

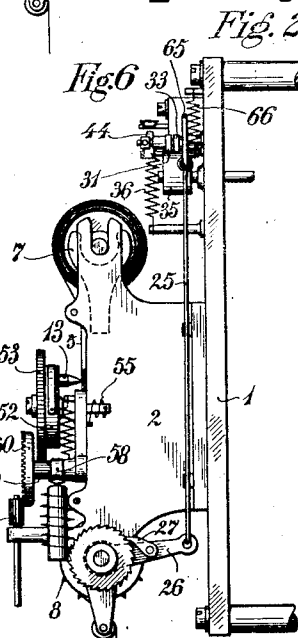
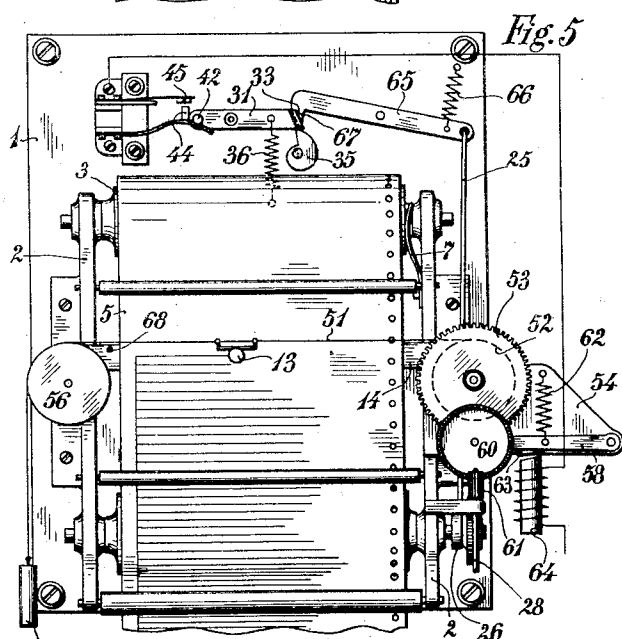
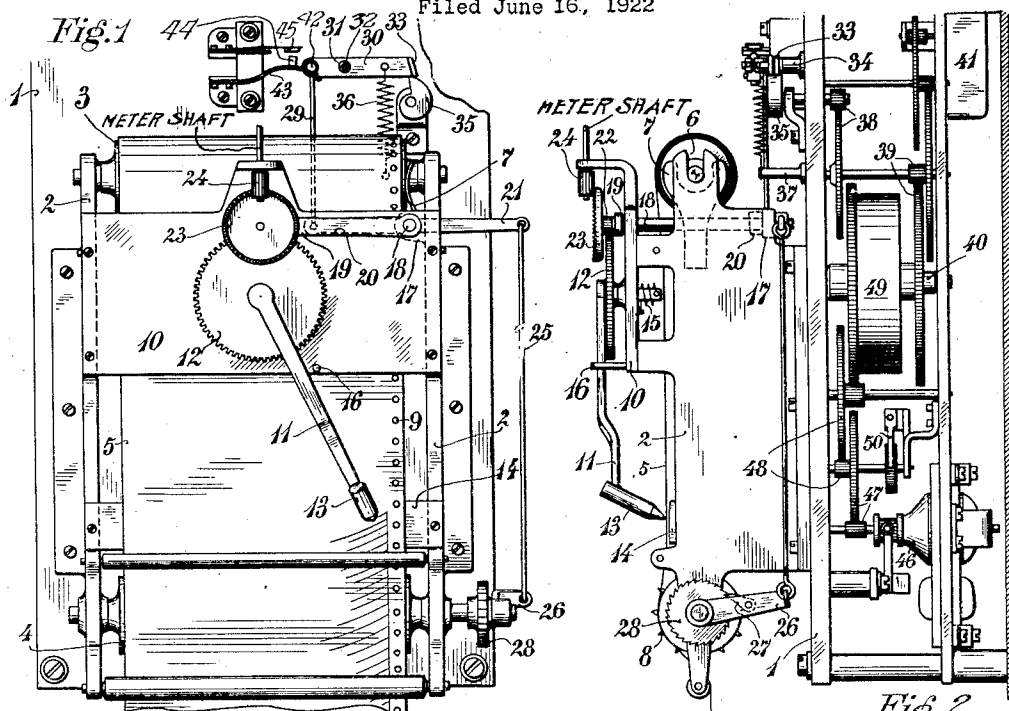
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CHART RECORDING METER

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# UNITED STATES PATENT OFFICE.

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## CHART-RECORDING METER.

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The invention relates to means for returning the recording device to its zero position, after each record has been made, and means for giving an intermittent feed to the chart in co-operation with the recording device.

The accompanying drawing shows two forms of the invention, Fig. 1 being a front elevation of the first form, and Fig. 2 a side elevation from the right of Fig. 1. The Figs. 3 and 4 represent a detail in different positions. A front elevation of the second form is shown in Fig. 5 and Fig. 6 is a right hand side-elevation of Fig. 5.

In the forms shown in the Figs. 1 to 4 there are two supports 2 fixed to a plate 1, these supports carrying the upper drum 3 and the lower drum 4. The chart 5 on which the consumption is to be recorded is wound initially on the drum 3; this drum being supported in the slots 6 in the supports 2, and braked by a spring 7. The chart is wound on to the drum 4, which latter is provided with a ring of taper pins 8, which engage with the holes 9 punched in the chart. On a cross plate 10 mounted above the chart between the supports 2, is pivoted an arm 11 carrying at its free end an ink reservoir 13, which is provided with a fine opening where it touches the chart. In order to ensure that the ink reservoir works smoothly and surely on the chart, a second cross plate 14, passing in this case behind the chart, is mounted near to the arc described by the arm 11. A coil spring 15 is wound round the pivot of the arm 11 and tends to keep the latter pressed against the stop 16, the position of this stop corresponding to the zero position of the recording device. The spindle 18 on which are mounted the levers 19, 20 and 21, is supported at one end in the cross plate 10, and at the other in a lug 17 on one of the supports 2. The lever 19 carries a pinion 22 which is integral with the crown wheel 23. This crown wheel 23 meshes with a pinion 24 which is driven by the electricity meter. The lever 21 is connected, by means of a rod 25, with a feed lever 26, loosely mounted on the shaft of the drum 4. The feed lever 26 drives the ratchet wheel 28, which is fixed on the shaft of the drum 4, by means of a pawl 27.

The lever 20 is connected by means of a rod 29 with one end of a lever 30, which latter is freely pivoted at a hub 31 on a stud 32, carried by a second lever 33. The

end of the lever 33 on which the stud 32 is mounted, is pivoted on a stud 34 fixed in the plate 1. The free ends of the levers 30 and 33 rest on a cam 35. The lever 33 which is a little longer than lever 30 projects somewhat further than the latter on to the cam. A tension spring 36 fixed at one end to the plate 1, by means of a pin 37, acts on the free span between the hub 31 and the end of the lever 30 resting on the cam 35.

The cam 35 is driven from the spindle 40 of the barrel 49 of the clockwork, by means of the gears 38 and 39. The going of the clockwork is regulated by a lever escapement 41. At the point where the rod 29 is attached, the lever 30 carries an insulating pin 42 which presses on the contact blade 43 of a spring contact 44. The contact pin 44 and the corresponding contact 45 are connected in series with an electric motor 46, which is connected through the gears 47 and 48 with the spring barrel 49 of the clockwork. A spring pawl 50 prevents the motor from running backwards. In the Figs. 1 and 2 the levers 30 and 33 are shown almost in their highest position on the cam 35. In this position the two levers 30 and 33 are in line with one another, the tension spring 36 is stretched, the contact between the contact pin 44 and the contact 45 is interrupted, the feed lever 26 is raised, and the pinion 22 is in mesh with the toothed wheel 12. The arm 11 is thus free to be driven by the electricity meter through the gears 24, 23, 22 and 12 and the ink reservoir 12 leaves an ink-line on the stationary chart which represents the consumption of electrical energy during the current registration period.

At the instant when the current registration period is terminated, the face joining the highest and lowest points on the cam 35 passes under the free end of the lever 30, and permits the latter to pivot about the stud 32 until it is brought to rest on the lowest point of the cam 35 under the action of the spring 36 (see Fig. 3). This causes the rod 29, which turns the spindle 18, to move upwards, thus lifting the pinion 22 out of mesh with the toothed wheel 12, and lowering the lever 26. At the same time the contact pin 44 is released and makes contact with the contact blade 45. The uncoupling of the electricity meter from the arm 11 leaves the latter free to return to the edge of the chart 5, under the action of the coil

spring 15, it being here arrested by the stop 16. Upon the circuit of the contacts 44 and 45 being closed, the motor 46 is switched in and winds up the spring of the clockwork. As the cam 35 continues to turn it releases the lever 33. Since this lever turns about the stud 34 it now drops into the same position as the lever 30 (see Fig. 4) so that the end of the lever 30 carrying the insulating pin 42, and to which the rod 29 is attached, returns to its initial position, thus causing the contacts 44 and 45 to open and interrupt the circuit of the motor, which accordingly comes to a stop. At the same time the feed lever 26 is raised under the action of the spring 36, and the pawl 27 advances the chart drum 4, and the gears 12 and 22 once more engage, so that the electricity meter again commences to move the arm 11 over the chart.

In the second form of the invention the uncoupling of the electricity meter is effected electrically instead of mechanically as in the first example. The parts 1-9, 13, 14, 25-28, 30-37 and 42-45, are identical with those employed in the first form. The control of the cam 35, the timing of same, and the rewinding, are also carried out in the same way as in the first example.

In this case the ink reservoir 13 is carried by a tape 51 which passes transversely above the chart 5. At one end the tape is attached to a drum 52, integral with a toothed wheel 53 which turns on a spindle mounted on the support 54, and is under the influence of the coil spring 55. The tape passes over a second drum 56 mounted opposite to the drum 52 and is kept taut by the weight 57. A lever 58 is mounted on the support 54 and carries a pinion 59, to which is rigidly attached a crown wheel 60, this latter meshing with a pinion 61 driven by the electricity meter. The pinion 59 is kept in gear with the toothed wheel 53 by means of the tension spring 62, and is carried by a lever 58, the part 63 of which acts as armature of the relay 64.

The rod 25 is connected to a lever 65 whose hook-shaped extremity 67 is held against the cam 35 by a tension spring 66.

The working of the levers 30 and 33 in connection with the contact device 43, 44, 45, is the same as in the first example. As the lever 30 drops from the highest to the lowest point on the cam 35, it closes the contacts 44, 45 and the relay 64, which is connected in the circuit of the winding motor is excited and, by attracting the armature 63, uncouples the recording device (the ink reservoir 13) from the electricity meter. As a result the recording device is returned to its zero position, which may be adjusted by means of a stop 68, under the action of the weight 57. The coil spring 55 serves to

prevent the drum 52 and the toothed wheel 53 from running too fast, or turning too far after the recording device has reached its zero position. As the cam 35 turns further, and just after the lever 30 has dropped, the hooked end of the lever 65 drops from the highest to the lowest point of the cam 35, thus raising the feed lever 26 and advancing the chart 5. As the cam 35 turns still further the lever 33 drops from the highest position of the cam to the lowest, thus causing the levers 30 and 33 to assume the same position as shown in Fig. 4, the contacts 44 and 45 being once more opened and the recording device again coupled with the electricity meter.

What I claim is:—

1. An electricity meter, chart feeding mechanism, a recording means, means for connecting and disconnecting the said meter and said recording means and including a spindle, a clockwork, an electric motor to rewind the clockwork, a contact device in circuit with said motor, and a controlling device comprising two levers arranged side by side, and a cam driven by the clockwork and on which one end of each of said levers is arranged for operation, one of said levers being provided at its opposite extremity with a fixed pivot, and the other lever being linked to the first named lever and being also arranged to actuate said contact device for controlling the electric motor and being connected to said spindle.

2. An electricity meter driven pinion, a recording device including a gear wheel, a cam mounted for rotation, a rock shaft having a lever arm, a pinion having a bearing on said lever arm and movable thereby into and out of engagement with said gear wheel, a crown wheel fast to said second named pinion and permanently engaged with and slidable on the meter driven pinion, a cam, and a lever operated by said cam and connected to said lever arm to actuate the latter.

3. An electricity meter driven pinion, a recording device including a gear wheel, a cam mounted for rotation, a rock shaft having a lever arm, a pinion having a bearing on said lever arm and movable thereby into and out of engagement with said gear wheel, a crown wheel fast to said second named pinion and engaged with the meter driven pinion, a cam, and a lever operated by said cam and connected to said lever arm to actuate the latter, and chart feeding means, and connections between said rock shaft and a member of said chart feeding means to cause said rock shaft to actuate said chart feeding means.

In witness whereof I affix my signature.

FRANZ MAURER.