

No. 784,712.

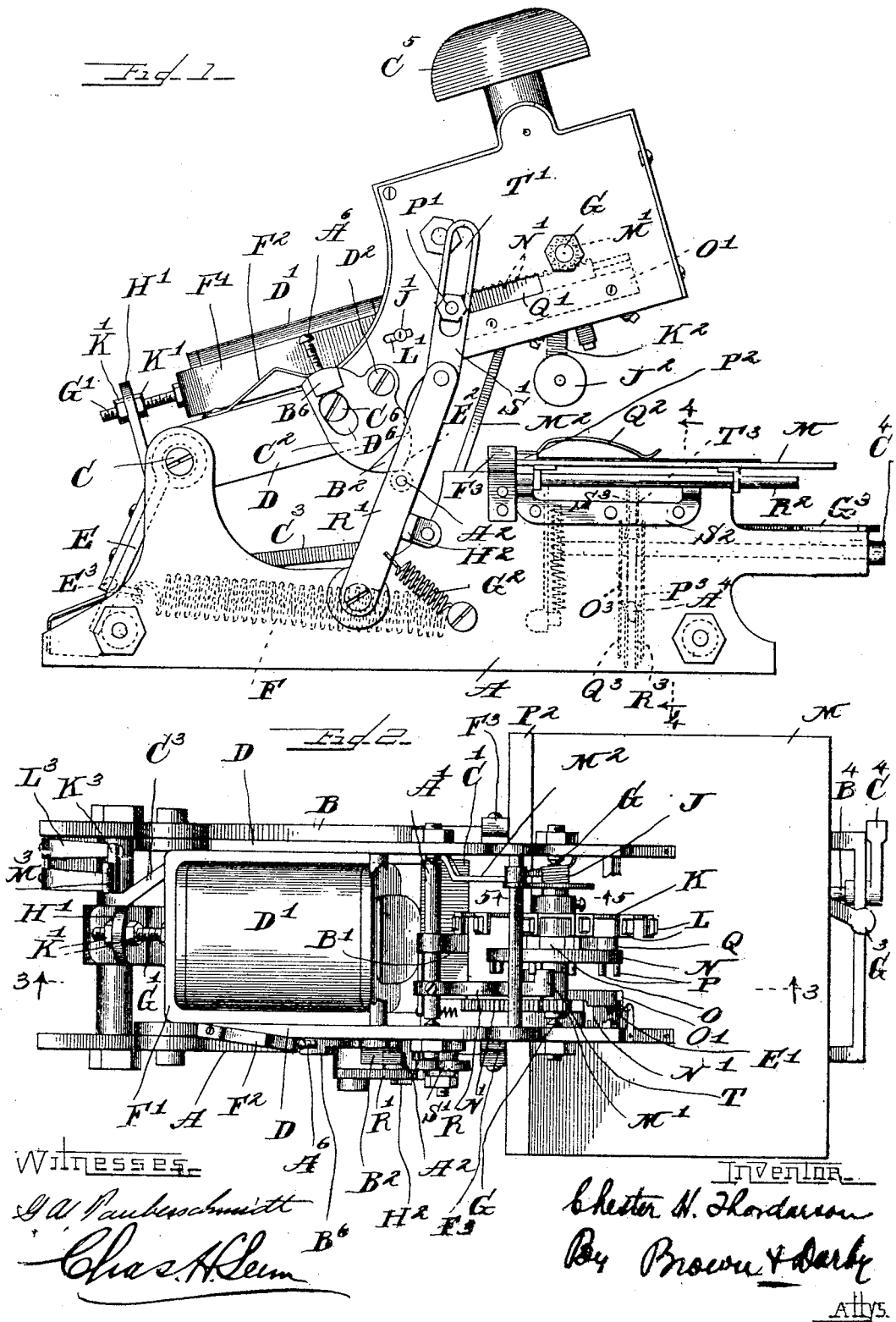
PATENTED MAR. 14, 1905.

C. H. THORDARSON.

ELECTRIC CENTRAL STATION RECORDING MECHANISM FOR METERS.

APPLICATION FILED OCT. 28, 1903.

3 SHEETS—SHEET 1.

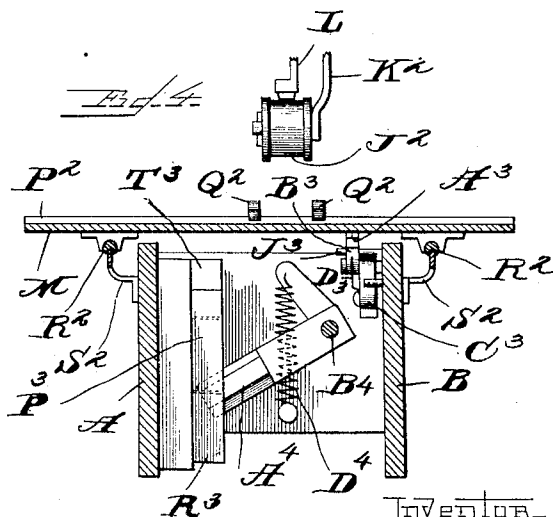
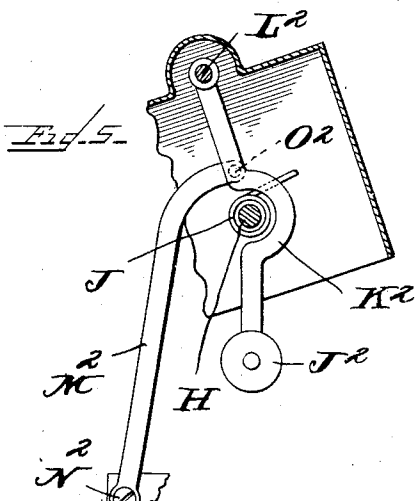
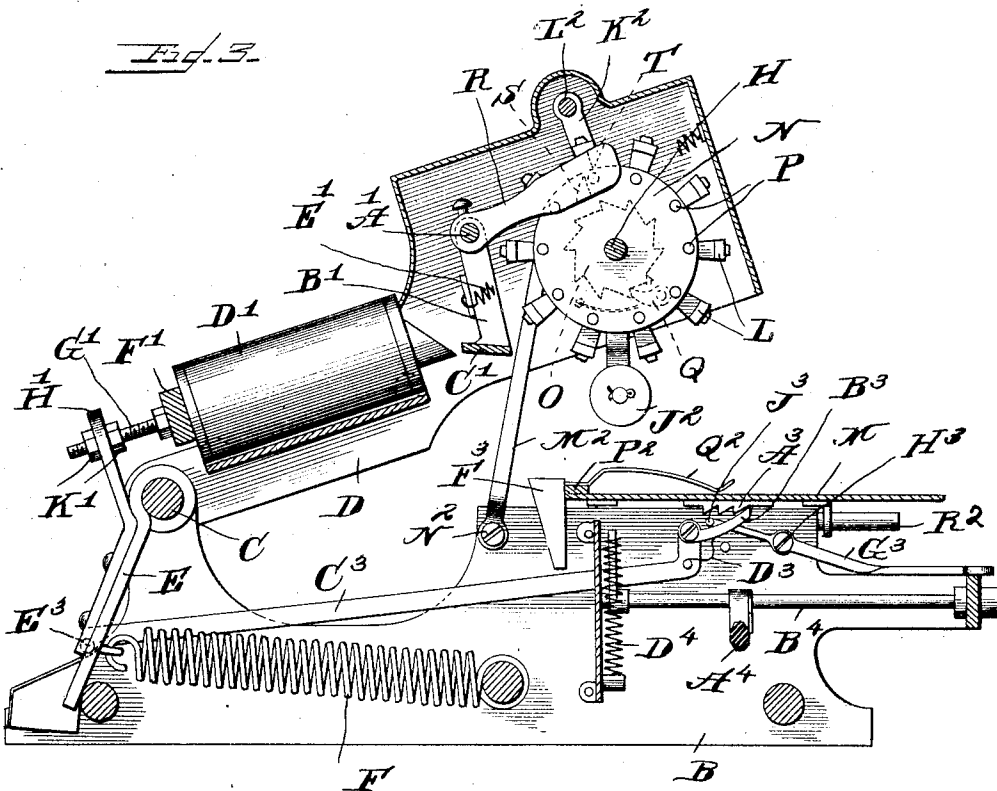


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3 SHEETS—SHEET 2.



Witnesses—

W. A. Paulschmitt
Chas. H. Seim

INVENTOR—

Chester H. Thordarson
By Brown & Darby

ATTY

No. 784,712.

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3 SHEETS—SHEET 3.

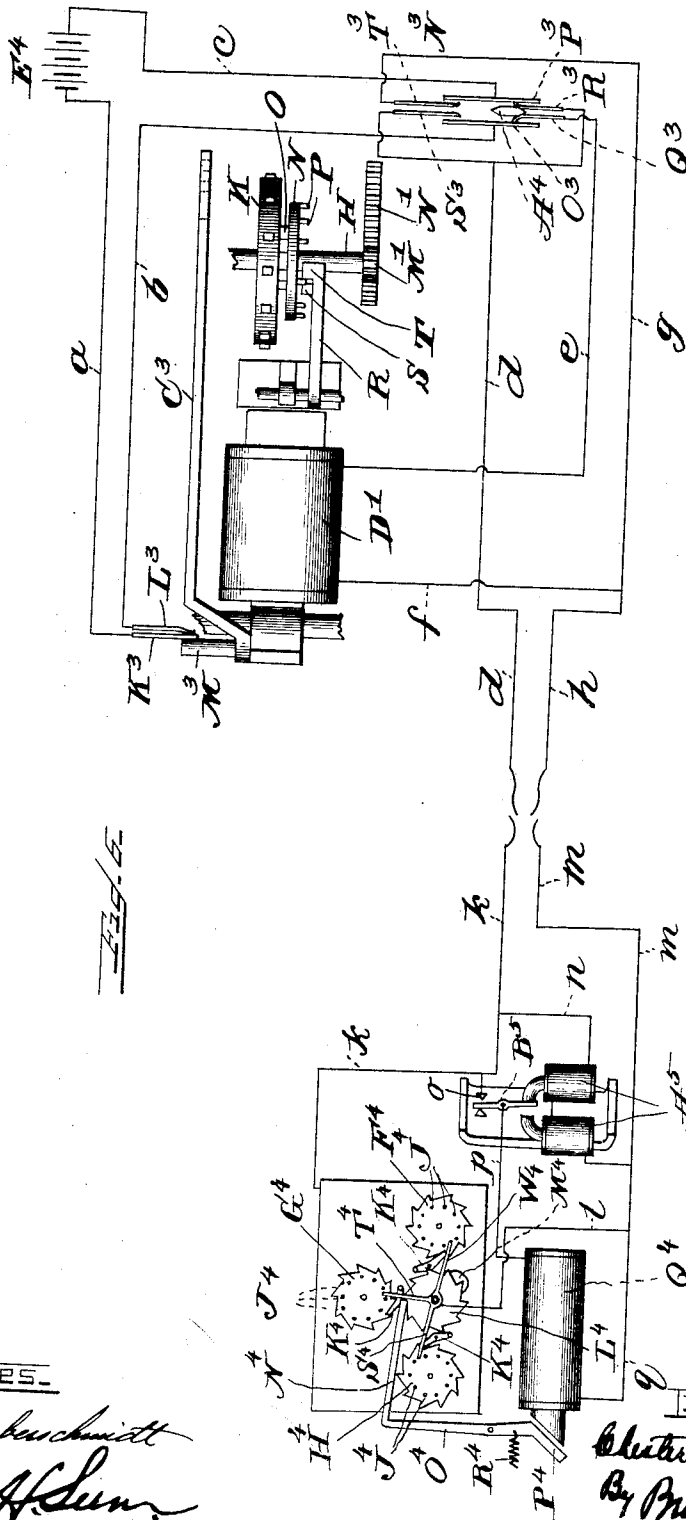


FIG. 6.

WITNESSES.

Chas. H. Lund
Chas. H. Lund

INVENTOR.

Charles H. Thordarson
By Brown & Darby

ATTYS.

UNITED STATES PATENT OFFICE.

CHESTER H. THORDARSON, OF CHICAGO, ILLINOIS.

ELECTRIC CENTRAL-STATION RECORDING MECHANISM FOR METERS.

SPECIFICATION forming part of Letters Patent No. 784,712, dated March 14, 1905.

Application filed October 23, 1903. Serial No. 178,839.

To all whom it may concern:

Be it known that I, CHESTER H. THORDARSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Electric Central-Station Recording Mechanism for Meters, of which the following is a specification.

This invention relates to electric central-station recording mechanism for meters.

The object of the invention is to provide an electrical central-station recording apparatus for meters which is simple and efficient.

A further object of the invention is to provide an apparatus whereby an operator at a central station may effect a record of the readings of meters located at a distance from the central station.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation of a recording apparatus embodying the principles of my invention. Fig. 2 is a top plan view of the same, parts broken out and parts removed. Fig. 3 is a view in section on the line 3 3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a broken detail view in section on the line 4 4 of Fig. 1 looking in the direction of the arrows. Fig. 5 is a broken detail view in section on the line 5 5 of Fig. 2 looking in the direction of the arrows. Fig. 6 is a view somewhat diagrammatic, illustrating the electrical connections and circuits of the apparatus and in association with a meter at a subscriber's station.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

It has heretofore been a common practice with gas, water, electric-light, and telephone, and similar companies which furnish measured service to subscribers to employ meters for

measuring the gas, water, electric current, or the like supplied to a consumer, customer, or subscriber or to register the number of calls made on a telephone instrument and to employ a corps of inspectors to examine the meters periodically and take a reading of the same as a basis for bills rendered to the subscriber, customer, or consumer for the service rendered, supplied, or used. This entails a large expense upon the company in maintaining a corps of inspectors for this duty.

It is among the special purposes of my present invention to provide an electric recording apparatus to be located at a central station—such, for instance, as the general or branch offices of the company—and by means of which a single operator at the central station may accurately read and record the readings of a subscriber's meter or registering mechanism.

It is also among the special purposes of my invention to provide such an apparatus as will enable the operator at the central station to effect a reading and recording of the register or meter at any time, thus dispensing with the services or the necessity for the services of inspectors or other employees such as have heretofore been employed for visiting periodically the residences or other places of location of the meters or registering mechanism of the subscribers.

In the accompanying drawings I have shown a form of apparatus which I have found simple and efficient in carrying out the principles of my invention, but to the specific details of construction and arrangement of which, however, I do not desire to be limited or restricted, as the principles thereof may be embodied in a wide variety of specific constructions and arrangements and still fall within the spirit and scope of my invention.

In the particular form shown I employ a base comprising side plates A and B, suitably spaced apart and bolted together to constitute a base-frame and upon which the recorder mechanism of my invention is mounted. Hinged or otherwise suitably pivoted or mounted upon the base-frame—as, for instance, upon a stud or bolt C thereof—is a movable frame D, upon which the recorder

mechanism is mounted. The recorder-supporting frame D is normally maintained in one limit of its movement in any convenient manner permitting said frame to move. A simple arrangement is shown, but to which my invention is not limited or restricted, wherein the movable frame D is provided with a tailpiece E beyond its point of pivotal connection to the base-frame and to which tailpiece or extension one or more springs F are connected, the tension of said springs operating to rock or move the movable frame D into raised position with reference to the base-frame.

Upon pivot pins or studs G or otherwise suitably mounted or journaled in movable frame D to rotate is a shaft H, the rotation of such shaft in one direction being yieldingly opposed in any convenient manner—as, for instance, by means of the spiral spring J, (see Figs. 2 and 5,) the tension of said spring being exerted upon shaft H to restore same when rotated to initial position.

Mounted upon to rotate with shaft H is a type-wheel K, having type-carrying arms L radiating therefrom. In practice I employ ten type-arms, bearing, respectively, the nine digits and a zero. Under normal conditions the type-wheel K is held in such position that the type-arm thereof which bears the zero designation or type is in position with reference to the table or platen M or a card, strip of paper, or other similar material held thereon to print, indent, or otherwise mark the zero thereon when the frame D is moved toward the base-frame sufficiently for the type carried by said type-arm to impinge upon the card or other surface to receive such imprint; but the shaft H and type-wheel are held in this initial position against the tension of spring J. In other words, when the type-wheel is in the position referred to the spring J is wound up and its tension is applied in a direction to rotate said shaft H and type-wheel, and the type-arms, or rather the type carried by the type-arms, are arranged in such relative order as that when the type-wheel is held in the initial position referred to and is released one step—that is, released so as to be permitted to rotate through a definite distance under the influence of spring J—the type-arm carrying the designation “1” is brought into position to print upon the card or other record-paper placed upon platen or table M, when the movable frame D is again moved relatively to the base-frame for such purpose. If the type-wheel is released two steps, the type-arm bearing the type “2” will similarly be brought into printing position, and so on throughout the entire number of type-arms with which the type-wheel is provided. A step-by-step release of the type-wheel may be effected in many specifically different ways. While, therefore, I have shown and will now describe one form of mechanism for accom-

plishing this purpose, I do not desire to be limited or restricted thereto. In the particular form shown I mount loosely upon shaft H a disk N, carrying pins P, arranged to extend laterally from one face thereof, and I provide means whereby the disk N and type-wheel and shaft H may be coupled to rotate together in one direction, while said shaft and type-wheel are permitted rotation in the opposite direction independent of disk N. I have shown a simple arrangement for accomplishing this result, but to which I do not desire to be limited or restricted, wherein a ratchet-disk O is connected to rotate with the type-wheel, while a pawl Q is mounted upon release wheel or disk N and coöperates with the teeth of ratchet-disk O to permit relative movement of said ratchet-disk with respect to release wheel or disk N in one direction, but compelling coincident rotation of these parts in the opposite direction. Coöperating with the pins P of the release-disk is an arm R, carrying or having formed thereon lugs S and T, constituting stop-lugs and so relatively arranged that when said arm R is held in displaced position, as shown most clearly in Fig. 3, a stop-pin P bears against the stop-lug S, being held thereagainst by the rotative tension imparted to shaft H and the parts carried thereby; but when said arm R is depressed the stop-lug S is thereby caused to be withdrawn from supporting relation with respect to the adjacent pin P, while at the same time the stop-lug T is brought into position to form a stop for and to be engaged by the next adjacent stop-pin P, and when the arm R is restored to its initial position the stop-pin P, which has been arrested by the stop-lug T, is released by the withdrawal of said stop-lug, while at the same time the lug S is again raised or brought into position to form a stop therefor. Thus by rocking lever R a step-by-step release of the type-wheel is effected, thereby permitting step-by-step rotary movement to be imparted thereto to an extent dependent upon the number of times the lever R is rocked. Lever R is mounted upon a stud-shaft A', suitably journaled in the movable frame D, and said shaft may be rocked in any convenient manner—as, for instance, by means of an arm B', mounted thereon and carrying the armature C' of an electromagnet D'. If desired, the rocking of said arm B' upon the energization of magnet D' may be yieldingly opposed in any convenient manner—as, for instance, by means of a spring E'.

From the foregoing description it will be seen that when magnet D' is suitably energized so as to attract its armature C' shaft A' is rocked, thereby causing arm R to move in a direction so as to withdraw stop-lug S from the path of the release-pin P, bearing thereagainst, at the same time bringing stop-lug T into position to form a stop for the

next adjacent pin P, and when magnet D' becomes deenergized arm B' is returned or restored to initial position by means of spring E', thereby moving arm R in the opposite direction, and hence withdrawing stop-lug T from engaging relation with respect to the stop bearing thereagainst, the same movement bringing stop S into position to form a stop for the pin which has been released by the stop-lug T. In order to facilitate the return of arm R to its raised position upon the breaking of the circuit of magnet D', I employ the tension of spring J in addition to the tension of spring E', and this is accomplished by beveling the surface of stop-lug T on the under side thereof and which constitutes a stop. By thus beveling this stop-surface the stop-pin P exerts a wedge action thereon tending to restore said arm R to its initial position, and by reason of this construction and arrangement it will be observed that I avoid derangement of the mechanism, or rather I effect restoration of the printing-wheel-release mechanism to initial position upon the breaking of the circuit of magnet D' and avoid any derangement resulting from a possible sticking of the magnet-armature through residual magnetism or otherwise to the core of the magnet, thus enabling the carrying out of the operations necessary to effect the recording of the readings of a meter or other registering device, as will be more fully explained hereinafter.

The magnet D' may be mounted upon the movable frame D in any suitable or convenient manner—as, for instance, the magnet D' may be carried in a bracket F', mounted upon frame D—and capable of a desirable range of adjustment—as, for instance, by means of a threaded rod G', passing through a flange H' and held in adjusted position by set-nuts K', the bracket F' being guided in the adjusting movements thereof by means of studs J', (see Fig. 1,) extending through elongated slots L' in the side pieces or plates of frame D.

From the foregoing description it will be seen that by successively energizing electromagnet D' a suitable number of times the type-wheel is revolved to such extent as to bring any desired type-arm thereof into position to print. It will be understood that the rotary movements thus imparted to the type-wheel to bring any desired type-arm thereof into printing position is imparted by spring J, which is held under tension when the type-wheel is in its initial or zero position and which is released step by step through the release mechanism above described controlled by the successive energization of magnet D'. After the type-wheel has been rotated so as to bring a particular type-arm into printing position and the printing therefrom has been effected it is desirable that the type-wheel be returned or restored to its initial position and so as to restore the expanded tension of spring J. This

result may be accomplished in many specifically different ways. I have shown a simple arrangement for accomplishing the desired object, but to which I do not desire to be limited or restricted, and wherein I mount a pinion M' upon shaft H and arrange the same to intermesh with a sliding rack N', mounted to slide in a guide O', suitably supported upon the movable frame D. The rack N' is guided in the sliding movements thereof by means of a stud P', carried thereby and projecting through a slot or opening Q' in the side plate of frame D. Suitably pivoted upon the base-frame is an arm R', to the free end of which is pivotally connected a link S', longitudinally slotted, as at T', the guide stud or pin P' of rack N' extending through and operating in the elongated slot T'. Carried by or mounted upon arm R' is a stud or projection A², (see Fig. 1,) arranged to be engaged by a shoulder B², formed on a plate C², suitably hinged or pivoted, as at D², to movable frame D, said shoulder B² having a rounded under surface, as indicated at E², whereby when frame D is moved toward the base-frame the rounded under surface of shoulder B² engages stud or projection A², thereby causing plate C² to rock or swing about its pivot D², so as to carry said shoulder free of stud A². This rocking or swinging movement of plate C² may be yieldingly opposed in any convenient manner—as, for instance, by means of a spring F², said spring operating when shoulder B² has been carried below or past stud A² to rock or swing said plate into position for said shoulder to engage pin or stud A², whereby when frame D is again raised the pin or stud A² is engaged by shoulder B² and arm R' rocked or swung against the tension of a spring G², the tension of which is normally exerted on arm R' to hold the same against a back-stop H². If desired and in order to adjust the plate C² to accommodate any wear that may take place upon the engaging surface of shoulder B², a set-screw A⁶ (see Fig. 1) may be tapped through a projecting lug B⁶, formed on said plate to bear against a guide-stud C⁶, arranged to operate in a curved slot D⁶ in said plate. By suitably turning up or backing off adjusting-screw A⁶ the position of plate C² may be adjusted for wear. The operation of this part of my invention is as follows: When the magnet D' is energized successively the required number of times to release the type-wheel so as to bring the desired type-arm into printing position, rotative movement is thereby permitted to shaft H under the influence of its spring tension J, said spring correspondingly unwinding. This rotative movement, however, through the engagement of pinion M' and rack N' effects an advancement of slide-rack N' a corresponding amount, such movement being permitted by the swinging link S' through the engagement of stud P' in the elongated slot T' thereof, said link merely

swinging about its point of pivotal connection with the free end of arm R'. After the printing-wheel is thus rotated into the desired printing position the frame D is moved relatively to the base-frame, so as to effect the printing operation, thereby causing shoulder B² to be carried down into engaging relation underneath pin or stud A² on arm R', so that upon the release or return of frame D to its initial or raised position the pin or stud A² is engaged by the upper surface of shoulder B² and arm R' thereby rocked against the action of spring G² and in a direction to draw link S' therewith, and consequently also restoring rack-bar N' to its initial position. Of course it will be understood that the slot T' and guide-slot Q' are so relatively proportioned as to length that unless the type-wheel has been rotatively displaced from its initial or zero position, and hence unless the rack-frame N' has been correspondingly displaced through the engagement of pinion M' therewith, the rocking of arm R' by the engagement of shoulder B² with the pin or stud A² thereon will not, of course, effect a restoration or other movement of slide-rack N'; but if the slide-rack is displaced, even to the extent of one step of rotary movement of the type-wheel, said slide-rack is restored to its initial position by the arm-and-link connection and the means for operating the same above described, and the restoration of this slide-rack to its initial position imparts a corresponding rotary movement to shaft H in a direction reverse to that of the rotation thereof under the influence of spring J, thereby winding up said spring or restoring its tension and also restoring the type-wheel to its initial or zero position, but without effecting any reverse rotation of the release-control disk N, such relative movement or reverse rotation of the type-wheel being permitted by reason of the ratchet-and-pawl connection of said type-wheel with the release-wheel N.

It is desirable in apparatus of this nature to provide means for efficiently inking the type carried by the type-arms of the type-wheel where printing is to be effected, and it is desirable that such ink-applying apparatus be so arranged as to be carried into position so as not to interfere with the proper operation of the machine while accomplishing its printing function. This idea may be embodied in many specifically different constructions. I have shown a simple construction and arrangement, but to which I do not desire to be limited or restricted, wherein I mount an inking wheel or roller J² upon a swinging arm K², suitably hinged or pivoted, as at L², to the movable frame D, so as to permit said ink-roller to swing in the plane containing the type-wheel and into and out of position for the type carried by the type-arms to wipe over the peripheral surface of said roller, whereby ink carried thereby is applied to the type.

An arm M² is pivotally mounted, as at N², upon the base-frame and is pivotally connected at its upper end, as at O², (see Fig. 5,) to swinging arm K² and in such relation as to hold said swinging arm, and consequently the ink-roller J², in an initial or retracted position when frame D is in raised position, as shown in Fig. 3, for the type on the type-arms of type-wheel K to wipe over the peripheral surface of said roller during the rotative movement of said type-wheel to bring any particular or desired type into printing position, as above explained; but when said frame D is moved toward the base-frame to accomplish the printing operation the consequent rocking of arm M² about its pivot N² will swing arm K², and with it the ink-roller J², forwardly and out of the path of the type-wheel. The return of frame D to its elevated or raised position restores the ink-roller to its initial or retracted position by reason of the pivotal connections of arms M² and K².

The card, strip of paper, or the like upon which the printing of the record is effected is placed in proper position to receive the imprint of the type when frame D is moved to effect the printing operation and is placed upon the table or platen M, as above referred to, the card or other strip of paper receiving the print resting against a flange or ledge P² and may be clamped or held on the platen or table M in any simple or convenient manner—as, for instance, by means of the spring-strips Q²—firmly in position to receive the imprint of the type.

From the foregoing description it will be seen that the type-wheel is rotarily displaced to bring the desired or proper type-arm into printing position, and after each operation of effecting an imprint of a particular type brought into printing position the type-wheel is returned to initial position and again rotarily displaced to bring another type-arm into printing position, and so on, according to the number of figures required to effect a recording of the meter-reading. For instance, the type-wheel is successively displaced rotarily and returned to initial position to effect a printing of the units, tens, and hundreds digits of the meter-reading. This necessitates a relative movement of the card or strip of paper receiving the imprint with reference to each actuation of the type-wheel into printing position and its operation to effect an imprint. This relative movement may be effected in many specifically different ways. I have shown a simple arrangement for accomplishing the desired object; but I do not desire to be limited or restricted thereto, as many variations therefrom would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. In the particular form shown I arrange the table M to slide or to be advanced with each actuation of frame D to a printing opera-

tion. To this end the table M is mounted to slide upon supporting-rods R², carried by brackets S², mounted upon the side plates A B of the base-frame. To the under side of the table M is secured a rack A³, with which engages and coöperates a pawl B³, pivotally connected to the upturned end of a bar C³ and held by a spring D³ into engaging relation with respect to the teeth of rack-plate A³. The bar C³ is pivotally connected, as at E³, (see Fig. 3,) to the tailpiece or extension E of frame D, so that when frame D is moved to effect a printing operation of the type-wheel the bar C³ is drawn longitudinally in a direction to cause pawl B³ to ride over one tooth of the ratchet-plate A³, and when frame D returns to its raised position bar C³ is projected in the opposite direction, thereby causing the pawl B³ to advance the table M one step. In this manner the table is advanced one step upon each actuation of frame D to effect a printing operation, and hence successively bringing a new space on the surface to be printed into position to receive an imprint from the type-wheel at each actuation of the latter in the operation of effecting a meter-reading. The table M may be returned to initial position against a stop-block F³ by hand or otherwise after a meter-reading has been completed, and to this end any simple means may be provided for disconnecting pawl B³ from engaging relation with respect to rack A³. I have shown for accomplishing this purpose a lever G³, pivotally mounted, as at H³, and having one arm extending beyond the edge of the table in convenient position to be manipulated by the hand of the operator and carrying a pin or projection J³ at its other end arranged in position with respect to pawl B³ to effect a disengagement of the latter from rack A³. By thus detaching pawl B³ from engaging relation with respect to the ratchet A³ the table M may be returned to its initial position. The circuit of magnet D' may be controlled by any suitable or convenient arrangement of switch. I have shown a simple arrangement, to which, however, I do not desire to be limited or restricted, wherein contact-springs K³ L³ are arranged to be pressed into contacting relation with respect to each other by an insulating stud or projection M³, connected to move with the movable frame D, the arrangement being such that when frame D is depressed to effect an imprint upon the record card or strip the circuit between strips K³ and L³ is broken, said circuit being normally closed through the strips K³ L³ when the frame D is held in its raised position.

Associated with the recorder mechanism above described and employed in the operation of the device in effecting a record of a meter-reading is a switch device arranged to control the direction of an electrical current, and which I will consequently designate a "pole-changing" switch. This device is illustrated

generally and diagrammatically at N³, Fig. 6, and may be of any suitable or convenient construction adapted to so change the circuit connections as to alter or vary the direction of flow of the current. In the particular form shown, to which, however, I do not desire to be limited or restricted, I employ contact-plates O³ P³, with which coöperate contact-strips Q³ R³ S³ T³, arranged in pairs, as shown, and I provide means whereby the members of each pair of strips Q³ R³ S³ T³ may be respectively brought into electrical contact with the plates O³ P³. In the present instance this is accomplished by means of an arm A⁴, of insulating material, arranged to extend from a rock-shaft B⁴, which shaft is provided with a crank-arm C⁴, (see Fig. 2,) by which rocking movement may be imparted to said shaft against the action of a retractile spring D⁴, arranged to hold said shaft in an initial position, whereby the insulating-arm A⁴ is held normally between the pair of contact-strips Q³ R³ to press the same respectively into contacting relation with respect to the contact-plates O³ P³; but when shaft B⁴ is rocked the arm A⁴ is carried in the opposite direction and is brought between the contact-strips S³ T³ to effect contact between said strips and plates O³ P³, respectively, while at the same time contact between strips Q³ R³ and plates O³ P³ is broken.

Referring to the diagram in Fig. 6, E⁴ designates a source of current. This may be either a battery, as shown, or any other suitable source—as, for instance, a generator. One side of the source of current is connected, through a wire *a*, to contact-strip K³. The contact-strip L³ is connected, through a wire *b*, with contact-plate O³. The other side of the source of current is connected, through wire or conductor *c*, with the contact-plate P³. The contact-strips S³ R³ are in electrical connection through a line wire or conductor *d*. One terminal of the coil of magnet D' is connected, through wire or conductor *e*, with contact-strip Q³, the other terminal of said coil being connected, through a wire or conductor *f* and *g*, with contact-strip T³ and with a line-wire *h*.

In order that the complete operation of the recorder mechanism in effecting a record of a meter-reading may be fully understood, I have shown in the diagrammatic view, Fig. 6, enough of a register or meter mechanism to illustrate the coöperation of the recorder mechanism therewith. The specific construction of the meter mechanism is unimportant so far as the present invention is concerned, except that such mechanism shall include means whereby the release of the register or meter wheels will effect successively makes and breaks of an electric circuit corresponding to the register of such mechanism. For instance, if the meter registers "537"—that is, if the register has been actuated by the flow of gas, water, electric current, or the like, so as to

register "537" at the meter—the mechanism should be such that when released the units-wheel in returning to initial position will effect a make and break of an electric circuit seven times, the tens-wheel will make and successively break the electric circuit three times, and the hundreds-wheel will make and break the circuit five times. Of course it will be understood that instead of units, tens, and hundreds denomination of register-wheels said register-wheels may be of tens, hundreds, and thousands denominations or otherwise, as will be readily understood by persons skilled in the art. In the diagram in Fig. 6 I have shown contact-wheels in the form of ratchets, designated, respectively, F^1 , G^1 , and H^1 , and each carrying a series of contact-points J^1 , corresponding in number to the type-arms on the type-wheel K of the recorder mechanism, and the wheels F^1 , G^1 , H^1 corresponding, respectively, to the units, tens, and hundreds wheels of the meter or register mechanism and adapted to be rotatively displaced by the flow of gas, water, current, or the like to be measured against a tension tending to return or restore the same to initial position and each held in rotarily-displaced position by pawls K^1 . L^1 designates a release ratchet-wheel, carrying a projection or extension M^1 , arranged to successively engage the locking-pawls K^1 , so as to successively release the make-and-break contact-wheels H^1 , G^1 , F^1 . The release ratchet-wheel L^1 may be actuated in any convenient manner—as, for instance, by means of a pawl-arm N^1 , carried by a pivoted lever O^1 , carrying the armature P^1 of an electromagnet Q^1 , and so relatively arranged that when magnet Q^1 is energized the armature P^1 is attracted against the action of a spring R^1 , so as to withdraw pawl-arm N^1 into position to engage in the next tooth of release ratchet-wheel L^1 , and consequently when magnet Q^1 is sufficiently deenergized the spring R^1 withdraws armature P^1 , rocks lever O^1 , and hence projects pawl-arm N^1 in a direction to rotatively move release ratchet-wheel L^1 one step. By thus successively energizing release-magnet Q^1 a sufficient number of times the cam projection or extension M^1 is first brought into engaging relation with the locking-pawl K^1 of contact-wheel H^1 to release the same if said wheel has been rotarily displaced and permitting the return of said wheel to initial position. Such return causes the contact-points J^1 thereon to make successive contact with a contact-arm S^1 . The further energization of magnet Q^1 causes the cam projection M^1 thereon to engage the locking-pawl K^1 of contact-wheel G^1 , thereby releasing said wheel if it has been rotarily displaced, and hence permitting its return to initial position, thereby causing the contacts J^1 thereon to make successive contacts with a contact-arm T^1 , and similarly contact-wheel F^1 is released, and in returning to initial position the contacts J^1 thereof are caused to make

successive contact with a contact-arm W^1 . The several contact-points J^1 of the contact make-and-break wheels F^1 , G^1 , H^1 are in electrical connection through the frame of the apparatus or the mass and wire or conductor k to the line, while the contact-arms S^1 , T^1 , W^1 are insulated from the base or frame of the mechanism, but are all connected through a conductor l to a line-wire m . A^5 designates a polarized magnet, the coils of which are included in a constantly-closed circuit connection n , bridged across the line-wires k and m . This polarized magnet controls a switch-arm B^5 , through which circuit is made or broken through a contact o with conductor p , through the coils of magnet Q^1 and wire or conductor q to line-wire m , according to the direction of flow of current through the bridging-circuit n .

Assuming now that the line-wires k and l of the recorder mechanism are respectively brought into electrical connection with the line-wires k and m of the meter or register mechanism, I will describe the complete operation of the apparatus in effecting a recording at the central station of a reading of the meter located at a distant point—as, for instance, at the residence or place of business of a subscriber or consumer—and in order to illustrate the operation I will assume that the meter has been operated by the flow of gas, water, current, or the like to be measured so as to register "537." With the apparatus in the normal position of the parts thereof and the frame D raised, as shown in Fig. 3, circuit is completed from the source of supply at E^1 , as follows: conductor a , contact K^3 , contact L^3 , conductor b , contact-plate O^3 , Q^3 , c , D' , f , h , m , A^5 , n , h , d , R^3 , P^3 , e , to the other side of the source of current at E^1 . The current traversing this path is sufficient to cause switch B^5 to be held in position to break the circuit of magnet Q^1 ; but the tension of spring E' should be so adjusted as to prevent a sufficient energization of magnet D' to attract its armature C' . The operator now actuates the crank-arm C' of shaft B^1 , so as to successively carry switch-arm A^1 as to cause a break of circuit connection between strips Q^3 , R^3 and plates O^3 , P^3 , respectively, and to make contact between strips S^3 , T^3 and said plates O^3 , P^3 . Upon completion of the circuit between strips S^3 , T^3 the following circuit is completed: from the source E^1 to conductor a , K^3 , L^3 , b , O^3 , S^3 , d , h , n , A^5 , m , h , g , T^3 , P^3 , e , to the other side of the source at E^1 , thus changing the direction of the current through the polarized magnet A^5 and at the same time cutting out or bridging the coils of magnet D' . The change in direction of the current through the polarized magnet A^5 causes switch B^5 to be actuated to contact with contact-point o , thereby completing the circuit of magnet Q^1 through the same circuit above traced from the source of current E^1 to line-wire k , where the current di-

vides, part flowing through the polarized magnet, as above described, and the other part flowing from k to o , B^5 , p , Q^4 , q , and m , back to the source of current above described, the energization of magnet Q^4 resulting in the operation of pawl-lever N^4 to retract the same into position, enabling said pawl to rotatively actuate release ratchet-wheel L^4 through one step of rotary movement, when the circuit of magnet Q^4 is again broken. After the operator has completed the circuit above described by depressing the crank-arm C^4 of shaft B^4 said crank-arm is released and switch-arm A^4 is returned to its initial position, or the position shown in Fig. 6, thereby breaking the circuit of magnet Q^4 through the change in direction of the current through the polarized magnet A^5 and the consequent return of switch B^5 to the position shown in Fig. 6. The operator then repeats the operation by again depressing crank-arm C^4 and repeats the operation a number of times sufficient to rotatively actuate release ratchet-wheel L^4 into position for the cam projection M^4 thereon to engage and release the pawl K^4 , which maintains the contact-wheel H^4 in its rotarily-displaced position. The number of times required to actuate the pole-changing switch N^3 to accomplish this purpose will of course be dependent upon the number of teeth on release ratchet-wheel L^4 . When the contact-wheel H^4 has thus been released, it returns to its initial position if at the time the reading is effected it has been rotarily displaced, and in returning it effects a make and break of circuit through the contact of contacts J^4 with contact S^4 a number of times corresponding to the extent to which said contact-wheel H^4 has been rotarily displaced. It will be observed that when the pole-changing switch-arm A^4 is in position to effect contact between strips S^3 T^3 and O^3 P^3 , respectively, the circuit of magnet D' is broken, but the circuit of magnet Q^4 is completed, and that when the pole-changing switch A^4 is in position to effect contact between Q^3 R^3 and O^3 P^3 , respectively, the circuit of magnet D' is completed, while the circuit of magnet Q^4 is broken. It will also be seen that the energization of magnet Q^4 does not effect anything further than to move pawl N^4 into withdrawn position, so that when the circuit of magnet Q^4 is broken said pawl-arm may be projected to rotarily displace the release-wheel L^4 . Consequently the time required for the retractile spring R^4 to effect a withdrawal of armature P^4 after the circuit of release-magnet Q^4 is broken and a consequent rocking of lever O^4 and projection of pawl N^4 and the actuation of release ratchet-wheel L^4 and the release of contact-wheel H^4 is sufficient to insure a complete return of the pole-changing switch-arm A^4 to its initial position to reestablish the circuit of magnet D' . Therefore the return of contact-wheel H^4 to its initial position, effecting by such re-

turn a successive make and break between contact-points J^4 , carried thereby, and contact-arm S^4 , successively completes the following circuit: from the source of electrical supply at E^4 through a , K^3 , L^3 , b , O^3 , Q^3 , c , D' , f , h , m , l , S^4 , J^4 , the mass of the apparatus, k , d , R^3 , P^3 , e , to E^4 . The completion of this circuit effects an energization of magnet D' sufficient to attract its armature and to release the type-wheel K , and since this circuit is made and broken a number of times corresponding to the number of makes and breaks effected by contact-points J^4 with contact-arm S^4 it will be seen that the type-wheel K is released a corresponding number of times through the rocking movement imparted to release arm R , thereby bringing that type-arm of the type-wheel which corresponds to the position to which the contact-wheel H^4 has been rotarily displaced in the operation of the meter into printing position. Thus in the illustration above referred to where the meter registers or records "537" the contact-wheel H^4 has been rotarily displaced to an extent such as to cause five successive makes and breaks of the circuit between contact-points J^4 and arm S^4 , and consequently the type-wheel K is released, so as to bring the type-arm carrying the type "5" into printing position. The frame D is then actuated or depressed—as, for instance, by being struck upon the handpiece C^5 in the manner of operating a time-stamp—the lowering movement of said frame D resulting in effecting a printing of the number "5" upon the record-sheet. The rotary displacement of the type-wheel, as above explained, results in the application of the peripheral surface of the ink-roller to the type, so as to supply the same with ink to effect the printing. The lowering movement of the frame D also results in breaking the circuit from the source of current between the strips K^3 L^3 , so as to avoid possible derangement of the apparatus during the printing operation. The restoration of frame D to its elevated or raised position restores contact between strips K^3 L^3 , restores the ink-roller to its initial position ready to supply ink to the type of the type-wheel in its further operation, and also, through the arm R' , shoulder B^2 , stud A^2 , and link connection S' , returning or restoring the type-wheel to its initial or retracted position ready for the next operation. The operator now again depresses crank C^4 —that is, he again actuates the pole-changing switch in the same manner as above described a sufficient number of times to cause the release ratchet-disk L^4 to again advance so as to effect a release of contact-disk G^4 . In the illustration above given this wheel is displaced to a position corresponding to the numeral "3," so that in returning it effects three successive makes and breaks of the circuit above described by reason of the contact of contact-points J^4 thereon with contact-arm T^4 , thereby re-

leasing the type-wheel through three steps of its rotative movement, and hence bringing the type-arm bearing type-numeral "3" into printing position in the same manner as above described, and hence into position for frame D to be again depressed to effect an imprint of the numeral "3" upon the record card or strip carried upon table M, it being remembered that the previous return of frame D to its elevated or raised position advanced the table M one step, so as to bring a fresh surface of the record sheet, strip, or card into printing position with reference to the type-wheel. The operator now again depresses crank-arm C¹—that is, actuates the pole-changing switch N³, so as to effect a release of contact-wheel F¹ of the meter mechanism, such release being effected in identically the same manner as above explained by reason of the further rotative movement of release ratchet-wheel L¹. The release of this contact-wheel in the instance above given effects a make and break of circuit through contact-points J¹ thereon and contact-arm w¹ seven times, thereby rotarily displacing the type-wheel to an extent sufficient to bring the type-arm bearing the type-numeral "7" into printing position, at which time the frame D is again depressed, thereby effecting a record of the numeral "7" on the record-card, thus completing the record at the central station of the reading of a meter located at a distant point.

It is obvious that any desired line-circuit connection may be made between the meter and the recorder mechanism—such, for instance, as the ordinary telegraph, telephone, or electric-light circuits, when such circuits are not otherwise in use—or an independent circuit system may be employed specially for the meter and recorder mechanism.

In practice I propose to employ a polarized magnet A² of the meter mechanism with about eighteen hundred ohms resistance, while the resistance of magnets Q¹ and D¹ are respectively about fourteen hundred and one thousand ohms resistance, though these relative proportions may be varied or changed as desired.

From the foregoing description it will be seen that I provide a simple and efficient apparatus for recording meter or register readings from a central station, and hence enabling a recorder mechanism to be plugged into a number of circuit connections for distant meters or registers, and hence enabling one operator at the central station to effect quickly and accurately and in a short space of time a record of a large number of meters located at distant points throughout a city, for instance, and thereby saving the expense of maintaining a large army of inspectors for accomplishing this work. It will also be observed that I secure absolute accuracy in the operation.

Having now set forth the object and nature

of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a central-station recording mechanism for meters, and in combination with a meter, including means for successively registering unit-tallies and such units in units of higher denomination and circuit make and break devices, a recorder mechanism including a printing-wheel, and means arranged in the circuit made and broken by the make and break devices of the meter for successively actuating the printing-wheel of the recorder mechanism to position to record the tallies in such meter, as and for the purpose set forth.

2. In a central-station recording mechanism for meters, and in combination with a meter, including tally-registering mechanism and circuit make and break devices, a recorder mechanism including a printing-wheel, and means arranged in the circuit made and broken by such make and break devices for successively positioning the printing-wheel of the recorder mechanism in accordance with the tally-registers, as and for the purpose set forth.

3. In a central-station recording mechanism for meters, printing devices including a printing-wheel, electrical devices for positioning the printing-wheel, a meter including registering mechanisms, and means actuated by registering mechanisms of the meter for controlling the circuit of said electrical devices in accordance with the registers of such registering mechanisms, as and for the purpose set forth.

4. In a central-station recording mechanism for meters, printing devices, electric means for controlling the printing position of said devices, a meter including means for registering thereon unit-tallies and in units of higher denominations, said registering means controlling the circuits of said electrical devices, as and for the purpose set forth.

5. In a central-station recording mechanism for meters, printing devices including a type-wheel, means for imposing a rotative tension upon said wheel, electrical devices for releasing said wheel, and a meter mechanism including means for registering by unit-tallies, said mechanism controlling the circuits of said electrical devices, as and for the purpose set forth.

6. In a central-station recording mechanism for meters, a recorder, including printing devices, means for imposing a tension upon said devices tending to move the same, electrical devices for releasing said printing mechanism for positioning the same for the printing operation, and a meter mechanism including means for registering by unit-tallies, said means controlling the circuit of said electrical devices, as and for the purpose set forth.

7. In a central-station recording mechanism for meters, a printing mechanism normally held under a tension tending to shift or move the same, electrical devices for controlling the

release of said printing mechanism whereby said mechanism is permitted to move into printing position, a meter including means for registering unit-tallies and such units in units of higher denomination and means for controlling the circuit of said electrical devices from the meter registering mechanism, as and for the purpose set forth.

8. In a central-station recording mechanism for meters, printing mechanism, means normally maintaining said printing mechanism under a tension tending to move the same, release mechanism for controlling the movement of said mechanism under the influence of said tension, electrical devices for operating said release mechanism, and a meter including means for registering unit-tallies and in units of higher denominations, said registering mechanism operating to control the circuit of said electrical devices, as and for the purpose set forth.

9. In a central-station recording mechanism for meters, a printing mechanism including a type-wheel, means for normally maintaining said type-wheel under rotative tension, and electrical devices for controlling the release of said type-wheel, a meter including registering means for unit-tallies and said tallies in units of higher denomination, the circuits of said devices being successively controllable from such registering means, as and for the purpose set forth.

10. In a central-station recording mechanism for meters, printing mechanism including a type-wheel, means for imposing a rotative tension upon said wheel tending to rotarily displace the same, a release mechanism for controlling the extent of rotary movement of said wheel under the influence of said tension, electrical devices for controlling said release mechanism, a meter including registering means for unit-tallies and said tallies in units of higher denominations, the circuit of said electrical devices being controlled successively by such registering means, as and for the purpose set forth.

11. In a central-station recording mechanism for meters, a printing mechanism, a meter including registering devices for unit-tallies and such tallies in units of higher denominations, means controllable by said registering devices for automatically positioning said printing mechanism for the printing operation, and means for restoring the printing mechanism, and means for restoring the registering devices to normal positions, as and for the purpose set forth.

12. In a central-station recording mechanism for meters, a printing mechanism, means for maintaining the same under tension normally tending to shift or move the same, in combination with a meter, the readings of which are to be recorded, and means controllable by said meter for automatically positioning the printing devices, and means for re-

storing the printing mechanism to initial position.

13. In a central-station recording mechanism for meters, printing mechanism including a printing-wheel, means for imposing a rotative tension upon said wheel, a meter including registering devices, electrical devices automatically controllable from the registering devices for releasing said printing-wheel whereby said wheel is brought into printing position, and means for restoring the printing-wheel to initial position, as and for the purpose set forth.

14. In a central-station recording mechanism for meters, a base-frame, a frame movably mounted thereon, a single printing-wheel carried by said movable frame, electrical devices for controlling the printing positions of said wheel, a meter including registering devices, and operating to automatically control the circuit of said electrical devices to successively actuate said printing-wheel to printing position, and means for returning said wheel to normal position after each operation thereof.

15. In a central-station recording mechanism for meters, a base-frame for supporting a card or strip upon which the record is to be received, a frame movably mounted upon said base-frame, and normally held separated therefrom, a single printing-wheel carried by said movable frame, a meter including registering devices, electrical devices automatically controllable from said registering devices for successively positioning the printing-wheel for printing, and means for returning or restoring said wheel to normal position after each operation thereof.

16. In a central-station recording mechanism for meters, a base-frame, a table supported thereon, a frame movably mounted upon said base-frame and yieldingly held separated therefrom, a single printing-wheel carried by said movable frame, whereby when said movable frame is moved toward said base-frame the desired record is made, a meter including registering devices, electrical devices controllable automatically from the registering devices for controlling the successive printing positions of the printing-wheel, and means actuated by the movement of said movable frame for returning or restoring the printing-wheel to normal position.

17. In a central-station recording mechanism for meters, a base-frame, a table supported thereon, a frame movably mounted upon said base-frame and yieldingly held separated therefrom, printing mechanism carried by said movable frame whereby when said movable frame is moved toward said base-frame the desired record is made, electrical devices controllable automatically from the meter for controlling the printing position of the printing mechanism, and means actuated by the return of said movable frame to initial position for restoring the printing mechanism to its initial position, as and for the purpose set forth.

18. In a central-station recording mechanism for meters, a table or platen to receive the card or strip upon which the record is to be made, a printing mechanism mounted for movement toward and from said table or platen to effect the printing operation, said printing mechanism including a printing-wheel, means normally operating to maintain said printing mechanism separated from said table, a meter including registering devices, electrical devices controllable from said registering devices for successively moving said printing-wheel into printing position with reference to the table or platen, and means operated by the movement of the printing mechanism upon completion of the printing operation for returning or restoring the printing-wheel to normal position.

19. In a central-station recording mechanism for meters, a base-frame, a frame movably mounted thereon and yieldingly held separated therefrom, a printing mechanism carried by said movable frame and including a type-wheel, electrical devices for controlling the printing position of said type-wheel, the circuit of said electrical devices being automatically controllable from the meter, and means actuated by the movement of said movable frame toward the base-frame to effect the printing of the record for breaking the circuit of said electrical devices, as and for the purpose set forth.

20. In a central-station recording mechanism for meters, a printing mechanism including a rotary shaft, a type-wheel mounted thereon to rotate therewith, means for imposing a rotative tension upon said shaft, release mechanism for releasing said shaft, said release mechanism operating to arrest the rotative movement of said shaft at any predetermined point to bring the type-wheel into any desired printing position, a meter including registering devices, means actuated by such registering devices for controlling said release mechanism, and means for restoring said shaft and type-wheel to initial position, as and for the purpose set forth.

21. In a central-station recording mechanism for meters, printing devices including a rotary shaft, means for imposing a rotary tension thereon, a printing-wheel mounted upon to rotate with said shaft, an escapement mechanism, a meter including registering devices, means controllable from said registering devices for automatically releasing said escapement mechanism to bring said printing-wheel into printing position as predetermined by said registering devices, and means for restoring said printing-wheel to initial position, as and for the purpose set forth.

22. In a central-station recording mechanism for meters, a printing mechanism including a rotatable shaft, means for imposing a rotative tension thereon, an escapement mechanism, means for locking said shaft against

rotative movement under the influence of said tension, a printing-wheel mounted on said shaft to rotate therewith, means for detachably connecting said wheel and escapement mechanism, a meter including registering devices, and means controllable by the operation of said registering devices for releasing said escapement mechanism to permit said type-wheel to be brought into printing position as predetermined by the registering devices, as and for the purpose set forth.

23. In a central-station recording mechanism for meters, a printing mechanism including a rotatable shaft, a printing-wheel mounted thereon to rotate therewith, means for imposing a rotative tension upon said shaft, means for locking said shaft against rotary movement under the influence of said tension, a meter including registering devices for unit-tallies and said tallies in units of higher denomination, and automatically-operating devices controlled by the registering devices for releasing said locking mechanism, whereby said printing-wheel is successively brought into printing position as predetermined by the registering devices, as and for the purpose set forth.

24. In a central-station recording mechanism for meters, a printing mechanism including a rotatable shaft, a printing-wheel mounted thereon to rotate therewith, means for imposing a rotative tension upon said shaft, means for locking said shaft against rotation under the influence of said tension including a stop-disk, a pawl-and-ratchet connection between said disk and wheel, and means controllable from the meter for automatically releasing said stop-disk to permit the type-wheel to be brought into printing position corresponding to the action of the meter-controlling mechanism, as and for the purpose set forth.

25. In a central-station recording mechanism for meters, a printing mechanism including a rotatable shaft, a printing-wheel mounted thereon to rotate therewith, means for imposing a rotative tension upon said shaft, means for locking said shaft against rotation under the influence of said tension including a stop-disk, a pawl-and-ratchet connection between said disk and wheel, means controllable from the meter for automatically releasing said stop-disk to permit the type-wheel to be brought into printing position corresponding to the action of the meter-controlling mechanism, and means for restoring said shaft and type-wheel to initial position against the action of said tension, as and for the purpose set forth.

26. In a central-station recording mechanism for meters, a printing mechanism including a rotatable shaft, a printing-wheel mounted to rotate therewith, means for imposing a rotative tension upon said shaft, a ratchet-disk connected to rotate with said wheel, a stop-disk loosely sleeved upon said shaft and

carrying a pawl cooperating with said ratchet, stop mechanism cooperating with said stop-disk for locking said type-wheel in initial position against the tension of said tension mechanism, and means controllable from the meter for automatically releasing said locking mechanism to permit said type-wheel to attain printing position corresponding to the condition of the meter, as and for the purpose set forth.

27. In a central-station recording mechanism for meters, a printing mechanism, a supporting-frame therefor movably mounted to move said printing mechanism to effect a record, a rotatable shaft journaled in said frame, a printing-wheel mounted upon said shaft to rotate therewith, means for imposing a tension upon said shaft, means for locking said shaft against rotative movement under the influence of said tension, automatic devices controllable from the meter for releasing said locking mechanism to position said printing-wheel, and means actuated by the return of said frame to initial position after effecting a record for restoring said shaft and wheel to initial position, as and for the purpose set forth.

28. In a central-station recording mechanism for meters, a movable frame, printing mechanism carried thereby and including a rotatable shaft, a printing-wheel mounted upon to rotate with said shaft, means for imposing a rotative tension upon said shaft, means for locking said shaft against rotative movement to hold said wheel in initial position, means controllable from the meter for automatically releasing said locking mechanism, a pinion mounted upon said shaft, a movable rack with which said pinion engages, and means actuated by the return movement of said frame to initial position for shifting said rack to restore said shaft and wheel to initial position, as and for the purpose set forth.

29. In a central-station recording mechanism for meters, a movable frame, a printing mechanism carried thereby and including a rotatable shaft, means for imposing a rotative tension upon said shaft, printing devices carried by said shaft to rotate therewith, locking mechanism for holding said shaft against rotative movement under the influence of said tension and normally operating to hold said printing mechanism in initial position, means controllable from the meter for automatically releasing said locking mechanism, a pinion mounted upon said shaft, a sliding rack with which said pinion cooperates, and means operated by the return of said frame to initial position for restoring said rack, whereby said shaft and printing devices are restored to initial position, as and for the purpose set forth.

30. In a central-station recording mechanism for meters, a movable frame, a shaft journaled therein, means for imposing a rotative tension upon said shaft, a type-wheel mounted upon to rotate with said shaft, a ratchet-

disk connected to rotate with said shaft, a stop-disk loosely sleeved upon said shaft and carrying a pawl cooperating with said ratchet-disk, whereby said disk and wheel are connected to rotate together in one direction but said wheel is permitted to independently revolve in the opposite direction, a stop-arm cooperating with said stop-wheel for releasing the same step by step, means automatically controllable from the meter for actuating said stop-arm, a pinion mounted upon said shaft, and means engaging said pinion and operated by the movement of said frame for returning or restoring said shaft and type-wheel to initial position under tension, as and for the purpose set forth.

31. In a central-station recording mechanism for meters, a printing mechanism including a type-wheel, means for imposing a rotative tension upon said wheel, a locking mechanism for maintaining said wheel against rotary movement under the influence of said tension and in an initial position and including a stop-wheel, a stop-arm having cooperating engaging lugs, and electrical devices automatically controllable from the meter for actuating said stop-arm to release said type-wheel step by step, whereby said wheel is brought into printing position corresponding to the action of the meter, as and for the purpose set forth.

32. In a central-station recording mechanism for meters, a printing mechanism, means for normally maintaining said printing mechanism in initial or retracted position under tension tending to move the same, release devices therefor, a stop-arm, a spring for maintaining said stop-arm in initial position, an armature for moving said stop-arm, a magnet for moving said armature, and means controllable by the meter for automatically making and breaking the circuit of said magnet, as and for the purpose set forth.

33. In a central-station recording mechanism for meters, a printing mechanism, means for normally maintaining said printing mechanism in an initial position under a tension tending to move the same, a stop mechanism for releasing said printing mechanism step by step and including an arm, stop-lugs carried thereby and separated from each other, one of said stop-lugs presenting a flat engaging surface and the other an inclined or curved engaging surface, and automatic devices controllable from the meter for actuating said stop-arm to release said printing mechanism to an extent corresponding to the operation of the meter, as and for the purpose set forth.

34. In a central-station recording mechanism for meters, a base-frame, a frame pivotally hinged or connected thereto, means for yieldingly maintaining said pivoted frame raised from said base-frame, a printing mechanism carried by said swinging frame, means automatically controllable from the meter for positioning said printing mechanism to an ex-

tent corresponding to the operation of the meter, whereby said printing mechanism is brought into position to print when said movable frame is depressed toward the base-frame, and means actuated by the return of said pivoted frame to initial or raised position for restoring said printing mechanism to initial position, as and for the purpose set forth.

35. In a central-station recording mechanism for meters, a base-frame and a relatively movable frame, a single printing-wheel carried by said relatively movable frame, a meter including registering devices, means controllable by the registering devices for successively rotating said printing-wheel from initial position to an extent corresponding to the action of such registering devices for positioning said printing-wheel, means for returning or restoring said wheel to initial position after each rotative actuation thereof, and means for inking the printing-wheel.

36. In a central-station recording mechanism for meters, a base-frame and a relatively movable frame, a single printing-wheel carried by said relatively movable frame, a meter including registering devices, means controllable by the registering devices for successively rotating said printing mechanism from initial position to an extent corresponding to the action of the registering devices for positioning said printing-wheel, means for returning or restoring said wheel to initial position after each rotative actuation thereof, and automatic devices for supplying ink to said printing-wheel.

37. In a central-station recording mechanism for meters, a base-frame, a movable frame hinged or pivoted thereto and yieldingly maintained raised therefrom, a printing mechanism including a single type-wheel, a meter including registering devices, means controllable from the registering devices for rotatively actuating said printing-wheel successively from initial position to position the same for printing, means for restoring said wheel to initial position after each rotative actuation thereof, an ink-supply device arranged to supply ink to said printing-wheel during the positioning movements thereof, and means for automatically shifting said ink-supplying device out of the path of said printing-wheel when the latter is moved toward the base-frame to effect an imprint.

38. In a central-station recording mechanism for meters, a base-frame, a frame pivotally mounted thereon, means for yieldingly maintaining said pivoted frame in raised position relative to the base-frame, a single printing-wheel carried by said pivoted frame, whereby by rocking said pivoted frame said printing-wheel is caused to effect an imprint or record, a meter including registering devices, means automatically controllable by the registering devices for successively displacing said printing-wheel rotatively into printing

position, ink-supplying devices for said printing-wheel, means actuated by the movement of said pivoted frame toward said base-frame for shifting said ink-supplying devices out of the way, and means actuated by the movement of said pivoted frame away from said base-frame for returning or restoring said printing-wheel to initial position.

39. In a central-station recording mechanism for meters, a base-frame, a frame pivotally mounted to swing thereon, means yieldingly maintaining said pivoted frame in raised position, a single printing-wheel carried by said pivoted frame, whereby when said pivoted frame is rocked or swung toward the base-frame an imprint is made by the printing-wheel, a meter including registering devices, means automatically controllable from the registering devices for successively shifting said printing-wheel rotatively into printing position, an ink-supply roller for said printing-wheel, a swinging arm forming a support for said roller, an arm pivotally connected to said base-frame at one end and to said swinging arm at the other end, whereby when said swinging frame is rocked toward said base-frame said ink-roller is shifted out of the way, and means actuated by the rocking movement of said pivoted frame away from the base-frame for returning or restoring the printing-wheel to initial position.

40. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon and yieldingly held in raised position with reference thereto, a printing-wheel carried by said swinging arm, a meter including registering devices, means automatically controlled by the meter registering devices for operating said printing-wheel rotatively to position the same successively from initial position and including a magnet mounted upon said swinging frame, means for adjusting the position of said magnet and means for restoring said wheel to initial position after each rotative displacement thereof, as and for the purpose set forth.

41. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon, a printing mechanism carried by said swinging frame and normally held in initial position under tension tending to displace the same, means controllable by the meter for automatically releasing said printing mechanism to permit it to be displaced to position corresponding to the action of the meter, and a printing platen or table carried by said base-frame, and means actuated by the movement of said swinging frame for shifting the position of said table or platen, as and for the purpose set forth.

42. In a central-station recording mechanism for meters, a base-frame, a movable table mounted thereon, a printing mechanism, a movable frame upon which said printing mechanism is mounted, said movable frame being

movable toward and from said base-frame to carry said printing mechanism into position to imprint upon a record carried by said table, means controllable from the meter for automatically positioning the printing mechanism, and means actuated by the movement of said movable frame away from the base-frame for shifting the position of said table, as and for the purpose set forth.

43. In a central-station recording mechanism for meters, a base-frame, a table movably mounted thereon, a rack connected to said table, a swinging frame hinged upon said base-frame, a bar connected to move with said movable frame and carrying a pawl arranged to cooperate with said rack, and a printing mechanism mounted upon said movable frame, and means controllable from the meter for automatically positioning the printing mechanism, as and for the purpose set forth.

44. In a central-station recording mechanism for meters, a base-frame, a table movably mounted thereon, a rack connected to said table, a swinging frame hinged upon said base-frame, a bar connected to move with said movable frame and carrying a pawl arranged to cooperate with said rack, a printing mechanism mounted upon said movable frame, means controllable from the meter for automatically positioning the printing mechanism, and manual devices for releasing said pawl to permit said table to be returned to initial position, as and for the purpose set forth.

45. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon, a printing mechanism carried by said swinging frame, means actuated by the meter for automatically positioning the printing mechanism, and means actuated by the movement of said swinging frame for automatically restoring said printing mechanism to initial position, as and for the purpose set forth.

46. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon, printing mechanism mounted upon said swinging frame, means actuated by the meter for automatically positioning the printing mechanism, means for restoring said printing mechanism to initial position including a sliding rack, an arm pivotally mounted upon the base-frame, a slotted link pivoted to said arm, a stud carried by said rack and operating in the slot in said link, and means actuated by the swinging movement of said swinging frame for rocking said arm to restore said rack and printing mechanism to initial position, as and for the purpose set forth.

47. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon, a printing mechanism carried by said swinging frame, means actuated by the meter for automatically controlling the printing position of the printing mechanism, means for restoring the printing

mechanism to initial position, including a slide-rack, a stud carried thereby, an arm pivotally mounted upon said base-frame, lost-motion connecting devices between said arm and rack, and a movable plate carried by said swinging frame and arranged to engage said arm to restore said rack and printing mechanism to initial position, as and for the purpose set forth.

48. In a central-station recording mechanism for meters, a base-frame, a swinging frame pivotally mounted thereon, printing mechanism mounted upon said swinging frame, means actuated by the meter for automatically controlling the printing position of said printing mechanism, and means for restoring said printing mechanism to initial position, including an arm pivotally mounted upon the base-frame, lost-motion connecting devices between said arm and printing mechanism, a stud carried by said arm, a pivoted plate carried by said swinging frame and having an engaging shoulder arranged to cooperate with said stud to rock said arm, whereby said printing mechanism is restored to initial position by the movement of said swinging frame, as and for the purpose set forth.

49. In a central-station recording mechanism for meters, and in combination with printing mechanism and means actuated by the meter for automatically controlling the printing position of said printing mechanism, a pole-changing switch, and circuits arranged to be controlled thereby, as and for the purpose set forth.

50. In an apparatus of the class described, a meter including contact-wheels, locking devices therefor, means controllable from a central station for successively releasing said locking mechanism, circuit make and break devices actuated by the movement of said contact-wheels, electrical devices arranged in the circuits made and broken thereby, and printing mechanism and means actuated by said electrical devices for positioning the printing mechanism, as and for the purpose set forth.

51. In an apparatus of the class described, a meter including circuit make and break devices, release mechanism therefor, a release-magnet for controlling said release mechanism, a polarized magnet for controlling the circuit of said release-magnet, a pole-changing switch at the central station for controlling the circuit of said pole-changing switch, a printing mechanism, and a magnet for controlling the same, the circuits of said magnet being completed and broken by said make and break devices, all combined and arranged as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 23d day of October, 1903, in the presence of the subscribing witnesses.

CHESTER H. THORDARSON.

Witnesses:

CHAS. H. SEEM,
S. E. DARBY.