

F. F. KINNEY.
RECORDING WATTMETER.

APPLICATION FILED JUNE 26, 1907. RENEWED SEPT. 13, 1912.

1,061,182.

Patented May 6, 1913.

3 SHEETS-SHEET 1.

Fig. 1.

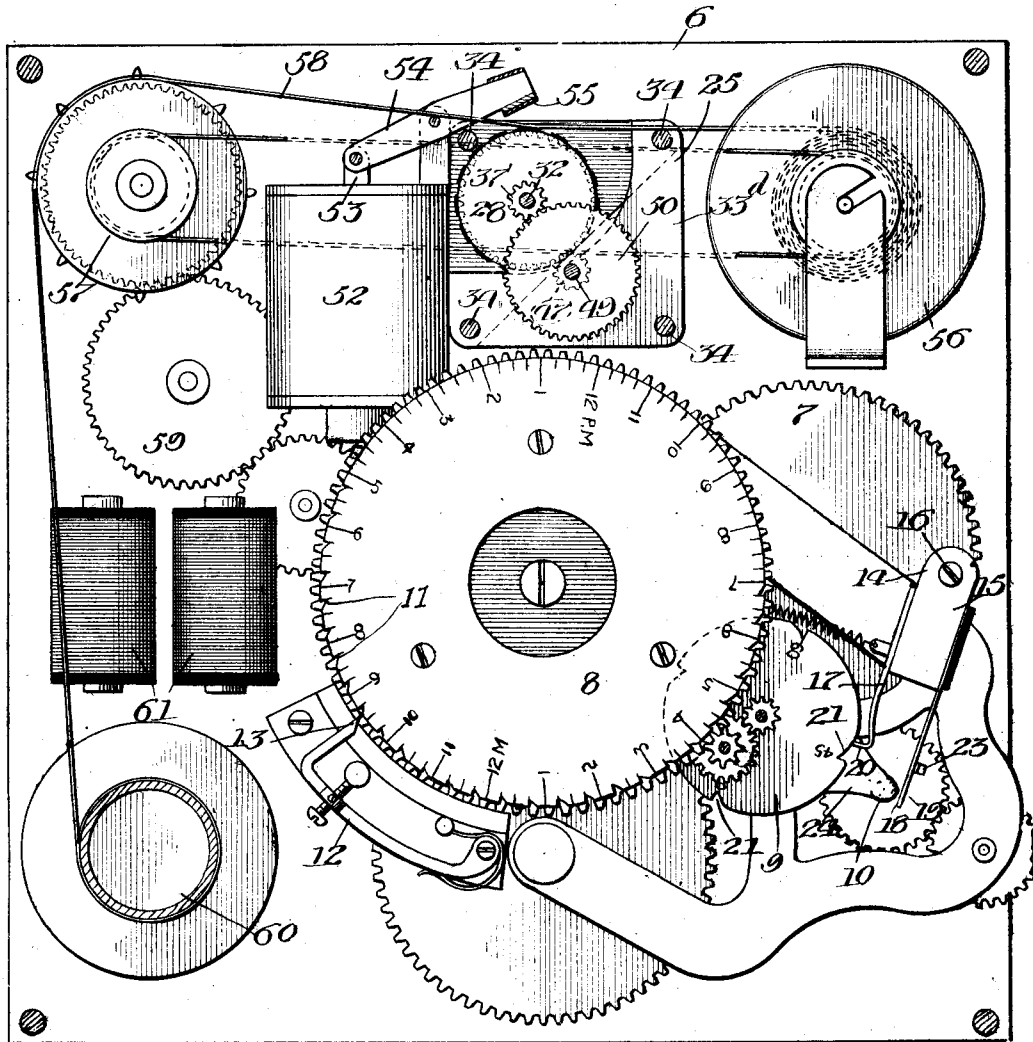
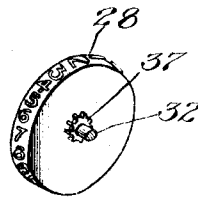


Fig. 4.



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3 SHEETS—SHEET 2.

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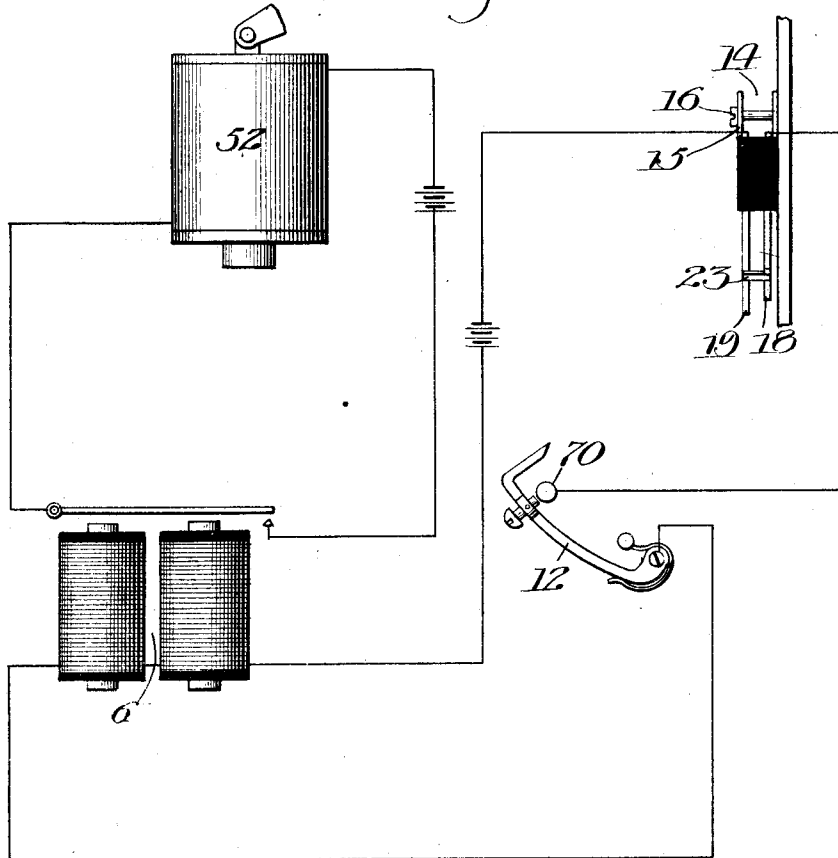
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3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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RECORDING-WATTMETER.

1,061,182.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK F. KINNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Recording-Wattmeters, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings; 5 forming a part of this specification.

My invention relates to recording wattmeters, and especially to the type of meter which will automatically record the integrations of an integrating wattmeter mechanism at predetermined stated intervals.

Prominent objects of the invention are, to provide a simple and practical printing mechanism for automatically printing the wattmeter integrations; to arrange the same in connection with an integrating wattmeter and recording mechanism so that a minimum space will be occupied and an advantageous arrangement made; and to secure the foregoing and other advantageous results in a simple and expeditious manner.

In the present application I show an integrating recording wattmeter involving the general features of construction and operation set forth in an application of mine Serial No. 373,523, filed May 13, 1907. In the present application I show an improved printing mechanism especially adapted for use in connection with the recording wattmeter of my said other application, and also combined with integrating wattmeter mechanism in an efficient and advantageous manner. Said printing mechanism, however, is capable of use with other recording mechanisms and adapted for combination therewith or attachment thereto. 40

In the accompanying drawings, Figure 1 is a side elevation of a recording integrating wattmeter embodying the general features of construction and operation of my said other application, and having a printing attachment embodying my present invention; Fig. 2 is a plan view of the same; Fig. 3 is a view of the printing attachment; and Fig. 4 is a detail of construction; Fig. 5 is a diagrammatic view illustrative of the circuit connections.

Referring first to Figs. 1 and 2, 1 represents an integrating wattmeter mechanism of any preferred style or form, that shown being a well known type of integrating watt-

meter involving the rotary disk 2 and permanent magnets 3, 3, cooperating therewith. Said wattmeter has a rotary spindle 4 which projects from the case containing its mechanism, and is adapted for connection with suitable recording mechanism, said spindle being rotated according to the integrations of the meter. Connected with the wattmeter 1 as by posts or struts 5, 5 is a case 6 supporting a containing mechanism by which the integrations of the wattmeter are automatically recorded at predetermined periods of time. This mechanism as shown, comprises a clock-work 7 which may be of any suitable or preferred type. This clock-work is provided with a wheel 8 which is so connected as to rotate once every twenty-four hours, which I will call a 24-hour wheel, or simply an hour wheel. The clock-work is also provided with a wheel 9 which rotates once every hour, which I will call a minute wheel in as much as it indicates the minutes; also a wheel 10 rotating once each minute which I call the second wheel as it indicates the seconds.

The hour wheel 8 is provided with a series of notches 11, 11 which are located at periods where it is desired to make a record of the wattmeter integration. As shown, this wheel is provided with notches located each half hour apart from 5 a. m. until 7 p. m. and also one notch at 12 midnight, so that the readings will occur at these points of time.

A contact device 12 is arranged in connection with the hour wheel 8, having a pointed finger 13 adapted to fit into the notches 11, 11. A contact device 14 is provided in connection with the minute and second wheels 9 and 10, said device consisting of a block 15 of insulating material pivoted at 16 and provided with a spring arm 17 and a pair of spring fingers 18 and 19 on the other side. The spring arm 17 has a bent end adapted to fit into notches 21, 21 in the wheel 9, said notches being located at 90 degree intervals from one another; that is to say, at intervals of fifteen minutes apart on this minute wheel. The spring fingers 18 and 19 are adapted to rest upon the wheel 10 and the finger 18 is shorter than the finger 19 and is provided with a contact spring 23 which extends over the finger 19. The arrangement is such that the spring arm 17 falls into one of the notches 21 of the

the wheel 9 at one of the fifteen minute intervals and the two fingers 18 and 19 rest upon the wheel 10 but as said wheel turns its abutment 24 passes under said fingers and permits the finger 18 to drop first because of its length; and when this finger drops, the contact strip 23 makes connection with the finger 19 and this connection lasts during the period of one second, which is the time required for the abutment to pass from under the finger 19 after the finger 18 has dropped. Thus a circuit connection is made through the fingers 18 and 19 for the period of one second, at exactly the instant when a reading is to be taken. The hour wheel 8 having notches at half hour intervals, will permit the contact to be made by the contact device 14 at the exact minute and second of such half hour periods, it being understood that both the contact devices 12 and 14 are included in one and the same circuit, so that both of them must be closed in order to complete said circuit.

The printing device 25 is mounted at the top of the case 6 and consists of a case containing printing type wheels and connections as will now be described. There are four type wheels 26, 27, 28 and 29 mounted between side walls 30 and 31 of the case and parallel with said sides. Each of said wheels is provided with two sets of numerals, each set running from 0 to 9 inclusive (Fig. 4). In this way the wheels are larger than they otherwise would be and the types are therefore more nearly flat. The wheels are mounted upon short spindles 32, 32, which are journaled in plates 33, 33 located between the side plates 30 and 31 and held in position by cross bars 34, 34. Each type wheel is mounted on a separate spindle, whereby it is free to revolve independently of the others, and the several type wheels are provided with gears 35, 36, 37 and 38 respectively, and pinions 35', 36', 37'. In the lower part of the case is a spindle 39 which is connected as by a spring 40 (Fig. 2) with the rotary spindle 4 of the wattmeter, and this spindle 39 is provided with a pinion 41 meshing with the gear 35 on the type wheel 26. A gear 42 is mounted on a separate spindle 43, journaled in struts 33^a and 33^b; whereof the former one, with the end plate 31, supports the spindle 39. The gear 42 meshes with the pinion 35' on the type wheel 26, and a pinion 44 also on the spindle 43 meshes with the gear 36 on the type wheel 27. Another spindle 45 is provided with a gear 46 which meshes with the pinion 36' on the type wheel 27 and is also provided with a pinion 47 which meshes with the gear 37 on the type wheel 28. The spindle 45 is journaled in struts 33^b and 33^c. Another spindle 49 journaled in struts 33^c and 33^d is provided with a gear 50 meshing with the pinion 37' on the type wheel 28.

A pinion 51 also on the spindle 49 meshes with gear 38 on the type wheel 29. The struts or supports 33^a, 33^b, etc., are cut away as shown in Fig. 1 to accommodate the type wheels and are supported by one of the upper and the two lower cross-bars 34, 34. The supports 33^a, 33^b are substantially triangular in shape, and are supported by the two upper and one of the lower cross-bars 34, 34, as shown in Fig. 1. Thus it will be seen that the spindle 39 is driven by the wattmeter and that it in turn drives the type wheel 26 which in turn, through the intermediate gears and pinions, drives the type wheels 27, 28 and 29. The proportioning of the gears and pinions to one another is such as to turn the several type wheels each one one-tenth of the speed of the wheel next to the right, whereby the wheels will be turned to indicate units, tens, hundreds and thousands.

Referring to Fig. 1, a solenoid 52 is shown mounted at one side of the printing type mechanism just described, and this solenoid is provided with a plunger 53 pivotally connected with a swinging lever 54 carrying a platen provided with an inking ribbon 55 which is adapted to cooperate with the type wheels 26, 27, 28 and 29. This solenoid 52 is connected with the relay 61 which in turn is included in a battery circuit containing the contact devices 12 and 14, so that the closure of the battery circuit energizes the relay 61 and thereby closes the circuit containing the solenoid 52. On the other side of the printing mechanism is a roller 56 and on the other side of the solenoid 52 is another roller 57, and extended between these rollers is a strip of paper 58 on which the record is to be printed. The roller 57 is connected by a gear 59 with the clock-work, so that it will be driven to advance the paper strip 58 continuously over the printing mechanism. In the lower part of the mechanism is a spool 60 on which the paper is carried.

In Fig. 5, I have more clearly set forth the circuit conditions. The circuit to operate the solenoid 52 is completed through the armature of the relay 61, and the circuit through the relay 61 is drawn as follows: from the pin 70, through the spring 18, projecting strip 23, spring 19, the battery, coils of the relay 61, and the arm 12.

The operation of the device is as follows: The clock-work automatically closes the circuit through the solenoid 52 at predetermined intervals which in the construction shown are half hour intervals, thereby actuating the solenoid 52 and causing the same to operate the lever 54 and cause the platen with its inking ribbon 55 to print upon the record strip 58. The record strip is automatically advanced and the printing wheels are also automatically turned and at each

half hour interval the solenoid is again energized so that the printing of the upturned numerals on the printing wheels is automatically printed at each interval, thereby forming a complete record of the integrations of the wattmeter.

It will be understood that changes and modifications can be made without departing from the spirit of the invention.

It will be seen that the printing mechanism is small and compact, and in as much as the type wheels are arranged lengthwise of the direction of movement of the paper, they occupy a minimum space, and that the whole arrangement can be fitted completely and compactly in the mechanism with a great economy of space.

It will also be seen that the type wheels, being of larger diameter owing to the two sets of numerals upon them, the printing will be more satisfactorily done because of the flatter shape of the types.

What I claim as my invention is:—

1. A recording wattmeter, comprising integrating wattmeter mechanism, means for forming a record of the integrations of said mechanism, time keeping mechanism combined with means for electrically operating said recording mechanism by said time keeping mechanism, said recording mechanism comprising a pivotally mounted platen, and a plurality of type wheels, for printing said record upon a strip of paper movable transversely to the said platen.
2. A recording wattmeter, comprising integrating wattmeter mechanism, means for forming a record of the integrations of said mechanism, timekeeping mechanism combined with means for electrically operating said recording mechanism by said timekeeping mechanism, said recording mechanism comprising a pivotally mounted platen, a plurality of type wheels, and a solenoid and plunger for operating said platen.
3. A recording wattmeter, comprising in-

tegrating wattmeter mechanism, means for periodically automatically providing a record of the integrations of said mechanism, timekeeping mechanism combined with means for operating said recording mechanism automatically at predetermined times by said timekeeping mechanism through the agency of electrical devices, said electrical devices consisting of a time-wheel, a pivotally mounted lever, and a relay.

4. A recording wattmeter, comprising integrating wattmeter mechanism, means for periodically automatically providing a record of the integrations of said mechanism, timekeeping mechanism combined with means for operating said recording mechanism automatically at predetermined times by said timekeeping mechanism through the agency of electrical devices, said electrical devices comprising a time wheel, a pivotally mounted lever for periodically closing the operating electric circuit associated with said time wheel, a relay, and means whereby said relay operates the recording means.

5. A recording wattmeter, comprising integrating wattmeter mechanism, means for periodically automatically providing a record of the integrations of said mechanism, timekeeping mechanism combined with means for operating said recording mechanism automatically at predetermined times by said timekeeping mechanism through the agency of electrical devices, said electrical devices comprising a time wheel, a pivotally mounted lever for periodically closing the operating electric circuit associated with said time wheel, a relay, and means whereby said relay operates a solenoid plunger to actuate the recording means.

In witness whereof, I hereunto subscribe my name this 20th day of June, A. D. 1907.
FRANK F. KINNEY.

Witnesses:

IDA E. KLIPSTEIN,
I. C. LEE.