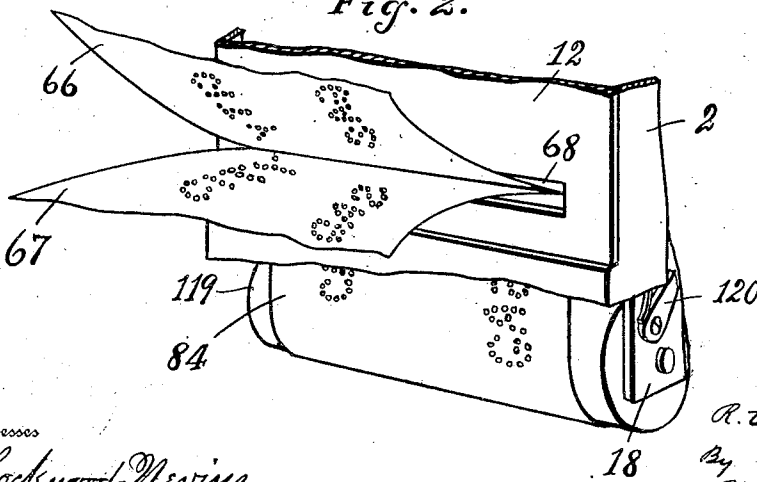


Fig. 2.



Witnesses

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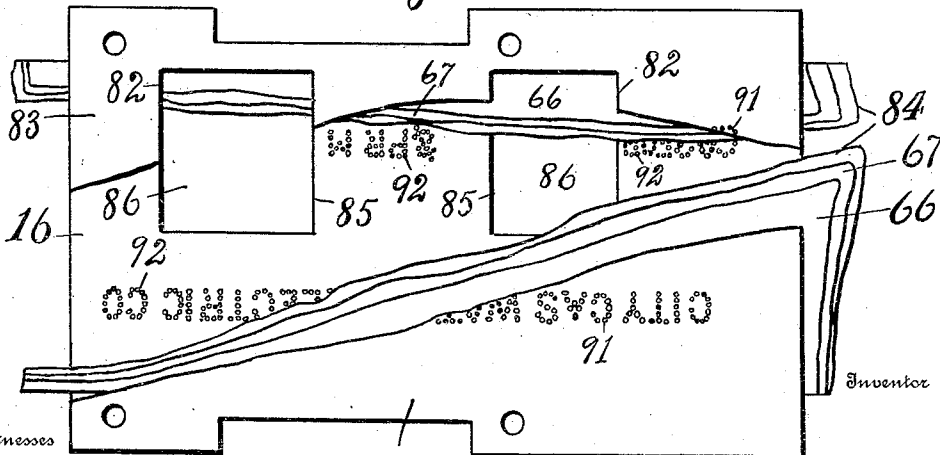
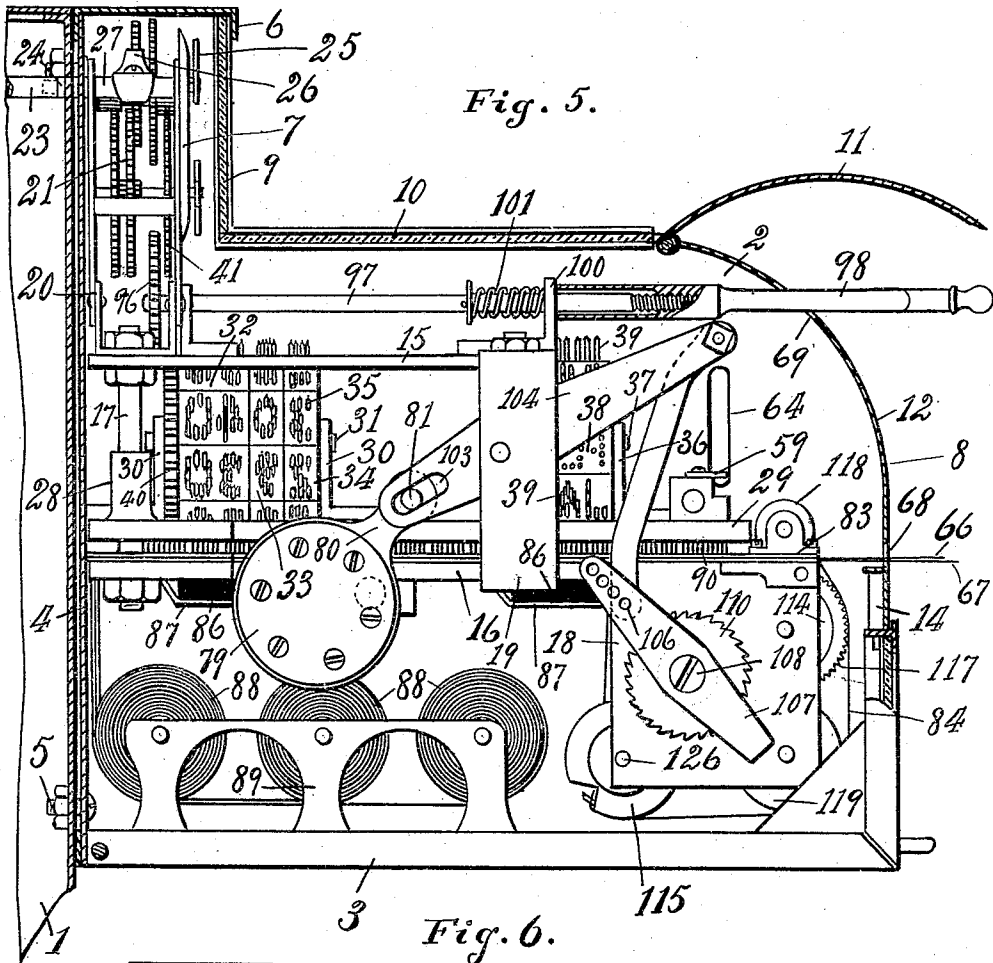
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6 SHEETS-SHEET 3.



Witnesses

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Boris Gofinkel

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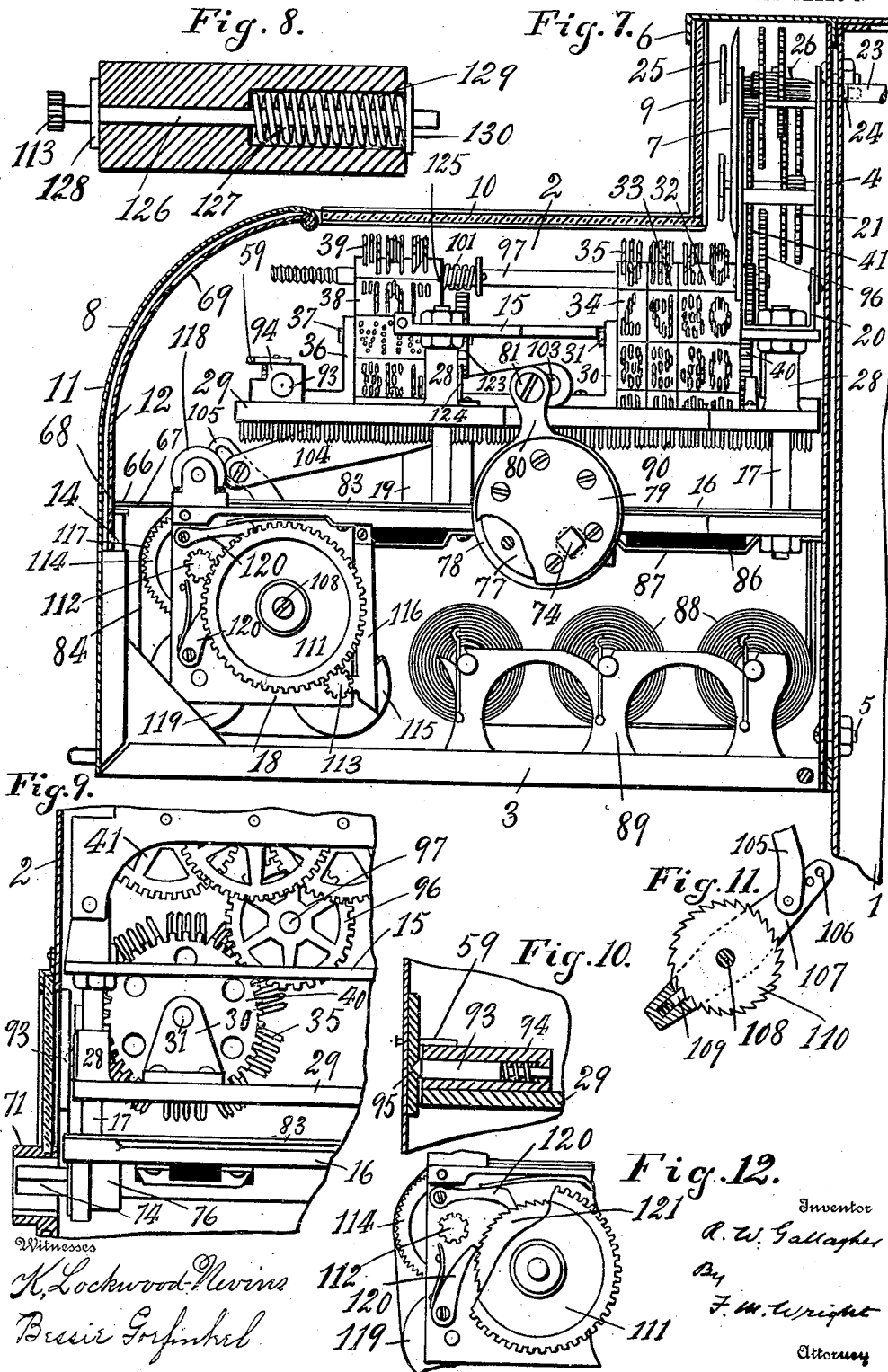
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6 SHEETS—SHEET 4.



Witnesses
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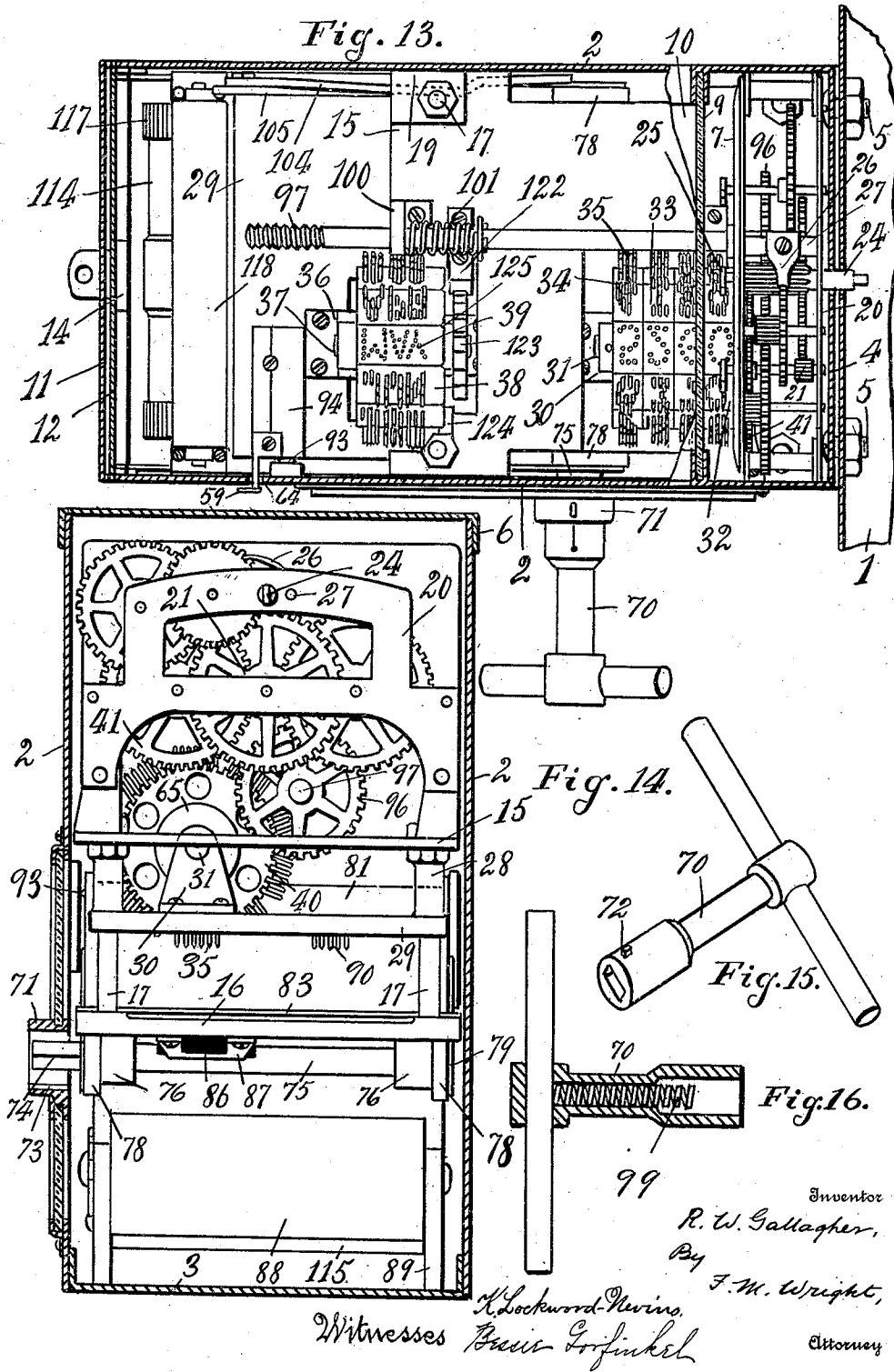
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6 SHEETS—SHEET 5.

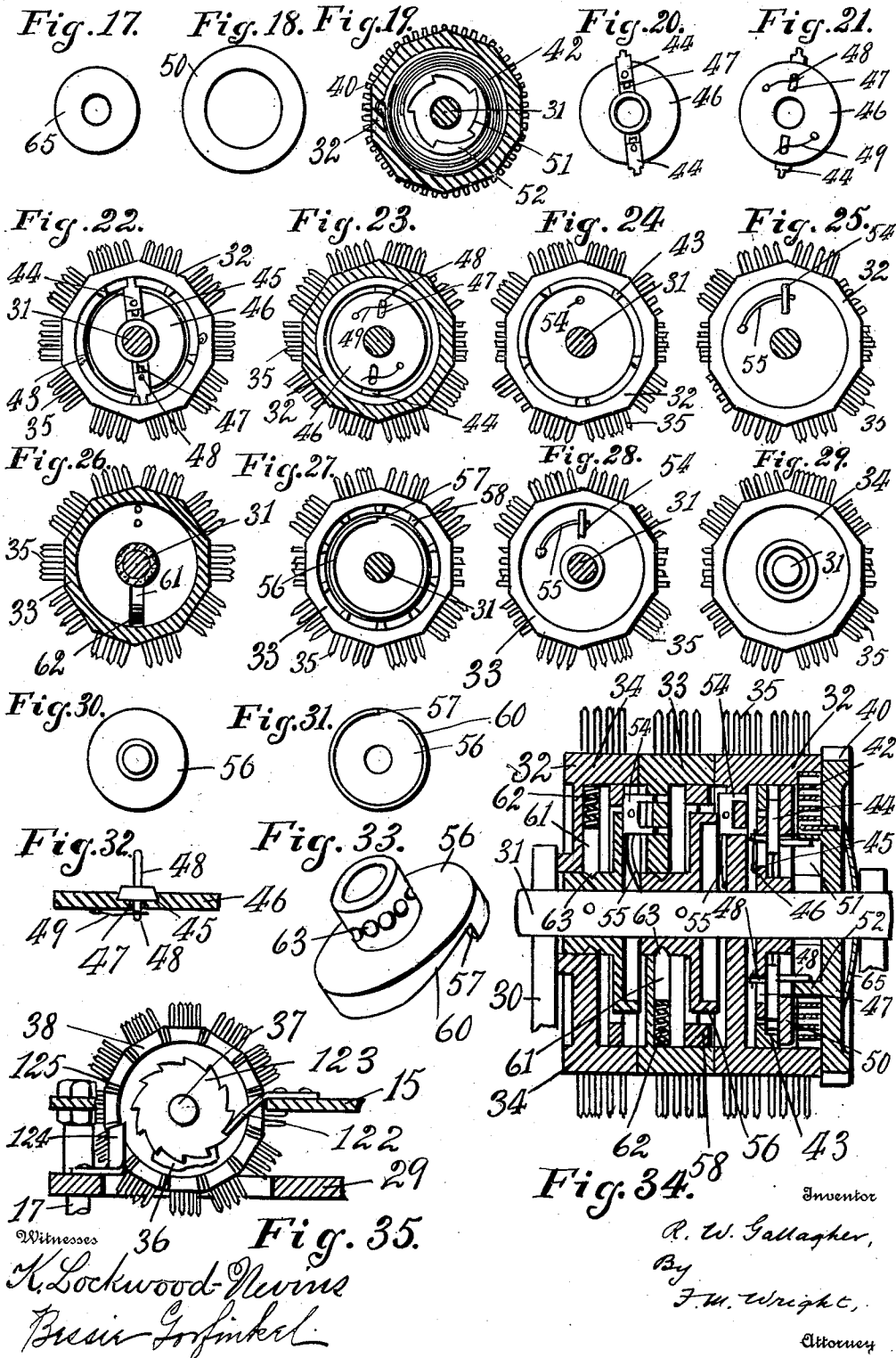


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6 SHEETS—SHEET 6.



UNITED STATES PATENT OFFICE.

RICHARD W. GALLAGHER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO AUTOMATIC BILLING COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

BILL-DELIVERY MECHANISM FOR METERS.

990,125.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed February 7, 1905. Serial No. 244,634.

To all whom it may concern:

Be it known that I, RICHARD WILLIAM GALLAGHER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Bill-Delivery Mechanism for Meters, of which the following is a specification.

This invention relates to an improved device for automatically delivering bills of meters such as gas meters, electric meters, water meters and the like, the object of the invention being to provide a device by means of which the inspector of the meter, instead of reading the meter, and making a record thereof, which record is then delivered to the office, from which a bill is afterward presented to the consumer, will at once take a duplicate record of the same, one of which will be presented to the consumer as a bill, and the other will be turned in at the office. A third record will be retained in the meter as a check upon the bill collector.

In the accompanying drawings, Figure 1 is a perspective view of a gas meter equipped with my improvement, the top of the gas meter being removed; Fig. 2 is a perspective view of a portion of the improvement showing the three recording sheets upon which the bill is recorded; Fig. 3 is a longitudinal vertical section of the attachment showing the mechanism in side elevation; Fig. 4 is a bottom plan view of the carrier plate; Fig. 5 is a view similar to Fig. 3 showing the carrier plate depressed; Fig. 6 is a broken plan view of the fixed plate and retainer plate and the record sheets thereon, said retainer plate and sheets being broken away in parts; Fig. 7 is a view similar to Fig. 3, but showing the opposite side of the mechanism; Fig. 8 is a detail sectional view of the winding roller; Fig. 9 is a rear elevation of a portion of the mechanism showing the setting gear in mesh with the gear which operates the recording dials to set said dials to zero; Fig. 10 is a sectional view of the automatic stop or obstructer carried by the carrier plate; Fig. 11 is a detail view from the inside of the ratchet wheel for operating the winding shaft; Fig. 12 is a broken view of the gear on the end of said shaft showing the ratchet wheel underneath; Fig. 13 is a plan view of the mechanism, the casing

being shown in section; Fig. 14 is a rear view of the mechanism, the casing being shown in section; Fig. 15 is a perspective view of the winding key; Fig. 16 is a longitudinal section of the same; Fig. 17 is a front view of the spring washer; Fig. 18 is a similar view of the spacing ring; Fig. 19 is a section through the first recording wheel taken just on the inside of the cam and spring; Fig. 20 is a view of one side of the disk carrying the latches; Fig. 21 is a view of the other side thereof; Fig. 22 is a side view of the recording wheel, the spring and gear being removed showing the latches and their relation to the lugs carried by said recording wheel; Fig. 23 is a section of Fig. 34 on the left hand side of the disk carrying the latches; Fig. 24 is a view of the recording wheel from the right hand side all except the ring attached thereto being removed; Fig. 25 is a left hand view of the same wheel; Fig. 26 is a section looking from the right-hand side, of the second recording wheel; Fig. 27 is a view from the right hand side of the said wheel with the cam disk therein; Fig. 28 is a view of the left hand side of the second recording wheel; Fig. 29 is a left hand view of the third recording wheel; Fig. 30 is a left hand view of one of the cams; Fig. 31 is a right hand view of the same; Fig. 32 is a section of one of the disks on an enlarged scale containing the sliding latch; Fig. 33 is a perspective view of another of the cams on an enlarged scale; Fig. 34 is a longitudinal section of the recording wheels and the gear therefor on an enlarged scale; Fig. 35 is a side elevation of the dating wheel.

1 represents the meter to which the bill delivery mechanism is attached. The outer casing of said mechanism comprises the two parallel sides 2, the bottom 3, the back 4 attached to the meter casing by bolts 5, the top 6 over the indicator dials 7 of the meter and the gearing therefor, and the front 8, the upper portion of which is preferably of glass, consisting of a glass plate 9 in front of the indicator dials 7, and a glass top 10 over the delivery mechanism, while the lower portion of the front has two hinged lids or covers 11, 12, the upper one 11 covering the whole lower front and being secured by a padlock 13 and the lower cover 12 being fastened by a lock 14. Within this casing is secured the frame of the mechanism

nism, which consists of an upper horizontal plate 15, a lower horizontal plate 16, four vertical posts 17 securing said plates together, two plates 18 depending from the sides of the lower plate, a plate 19 connecting the plates 15, 16, on one side, and a frame 20 mounted upon the rear of the upper plate and carrying the train of gearing 21 for the indicator dials 7. Said dials 7 and gearing 21 are of the ordinary construction in use in gas meters, and therefore need not themselves be particularly described. It is sufficient to state that the gearing 21 is driven from the vertical shaft 22 of the meter by a horizontal shaft 23 which engages the end of a shaft 24 that carries the pointer 25 of the small dial, one revolution of which registers the passage of two cubic feet of gas through the meter, and said shaft 24 by the train of gearing 21 communicates motion in succession to the shafts for the indicator dials 7 indicating the number of thousands, tens of thousands, and hundreds of thousands, of cubic feet of gas consumed. However, an addition is made to this gearing in that there is introduced a spring dog 26, secured upon a cross bar 27 of the frame 20, which engages one of the wheels of the gearing to permit it to advance but prevent its return.

Upon the four vertical posts 17 slide the guiding sleeves 28 of a carrier plate 29. Said carrier plate has mounted thereon standards 30 for a stationary shaft 31, which carries three (or more if necessary) recording wheels 32, 33, 34, each having ten plane faces on its periphery, upon which faces are secured pins 35 arranged in the form of numerals. The wheel 32 is nearly twice the width of the wheels 33, 34, and contains on each face pins forming a digit followed by a cipher, and is used to record the cents of cost, while the other two wheels 33, 34 contain only a single digit on each face, and are used to record units and tens of dollars of cost. The digits follow in numerical order on successive faces. The plate 29 also carries another pair of standards 36 for a shaft 37 carrying a single wheel 38 having twelve faces on its periphery, said faces having pins 39 secured thereon, the perforations made by the pins forming the abbreviations for the names of the months of the year.

Upon the shaft 31 rotates a gear wheel 40 which meshes with the gear wheel 41 which is secured on the shaft of the pointer of the thousands dial 7 of the meter indicator. The number of teeth in this gear wheel 40 will be determined by the price at which gas is to be sold. For instance, if the price of the gas is to be \$1.00 a thousand cubic feet, then the gear wheel 40 will have the same number of teeth as the gear wheel 41; if 75 cents a thousand cubic feet, the wheel 40 will have one and one-third times

the number of teeth of the gear wheel 41, making three-fourths of a revolution to each revolution of the wheel 41, and so on.

When the wheel 40 has made one-tenth of a revolution it causes the wheel 32 to advance instantaneously one-tenth of a revolution by the following mechanism. A coiled spring 42 is attached at one end to the gear wheel 40, and at the other end to the wheel 32. The wheel 40, continually rotating, winds up this spring 42, imparting power thereto to rotate the wheel 32, but said wheel 32 is permitted to rotate only intermittently. On the side of said wheel 32 are five equidistant lugs 43, which are engaged in turn by latches 44, which slide in undercut grooves 45 in a disk 46 secured upon the stationary shaft 31 upon which the wheels rotate. The bottoms of the grooves are slotted, as shown at 47, to permit pins 48 carried by the latches 44 to pass there-through, which pins are engaged by springs 49 attached at one end to the disk 46, thereby pressing the latches 44 radially outward. An annular washer 50 is interposed between the latches 44 and the spring 42 to prevent said latches and spring interfering with each other's action. These latches 44 engage in turn the pins 43 and hold the wheel 32 against rotation by the spring 42, but they are pressed inward by means of five equidistant cams 51 formed on the inside of a crown ring 52 secured to the inner side of the gear wheel 40. These cams engage the pins 48, which extend in both directions from the latches, and press the latches inward so that the ends of the latter can be passed by the pins 43. As soon as any pin 43 can pass a latch which had been holding it back, the wheel 32 moves forward one-tenth of a revolution. The reason why it can only move forward one-tenth of a revolution, although there are only five of the pins 43, is that the two latches operate alternately. That is to say, one latch engages one of the pins 43 while the other latch is midway between two opposite pins, and since there are only five equidistant cams, and therefore no two cams are diametrically opposite, no two cams act simultaneously upon the two diametrically opposite latches. Therefore, when the pin engaged by one latch is released, the wheel 32 moves forward until the other latch in its turn engages a pin, and so on alternately with the two latches, thus providing ten intermittent movements in one revolution of the wheel. The object of using two latches instead of one is to reduce the amount of friction, by providing comparatively long cam surfaces to act upon the latches.

The wheel 33, carrying the perforating pins for marking the numerals for the dollars, is operated from the wheel carrying the pins for the cents in the following man-

ner. On the side of the latter wheel 32, adjacent to the former 33, is carried a latch 54 which slides in and out to and from the wheel 32 in a direction parallel with the stationary shaft 31. Said latch is normally pressed outward by a spring 55, one end being secured to the side of the wheel 32 and the free end passing through the latch. As the wheel 32 revolves, said latch moves along the edge of a stationary crown cam ring 56 secured to the shaft 31, said cam ring normally pressing said latch inward, into the wheel 32, but said cam ring 56 has therein a square drop or shoulder 57, and when, by the revolution of said wheel, the latch is brought to said drop said latch is moved by said spring 55 out from the wheel 32. This movement immediately brings it into position to engage one of ten lugs 58 extending axially from the side of the wheel 33 and facing the wheel 32 so that when the wheel 32 makes its next movement through one-tenth of a revolution, which happens when the wheel 32 moves from a position to perforate "\$.90" to the position to perforate ".00", it carries with it also the wheel 33 through one-tenth of a revolution, into a position to register one dollar higher.

By the instantaneous and simultaneous movements of the wheels 32, 33, through one-tenth of a revolution under the action of the spring 42 as aforesaid, the latch 54 is brought against an incline 60 in the cam ring 56 and pressed backward thereby out of engagement with the pin 58, and the wheel 32 then continues to revolve intermittently, without revolving the wheel 33, until it has again made a complete revolution, when the latch 54 is again pressed by the spring over the drop in the stationary cam wheel 56 and again carries forward the wheels 32 and 33 through one-tenth of a revolution.

In order to accurately register the wheel 33 in the proper position there is carried by said wheel a radially moving plunger 61 pressed inward by a coiled spring 62, said plunger having a blunt point at its inner end adapted to enter in succession sockets 63 formed in the hub of the cam ring 56. The point of the plunger is sufficiently blunt to enable it to be forced out of a socket automatically against the pressure of the spring 62 when the wheel makes one-tenth of a revolution, when it immediately drops into the next socket 63 and centers the dial in the proper registering position. In precisely the same manner the wheel 34 for registering tens of dollars is actuated from the wheel 33 registering dollars.

A spring washer 65 is interposed between the gear wheel 40 and the bearing or standard 30 adjacent thereto, and presses the wheels 32, 33, 34, from the said standard 30, to insure that the pins thereon are in their

proper axial position. It will thus be seen that, if these wheels 32, 33, 34, be set at zero, the consumption of the gas or other commodity measured by the meter will advance said wheels to a position to record the cost of the commodity consumed up to the time of observation, estimated at a given rate a thousand cubic feet or other units of measurement. The recording faces of these wheels are those faces which are in the lowest position, since the recording is effected by the perforation of recording sheets by the pins arranged in the form of the proper recording digits.

The recording wheels having revolved in accordance with the consumption, say, for one month from the time that they were last set each at zero, let us suppose that the meter inspector takes a record thereof. For this purpose the inspector unlocks the padlock 13, and lifts the upper cover 11. This gives him access to the ends of two recording sheets 66, 67, which project through a slot 68 in the lower edge of the lower cover 12; also to an aperture 69 through which he can insert a key to turn the winding stem. First, however, a key 70 is inserted in a socket 71 in the side of the casing. Said key has a pin 72 on its outer surface which moves in a groove 73 in the socket, and the key can only be inserted when the pin aligns with the groove, and, after having been inserted and turned, can only be withdrawn when the pin registers with the groove, thus assuring that the parts are restored to their original position before withdrawal. The key is thus passed on to the squared end 74 of a shaft 75 extending across the frame of the machine and rocking in bearings 76 on the underside of the plate 16. Said shaft carries at its ends eccentrics 77, which rotate in collars 78, retained by outer eccentric plates 79, said collars having lugs 80 connected together by a bar 81 extending across and over the carrier plate 29 and secured thereto. The inspector then turns the key, and thereby, through the eccentrics 77 and bar 81, depresses the carrier plate and the recording wheels 32, 33, 34, and 38 carried thereby. The lowest pins on said wheels are thus caused to pass, first, through openings 82 Fig. 6 cut out of a retaining plate 83 secured upon, but spaced from the plate 16, then through three recording sheets 66, 67, 84, then through openings 85 in the plate 16, and into rubber blocks 86 secured to the plate 16 by frames 87. The recording sheets are supplied from rolls 88 removably supported upon standards 89. They pass between the plates 16 and 83, and the rubber blocks are supplied underneath them in order to support them against the downward pressure of the pins as they are being pierced by said pins. In this manner said record sheets are perforated to furnish a record of

the month in which the record is taken and of the cost of the commodity supplied since the previous record was taken in the preceding month. But in addition to these variable records of the months and cost, there may also be marked, by perforations of the recording sheets, constant words or other characters, as, for instance, the name of the company supplying the commodity, the marks \$PRM before the figures which indicate the cost, or any other desired characters. This is effected by means of pins 90 secured on the underside of the carrier plate 29, which pins pass, first through individual holes 91 in the retainer plate 83, then through the sheets of paper, and then through individual holes 92 in the plate 16. Individual holes in the fixed plates 83 and 16 are possible for these pins 90, because they are constant in position, whereas the pins 35, 39, which descend through said plates 83, 16, change for each month.

The pins 90 for making constant words or characters are not absolutely necessary, but may be omitted and sheets of paper may be used having the necessary legends printed thereon. The inspector will now turn back the key sufficiently far to enable the winding or resetting mechanism to be brought into operation, which can only be operated when the pins have been completely withdrawn from the paper. When the carrier plate 29 has risen to a sufficient height for this purpose, a spring actuated pin 93, sliding in a guideway 94, enters a socket 95 in the side of the casing, Figs. 9 and 10 and offers a slight resistance to the further upward movement of the carrier plate 29, thus notifying the inspector that the resetting mechanism may be operated. The end of the pin 93 is sufficiently rounded to leave the socket upon a further upward movement of the carrier plate. There is also provided a pointer 59 attached to the guideway 94 and moving in a slot 64 in the casing, Figs. 3 and 5 the position of which pointer also indicates the level of the carrier plate. It is arranged that when the carrier plate has risen to this level, the gear wheel 40 is out of mesh with the gear wheel 41, but is in such position that a gear wheel 96 on the end of a winding shaft 97, if moved axially, or in the direction of said shaft 97, can mesh with the gear wheel 40. To effect this result, the inspector inserts an internally threaded winding key 98 Fig. 5 through the hole 69 in the cover 12, and passes it upon the threaded end of the winding shaft 97. The rotation of the key screws it up on said shaft 97, but when the end of the key impinges against a bearing 100 for the shaft 97, the continued winding draws the shaft 97 forward against a spring 101, and thereby moves the gear wheel 96 on the rear end of the shaft into mesh with the gear

wheel 40 and thereafter the turning of the shaft 97 rotates said gear wheel 40. Said gear wheel 40 is then rotated until all the wheels 32, 33, 34, are brought to zero. The inspector now unscrews the winding key, the spring 101 then moving the gear wheel 96 away from the gear wheel 40, so that the plate 29 can continue to rise. As the inspector turns back the key 70 still farther, the recording sheets 66, 67 will be advanced through the slot 68 and the third sheet 84 will be wound up by the following mechanism. The bar 81 extends into a slot 103 in the end of the short arm of lever 104 pivoted on the plate 19, the long arm of said lever being pivoted to the slotted end of a link 105, Fig. 3, the lower end of which is pivotally attached, by one of a series of holes 106, to a lever 107 loose on a shaft 108, the other end of the lever 107 carrying a spring actuated pawl 109 Fig. 11 which engages a ratchet wheel 110 fast on said shaft 108. When the eccentrics return, the first part of the return movement lifts the pins out of the perforations made in the recording sheets and leaves the sheets free to advance, and, on account of the slots, said pins are clear before any rotary movement commences. Said shaft 108 carries a gear wheel 111, Figs. 7 and 11 which meshes with pinions 112, 113 on the shafts of rollers 114, 115, the shaft of the roller 115 being removably held at one end in a separable bearing 116 Fig. 7. These two rollers 114, 115 therefore advance the three recording sheets said sheets passing between the roller 114, having friction bands 117, and an upper roller 118, two of the sheets 66, 67 passing through the slot 68, while the third sheet 84 passes around an idle roller 119 and is then wound up on the roller 115.

It is important to prevent any backward movement of the recording sheets and therefore there are provided two spring actuated dogs 120 which engage a ratchet wheel 121 secured to the gear wheel 111 and prevent backward movement thereof.

As upon turning back the key 70 the plate 29 rises to its highest level, a spring metal pawl 122 engages a ratchet wheel 123 secured to the dating wheel 38 and turns it through one-twelfth of a revolution, thus bringing the pins for the name of the next succeeding month into position to perforate the recording sheets. A spring metal dog 124 engaging in succession radial grooves 125 in the face of the wheel centers the wheel faces, so that the pins will be in the proper position. The key 70 will now be in such position that it can be withdrawn from the socket 71, and this position will be indicated to the operator by the spring 99 which is, in this position, able to press the key 70 outward. The inspector now tears off the parts of the recording sheets 66, 67, which have

passed through the slot 68, delivers one of them to the customer, collecting the amount due, and turns in the other at the office of the company. The third record is preserved
 5 in a continuous sheet as a check upon the other records and may be removed from time to time and compared with said records. This may be done either by removing the roller 115 to take off the third record, or
 10 by turning back said roller, which can be done without turning back the shaft, on account of the following construction. The roller 115 is movable longitudinally on its shaft 126 Fig. 8 and is pressed by a spring
 15 127 against a friction disk 128 fixed on said shaft, said spring being contained in a recess 129 in said roller and compressed between the end of said recess and a ring 130 on the shaft. This provides sufficient friction
 20 to cause the roller to revolve with the shaft to wind the paper, but permits the roller to revolve on the shaft in the reverse direction to unwind the paper.

It may be required that the fact that the
 25 recording wheels have been turned to zero be shown upon the records. This may be done by arresting the further upward movement of the plate 29 after the turning to zero and before the dating wheel has been
 30 turned, but after the recording sheets have been advanced to a sufficient distance, and then depressing said plate a second time, which will cause a second record to be made on the sheets, showing the record wheels to
 35 have been set at zero.

In order to supply fresh rolls of recording sheets, it is necessary to unlock the second cover 12, when the bottom 3, which is hinged to the back 4, drops, permitting access to
 40 the rollers of the recording sheets, which may be removed, and rollers with full sheets replaced.

It will be seen that this device prevents fraudulent returns of the meter readings, and economizes in the number of bookkeepers, and other expense connected with bookkeeping.

I claim:—

1. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel for
 50 intermittently advancing said recording wheel, means for moving the recording wheel bodily to take a record therefrom, an operative connection between said gear wheel and gearing, inoperative when the wheel has
 55 been so moved and means adapted to be brought into operative connection with said gear wheel when the latter is out of operative connection with the gearing to turn said wheels to zero, substantially as described.

2. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel, an

operative connection between said gear wheel and recording wheel whereby the recording wheel is advanced intermittently from the continuous advance from the gear wheel, means for moving the recording wheel
 70 bodily to take a record therefrom, and a connection between said gear wheel and gearing, operative in the normal position of the recording wheel but inoperative when the wheel has been so bodily moved, substantially as described.

3. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel for
 80 advancing said recording wheel, means for moving the recording wheel bodily to take a record therefrom, an operative connection between said gear wheel and gearing, and means adapted to be brought into operative connection with the gear wheel when the
 85 latter has been bodily moved as aforesaid whereby said wheel may be turned independently of the gearing, substantially as described.

4. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, an operative connection between said gearing and recording wheel whereby the recording wheel is
 90 advanced intermittently from the continuous advance of the gearing, means for moving said recording wheel bodily to take a record therefrom, and means for turning said recording wheel independently of the gearing, substantially as described.

5. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel for
 105 advancing said recording wheel, said wheel being operatively connected with the gearing, means for moving said recording wheel bodily to take a record therefrom, a shaft, a gear wheel thereon, and means for moving said latter gear wheel into mesh with the former when the recording wheel has
 110 been so moved bodily and revolving said recording wheel independently of the gearing, substantially as described.

6. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel meshing with the gearing and operatively connected with the recording wheel whereby the latter is advanced intermittently from the continuous advance of the gear wheel,
 120 a shaft having a gear wheel thereon, and means for moving said latter gear wheel into mesh with the former gear wheel when the recording wheel has been moved bodily as aforesaid, substantially as described.

7. In an apparatus of the character described, the combination of a recording wheel, a gear wheel operatively connected therewith, a longitudinally movable shaft threaded at one end, a gear wheel on said
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shaft, an internally threaded winding key on said threaded end, and an abutment against which said winding key impinges after it has been screwed through a predetermined distance on the threaded shaft, whereby the continued turning of said key moves said shaft longitudinally, substantially as described.

8. In an apparatus of the character described, the combination of a recording wheel, a gear wheel operatively connected therewith, a longitudinally movable shaft threaded at one end, a gear wheel on said shaft, an internally threaded winding key on said threaded end, an abutment against which said winding key impinges after it has been screwed through a predetermined distance on the threaded shaft, whereby the continued turning of said key moves said shaft longitudinally, and a spring resisting said longitudinal movement, substantially as described.

9. In an apparatus of the character described, the combination, with meter gearing, of a recording wheel, a gear wheel meshing with said gearing, and operative connection between said gear wheel and recording wheel whereby the latter is advanced intermittently from the continuous advance of the former, a longitudinally movable shaft, threaded at one end, a gear wheel thereon arranged upon the longitudinal movement of the shaft to be brought into mesh with the first named gear wheel, an internally threaded key on the threaded end of the shaft, an abutment against which the end of key impinges after it has been screwed on the shaft through a predetermined distance, whereby the further revolution of the key moves said shaft longitudinally, and a spring resisting said longitudinal movement, substantially as described.

10. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel and a driving wheel revolving loosely thereon, a coiled spring around the shaft connected at its ends to said wheels, a circular series of cams secured to the driving wheel, a circular series of stops secured to the recording wheel, a radially movable spring-actuated latch, and a guideway therefor secured to the shaft, said latch engaging said stops in succession to arrest the recording wheel and being engaged by said cams in succession to be moved inwardly thereby to release said stops to permit the recording wheel to advance, substantially as described.

11. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel, and a driving wheel loose on the shaft, a stop carried by the recording wheel, a cam carried by the driving wheel, a coiled spring connected at its ends to said wheels, a latch, and a fixed bearing therefor, said latch engaging said stop to arrest the

movement of the recording wheel and being engaged by the cam to be withdrawn from said stop to release said recording wheel, substantially as described.

12. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel and driving wheel revolving loosely thereon, a coiled spring connected at its ends to said recording wheel and driving wheel, a circular series of stops on the recording wheel, a circular series of cams on the driving wheel, a pair of diametrically opposite latches, and a bearing plate therefor secured to the shaft, said latches moving radially from the shaft, each latch in turn engaging one of the stops while the other latch is midway between two stops on the opposite side of the recording wheel, and each latch in turn being engaged by one of said cams, substantially as described.

13. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel and driving wheel revolving loosely on said shaft, a coiled spring connected at its ends to said recording wheel and driving wheel, a circular series of stops on the recording wheel, a circular series of cams on the driving wheel, a disk secured to the shaft between the recording wheel and driving wheel and grooved on one side thereof, latches sliding therein in diametrically opposite directions, and springs for moving said latches radially in the grooves, one of said latches engaging one of the stops, while the other latch is midway between the other stops, and said latches being in turn engaged by the cams, substantially as described.

14. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel and driving wheel revolving loosely thereon, a coiled spring connected at its ends to said recording wheel and driving wheel, a circular series of stops on the recording wheel, a circular series of cams on the driving wheel, a pair of diametrically opposite latches, a bearing plate therefor secured to the shaft, said latches moving radially from the shaft, each latch in turn engaging one of the stops while the other latch is midway between two stops on the opposite side of the recording wheel, and each latch in turn being engaged by one of said cams, and means for centering the recording wheel upon the shaft, said means comprising a radially slidable pin and a socket sleeve on the shaft with which the pin engages, substantially as described.

15. In an apparatus of the character described, the combination of a fixed shaft, a recording wheel and driving wheel revolving loosely on said shaft, a coiled spring connected at its ends to said recording wheel and driving wheel, a circular series of stops on the recording wheel, a circular series of

cams on the driving wheel, a disk secured to the shaft between the recording wheel and driving wheel and grooved on one side thereof, latches sliding therein in diametrically opposite directions, springs for moving said latches radially in the grooves, one of said latches engaging one of the stops, while the other latch is midway between the other stops, and said latches being in turn engaged by the cams, and means for centering the recording wheel upon the shaft, said means comprising a radially slidable pin and a socketed sleeve on the shaft with which the pin engages, substantially as described.

16. In an apparatus of the character described, the combination of a frame for supporting a sheet of paper, a carrier plate adapted to be moved toward said frame, pins secured to the under side of said plate, standards on said plate, a recording wheel pivotally mounted between said standards, said recording wheel having pins thereon adapted to perforate the paper on said frame when the plate is moved thereon, meter gearing, and an operative connection between said gearing and said recording wheel, substantially as described.

17. In an apparatus of the character described, the combination of a frame for supporting a piece of paper, a plate movable toward said frame, a recording wheel and a dating wheel carried by said plate, meter gearing operatively connected with said recording wheel, and means for turning the dating wheel, operated by the movement of the plate, substantially as described.

18. In an apparatus of the character described, the combination of a frame for supporting a sheet of paper, a plate movable to and from said frame, a dating wheel and a recording wheel carried by said plate, a ratchet wheel secured to the dating wheel, a pawl carried by the frame engaging the ratchet wheel, whereby the movement of the plate turns said ratchet wheel and dating wheel, meter gearing, and an operative connection between said meter gearing and the recording wheel, substantially as described.

19. In an apparatus of the character described, the combination of a frame for supporting a sheet of paper, a plate movable to and from said frame, a dating wheel and a recording wheel carried by said plate, a ratchet wheel secured to the dating wheel, a pawl carried by the frame engaging the ratchet wheel, whereby the movement of the plate turns said ratchet wheel and dating wheel, meter gearing, and an operative connection between said meter gearing and the recording wheel, arranged to be discontinued by the movement of the plate, substantially as described.

20. In an apparatus of the character described, the combination of a frame for

supporting a sheet of paper, a plate movable to and from said frame, a dating wheel and a recording wheel carried by said plate, a ratchet wheel secured to the dating wheel, a pawl carried by the frame engaging the ratchet wheel, whereby the movement of the plate turns said ratchet wheel and dating wheel, meter gearing, an operative connection between said meter gearing and the recording wheel, arranged to be discontinued by the movement of the plate, and independent winding mechanism for the recording wheel adapted to be brought into operating connection with the recording wheel when so disconnected, substantially as described.

21. In an apparatus of the character described, the combination of a frame for supporting a sheet of paper, a plate movable to and from said frame, a dating wheel and a recording wheel carried by said plate, a ratchet wheel secured to the dating wheel, a pawl carried by the frame engaging the ratchet wheel, whereby the movement of the plate turns said ratchet wheel and dating wheel, meter gearing, and an operative connection between said meter gearing and the recording wheel, arranged to be discontinued by the movement of the plate, independent winding mechanism for the recording wheel adapted to be brought into operating connection with the recording wheel when so disconnected, said winding means comprising a longitudinally movable shaft, threaded at one end, a gear wheel on the end of said shaft, an internally threaded key on the threaded end of the shaft, an abutment against which the end of the key impinges when it has been screwed on to the shaft through a predetermined distance, whereby the movement of the key then moves said shaft longitudinally, and a spring resisting said longitudinal movement of the shaft, substantially as described.

22. In an apparatus of the character described, the combination of a plate for supporting a sheet of paper, a carrier frame movable to and from said plate, a recording wheel carried thereon, meter gearing operatively connected with said recording wheel in one position of the frame, a winding shaft and a gear wheel thereon adapted to be brought into operative connection with the recording wheel in another position of the frame, and means for moving said winding shaft and gear wheel into such operative connection with the frame when in such position, substantially as described.

23. In an apparatus of the character described, the combination of a plate for supporting a sheet of paper, a carrier frame movable to and from said plate, a recording wheel carried thereon, meter gearing operatively connected with said recording wheel in one position of the frame, a winding shaft and a gear wheel thereon adapted

to be brought into operative connection with the recording wheel in another position of the frame, means for moving said winding shaft and gear wheel into such operative
 5 connection with the frame when in such position, a casing for the above mentioned mechanism, and an indicator operatively connected with the carrier frame and extending through the casing and indicating
 10 by its location the position of the frame, substantially as described.

24. In an apparatus of the character described, the combination of a plate for supporting a sheet of paper, a frame movable
 15 to and from said plate, a recording wheel carried by said frame, meter gearing operatively connected with said recording wheel when in one position, a shaft extending beneath the plate, eccentrics secured to
 20 the ends of the shaft, outside the plate, collars on said eccentrics, and a bar connected to the frame and connected at its ends to said collars, substantially as described.

25. In an apparatus of the character described, the combination of a fixed plate for supporting a sheet of paper, a retaining plate over said fixed plate, between which
 25 plates the paper moves, a carrier plate, movable to and from the fixed plates, pins carried on the under side of the carrier plate, and a wheel having pins on its periphery and
 30 carried on the upper side of said carrier plate, the carrier plate having an aperture through which the pins on the wheel project downward, and the retaining plate and
 35 fixed plate having individual apertures for the fixed pins on the carrier plate and having an opening beneath the wheel through which the pins on the wheel can pass, substantially
 40 as described.

26. In an apparatus of the character described, the combination of a fixed plate for supporting a sheet of paper, a retaining plate over said fixed plate, between which
 45 plates the paper moves, a carrier plate, movable to and from the fixed plates, pins carried on the under side of the carrier plate, and a wheel having pins on its periphery and carried on the upper side of said carrier
 50 plate, the carrier plate having an aperture through which the pins on the wheel project downward, the retaining plate and fixed plate having individual apertures for the fixed pins on the carrier plate and having
 55 an opening beneath the wheel through which the pins on the wheel can pass, and a rubber block supported beneath said opening, substantially as described.

27. In an apparatus of the character described, the combination of a fixed plate, a
 60 carrier plate movable to and from the fixed plate, a registering wheel carried thereby, meter gearing operatively connected with said registering wheel, an independent
 65 wheel for turning said registering wheel,

means whereby, when the carrier plate is moved to a predetermined distance from said fixed plate, the independent wheel may be brought into operative engagement with the
 70 registering wheel, and means automatically operated, when the carrier plate is moved to said distance, to obstruct the further movement of said carrier plate, substantially as described.

28. In an apparatus of the character described, the combination of a fixed plate, a
 75 carrier plate movable to and from the fixed plate, a registering wheel carried thereby, meter gearing operatively connected with said registering wheel, an independent
 80 wheel for turning said registering wheel, means whereby, when the carrier plate is moved to a predetermined distance from said fixed plate, the independent wheel may be brought into operative engagement with
 85 the registering wheel, and a pointer carried by the carrier plate and extending outside the casing to indicate the level of the carrier plate, substantially as described.

29. In an apparatus of the character described, the combination of a plate for supporting a sheet of paper, a frame movable
 90 to and from said plate, a recording wheel carried by said frame, pins on said recording wheel adapted to perforate said paper, meter gearing operatively connected with said recording wheel when in one position, means for moving said frame to and from
 95 said plate to cause the pins to perforate the paper, and means, operated with the return movement of the frame but only after the pins have left the paper, to advance said paper, substantially as described.

30. In an apparatus of the character described, the combination of a pair of rollers,
 105 a plate for supporting recording sheets, said sheets being adapted to pass between said rollers, a pinion on one of said rollers, a winding roller, a pinion thereon, a gear wheel engaging both of said pinions, a
 110 ratchet wheel on the shaft of said gear wheel, a pawl engaging said ratchet wheel to advance the same, a lever carrying said pawl, a carrier plate, a wheel carried thereby having pins adapted to perforate the recording
 115 sheets, means for moving said carrier plate to and from the supporting plate, and means, operative upon the movement of the carrier plate from the supporting plate, to operate said pawl to advance the gear
 120 wheel, substantially as described.

31. In an apparatus of the character described, the combination of three delivery
 125 rolls for recording sheets, a casing, a plate hinged on one side to the casing and carrying said rolls, whereby when said plate is turned on its hinges the rolls can be withdrawn, means for passing said sheets into position to be marked with a record, means
 130 for so marking said record, a casing having

a slot through which two of the sheets are passed, a roller for winding up the third sheet, and means actuated in harmony with the marking means for advancing two of the sheets through the slot and for winding up the third sheet, substantially as described.

32. In an apparatus of the character described, the combination of three delivery rolls for recording sheets, a casing, a plate hinged on one side to the casing and carrying said rolls, whereby when said plate is turned on its hinges the rolls can be withdrawn, means for passing said sheets into position to be marked with a record, means for so marking said record, a casing having a slot through which two of the sheets are passed, a roller for winding up the third sheet, a shaft for said roller, said roller having frictional engagement with said shaft whereby rotation of the shaft advances said roller but permits it to be turned back upon the shaft, and means actuated in harmony with the marking means for advancing two of the sheets through the slot and for winding up the third sheet, substantially as described.

33. In an apparatus of the character described, the combination of counting wheels, recording wheels having on their peripheries pins in the form of digits and having an operative connection with said counting wheels, a shaft upon which said recording wheels revolve, a frame carrying said shaft, a plate surrounding the lower portions of said recording wheels and likewise having on its under side pins in the form of letters or characters, said recording wheels and plate being adapted to be moved on to recording sheets, and means for so moving said frame and plate, substantially as described.

34. In an apparatus of the character described, the combination of counting wheels, recording wheels having an operative connection with said indicator wheels, a shaft on which said recording wheels revolve, a plate surrounding the lower portions of said recording wheels and supporting said shaft, means for moving said wheels and plate on to recording sheets, and means for taking an impression therefrom on said sheets, substantially as described.

35. In an apparatus of the character described, the combination of continuously moving counting wheels, recording wheels having an operative connection with said counting wheels whereby they move intermittently from the continuous movement of the counting wheels, a shaft on which said recording wheels revolve, means for moving said wheels on to recording sheets, and means for taking an impression therefrom on said sheets, substantially as described.

36. In an apparatus of the character described, the combination with counting wheels, recording wheels having an opera-

tive connection with said counting wheels, a shaft on which said recording wheels revolve, a plate surrounding the lower portions of said recording wheels and supporting said shaft, means for moving said wheels and plate on to recording sheets, and means for taking an impression therefrom on said sheets, substantially as described.

37. In an apparatus of the character described, the combination with counting wheels, recording wheels having an operative connection with said counting wheels, a shaft on which said recording wheels revolve, a plate surrounding the lower portions of said recording wheels and supporting said shaft, means for moving said wheels and plate on to recording sheets, means for taking an impression therefrom on said sheets, and means for advancing said sheets, substantially as described.

38. In an apparatus of the character described, the combination with counting wheels, recording wheels having an operative connection with said counting wheels, a shaft on which said recording wheels revolve, a plate surrounding the lower portions of said recording wheels and supporting said shaft, means for moving said wheels and plate on to recording sheets, means for taking an impression therefrom on said sheets, a casing having a slot, a roller within the casing, and means for turning said roller to wind up one of said sheets, another sheet being thereby advanced through the slot, substantially as described.

39. In an apparatus of the character described, the combination with counting wheels, recording wheels having an operative connection with said counting wheels, a shaft on which said recording wheels revolve, a plate surrounding the lower portions of said recording wheels and supporting said shaft, means for moving said wheels and plate on to recording sheets, means for taking an impression therefrom on said sheets, a casing having a slot, a roller within the casing, and means automatically operated upon the return movement for turning said roller to wind up one of said sheets, another sheet being thereby advanced through the slot, substantially as described.

40. In an apparatus of the character described, the combination of means for conducting a fluid, a meter operatively connected with said conducting means and adapted to be actuated by the flow of the fluid, a series of recording wheels, each having formed circumferentially thereon a series of devices for marking numerals, a spring for advancing each wheel, a latch for each wheel preventing its advance, means controlled by the movement of the said meter for withdrawing the latch of the first wheel of the series when the said meter has moved a predetermined distance to permit said wheel to

advance, and means controlled by each wheel except the last of the series to withdraw the latch corresponding to the next succeeding wheel when the preceding wheel has advanced a predetermined amount, substantially as described.

41. The combination of means for conducting a fluid, meter mechanism connected with said conducting means and adapted to be actuated by the flow of the fluid, said mechanism comprising registering means and shafts for actuating the same, recording means, and means for advancing said re-

cording means from said registering mechanism arranged to be operatively connected to and disconnected from said registering mechanism without disassembling the latter, substantially as described. 15

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses. 20

R. W. GALLAGHER.

Witnesses:

FRANCIS M. WRIGHT,
BESSIE GORFINKEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
