

C. I. HALL.
CONTACT MAKING MECHANISM.
APPLICATION FILED MAR. 10, 1913.

1,120,712.

Patented Dec. 15, 1914.

Fig. 1.

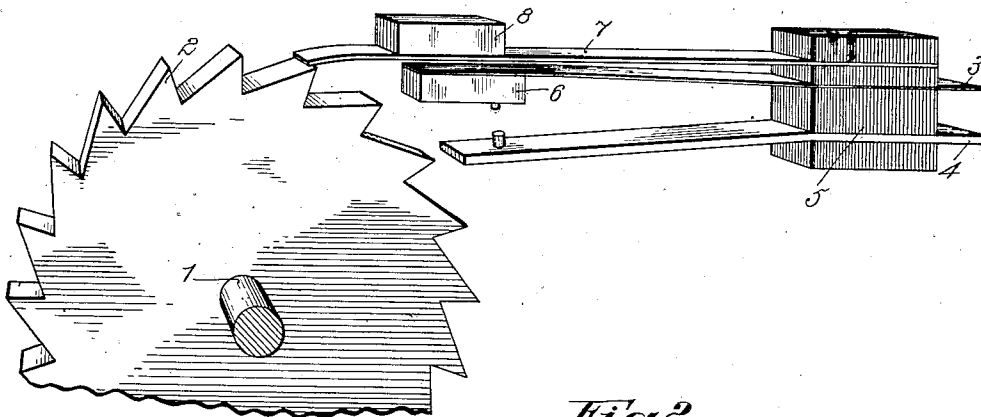
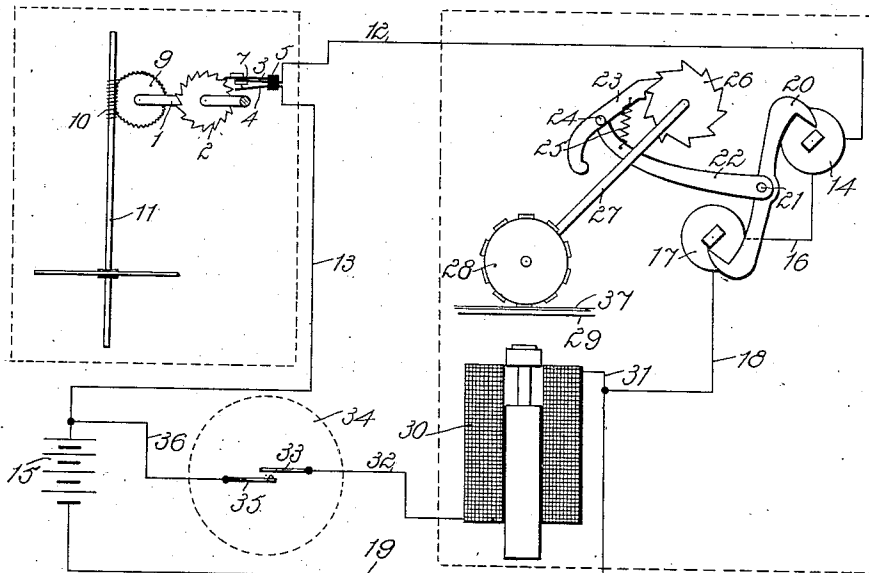


Fig. 2.



Witnesses:

Robert F. Bracke

Leslie W. Fricke

Inventor

Chester I. Hall

By Brown Williams Bell Hanson & Boettcher
Attorneys

UNITED STATES PATENT OFFICE.

CHESTER I. HALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHICAGO ELECTRIC METER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CONTACT-MAKING MECHANISM.

1,120,712.

Specification of Letters Patent.

Patented Dec. 15, 1914.

Application filed March 10, 1913. Serial No. 753,257.

To all whom it may concern:

Be it known that I, CHESTER I. HALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Contact-Making Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved form of contact making mechanism by which a slowly rotating device makes practically instantaneous contact between two contact members without the possibility of false operation of the contacts for different speeds of the rotating member.

By my invention, I provide a device in simple form that may be directly attached to a slowly moving part and secure a practically instantaneous closure of an electric circuit every time that this slowly moving part moves a predetermined amount and the possibility of the mechanism failing to make contact, or making double contact where but one should be made is eliminated by a simple relation of the parts, as will be described.

In carrying out my invention, which is particularly valuable as an attachment for metering devices of various kinds having rotary indexes, by which the readings may be transferred to a distance electrically, I employ a construction, as indicated in the accompanying drawings, in which—

Figure 1 is a view in perspective of the contact devices themselves; and Fig. 2 shows in diagrammatic circuit arrangement one example of how the contact devices may be employed in transferring readings from one point to another.

Similar numerals refer to similar parts throughout the several views.

As shown in Fig. 1, the shaft 1 is rotated by any suitable means and has rigidly mounted upon it the ratchet wheel 2. The contact springs 3 and 4 for transferring to a distant point the amount of rotation of the shaft 1 are rigidly mounted and insulated from each other, as indicated at 5, so that they are normally out of engagement with each other. The contact spring 3 is much lighter than the contact spring 4 and carries on the under side of its left-hand end a weight 6. Immediately above the spring

3 is disposed a spring 7, also rigidly mounted at 5; the left-hand end of said spring being in engagement with the ratchet wheel or cam 2 and of substantially the same strength as the spring 3. The weight 8 is carried by the spring 7 near its left-hand end. The springs 7, 3 and 4 are so related that the contacts carried by the springs 3 and 4 do not make engagement with each other when the left-hand end of the spring 3 is in engagement with the under side of the spring 7, whether the spring 7 is at the bottom or the top of one of the teeth of the ratchet wheel 2. These parts are so related, however, that the tension of the spring 7 causes it to move downward when its left-hand end passes from one of the teeth of the ratchet wheel 2 with sufficient force to move the weight 6 and the spring 3 into engagement with the spring 4, owing to the inertia of the weight 6. As the spring 4 is comparatively stiff, it yields but little and the rebound imparted to the weight 6 and the spring 3 is absorbed by the weight 8 carried by the spring 7 and, thus, a second rebound downward on the part of the weight 6 and the spring 3 is prevented as the energy of the upward motion of the weight 6 is absorbed by the weight 8.

Fig. 2 shows one example of how the contact mechanism just described may be employed to advantage. In this figure, the shaft 1 is indicated as driven by means of a worm-wheel 9 from a worm 10 carried by a meter shaft 11. The contacts 3 and 4 are connected by wires 12 and 13 with one terminal of the electromagnet 14 and one terminal of the battery 15, respectively. The other terminal of the electromagnet 14 is connected by wire 16 with one terminal of the electromagnet 17, the other terminal of which is connected by wires 18 and 19 with the other terminal of the battery 15. The magnets 14 and 17, together constitute the actuating magnets of the armature 20, pivotally supported at 21 and rigidly carrying a lever 22. A pawl 23 is pivotally connected at 24, to the outer end of the lever 22, being held by means of a spring 25 in operating engagement with a ratchet wheel 26 rigidly secured to a shaft 27 connected at its other end with printing wheels 28. Thus the electromagnets 14 and 17 serve as the actuating magnets of the printing wheels 28 and advance these printing wheels each time con-

tact is made between the contact springs 3 and 4. It will be observed that the contact made as described between the springs 3 and 4 is of short duration, whether the rate of rotation of the shaft 1 is fast or slow, and this duration of engagement between the contacts 3 and 4 is no more than amply sufficient to energize the magnets 14 and 17 to advance the printing wheels 28. A record strip 29 is placed below the printing wheels 28, which may be forced against said printing wheels by means of a solenoid 30, one terminal of which is connected by wire 31 with wire 18 while the other terminal is connected by wire 32 with the contact 33 of a time-controlled mechanism 34, a second contact of which mechanism 35 is connected by wire 36 with the opposite terminal of the battery 15 to that connected with the wire 19. A carbon paper 37 is interposed between the record strip 29 and the printing wheels 28, by which a record is communicated from the printing wheels to the record strip. As a result, when the contacts 33 and 35 are brought into engagement with each other at regularly recurring intervals, the solenoid 30 is energized and a record is made from the printing wheels 28 upon the record strip 29.

It is to be understood that, while I have shown my meter contact mechanism as applied to an electric meter for actuating a printing mechanism, as indicated in Fig. 2, that it may be used in many other connections and, in fact, wherever it is desired to produce electric impulses of short duration corresponding in number to the amount of rotation of a moving part.

What I claim is:

1. In a contact making mechanism, the combination of a ratchet wheel, a first spring resting upon the ratchet wheel, a weight carried by said spring, a contact spring disposed below said first spring, a weight carried by said contact spring, and a second contact spring electrically insulated from the first contact spring disposed below said first contact spring, said second contact spring being stiff as compared with the two springs disposed above it.

2. In a contact making mechanism, the combination of a ratchet wheel, a first spring resting upon the ratchet wheel, a weight carried by said spring, a contact spring disposed below said first spring, a weight carried by said contact spring, and a second contact spring disposed below said first contact spring and electrically insulated therefrom, said second contact spring being stiff as compared with the springs disposed above it, said springs being so disposed relatively to each other that the force, imparted to the weight on said first contact spring by the weight on the first-mentioned spring when said first spring passes from the point of one of the teeth of the ratchet wheel, moves said

first contact spring into engagement with the second contact spring.

3. In a contact making mechanism, the combination of a ratchet wheel, a first spring resting upon the ratchet wheel, a weight carried by said spring, a contact spring disposed below said first spring, a weight carried by said contact spring, and a second contact spring disposed below the first contact spring and electrically insulated therefrom, said second contact spring being stiff as compared with said first contact spring, said springs being so disposed relatively to each other that the force, imparted to the weight on said first contact spring by the weight on the first-mentioned spring when said first-mentioned spring passes from the point of one of the teeth of the ratchet wheel, moves said first contact spring into engagement with said second contact spring, said weight on said first-mentioned spring being of sufficient mass to absorb the energy of rebound of the weight on the first contact spring after it engages said second contact spring.

4. In a contact making device, the combination of two comparatively weak springs each provided with a weight, a cam for actuating one of said springs to cause it to engage the other spring, and a third relatively stiff spring electrically insulated from the other springs and normally out of engagement therewith.

5. In a contact mechanism, the combination of a first comparatively weak contact spring having large mass, a comparatively weak striking spring having large mass and tending to engage said contact spring, a second comparatively stiff contact spring insulated from said weak springs, said first contact spring tending to move away from said second contact spring, and a cam for moving said striking spring away from said first contact spring and releasing it, the spring tension of said striking spring when released from said cam serving to move said first contact spring into engagement with said second contact spring, the mass carried by said first contact spring serving to assist in moving it into engagement with said second contact spring when actuated by said striking spring, and the mass carried by said striking spring serving to absorb and dissipate the inertia of the mass carried by the contact spring when it returns from engaging said second contact spring.

6. In a contact mechanism, the combination of a comparatively weak contact spring having large mass, a comparatively weak spring having large mass and tending to engage said contact spring, a second comparatively stiff contact spring insulated from said weak contact spring, said first contact spring tending to move away from its associated contact spring, and a cam for actuat-

ing said second spring to cause it to engage said first contact spring.

7. In a contact mechanism, the combination of a comparatively weak contact spring having large mass, a comparatively weak spring having large mass and tending to engage said contact spring, a second comparatively stiff contact spring insulated from said contact spring, said first contact spring tending to move away from its associated contact spring, and a cam for actuating said second spring to cause it to engage said weak contact spring, the spring tension of said second spring when released from said cam serving to move said first spring into engagement with said third spring.

8. In a contact mechanism, the combination of a comparatively weak contact spring having large mass, a comparatively weak striking spring having large mass and tending to engage said contact spring, a second comparatively stiff contact spring insulated from said weak springs, said first contact spring tending to move away from said second contact spring, and a cam for moving said striking spring away from said first contact spring and releasing it, the spring tension of said striking spring when released from said cam serving to move said first contact spring into engagement with the second contact spring, the mass carried by said first contact spring serving to assist in moving it into engagement with said second contact spring when actuated by said striking spring.

9. In a contact mechanism, the combination of two switching members, an actuating member, and a ratchet wheel, said actuat-

ing member engaging said ratchet wheel and adapted when released by the same to close said switching members.

10. In a contact mechanism, the combination of two switching members, one having greater mass than the other, and an actuating member of comparatively great mass, the switching member of greater mass and the actuating member tending to engage each other, and the mass carried by the switching member of greater mass serving to move it into engagement with the other switching member when actuated, and the mass of the actuating member serving to absorb and dissipate the inertia of the switching member of greater mass when it returns from engagement with the other switching member.

11. In a contact mechanism, the combination of two switching members normally separated from each other, an actuating member, and a ratchet wheel, said actuating member engaging said ratchet wheel and adapted when released by the same to close said switching members, said switching members arranged to open a time interval after said members have been moved to closed position, said time interval being substantially constant for successive operations of said ratchet wheel, regardless of the speed or regularity of operation of said ratchet wheel.

In witness whereof, I hereunto subscribe my name this 3rd day of March, A. D., 1913.

CHESTER I. HALL.

Witnesses:

LESLIE W. FRICKE,

LEONARD W. NOVAUDER.