

(No Model.)

G. KORNMÜLLER.

APPARATUS FOR THE TRANSMISSION OF ELECTRICAL ENERGY.

No. 371,331.

Patented Oct. 11, 1887.

FIG. 1

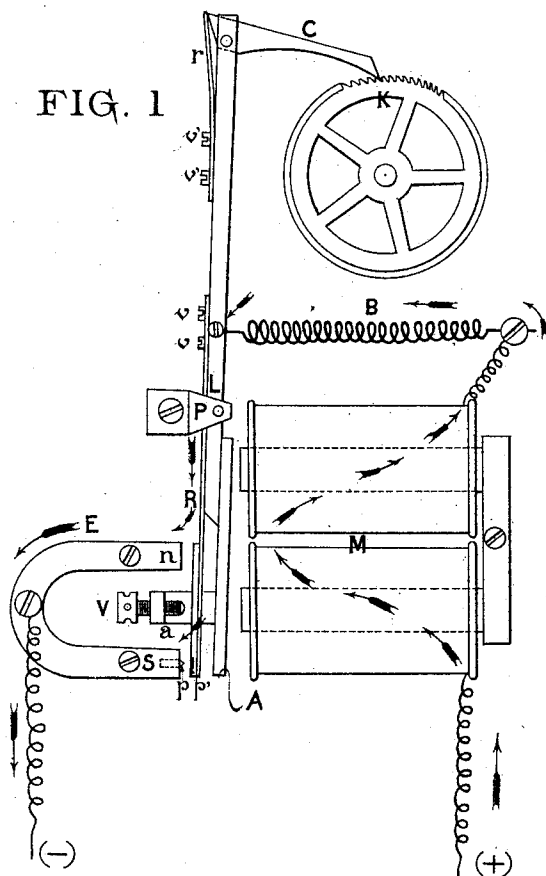


FIG. 2

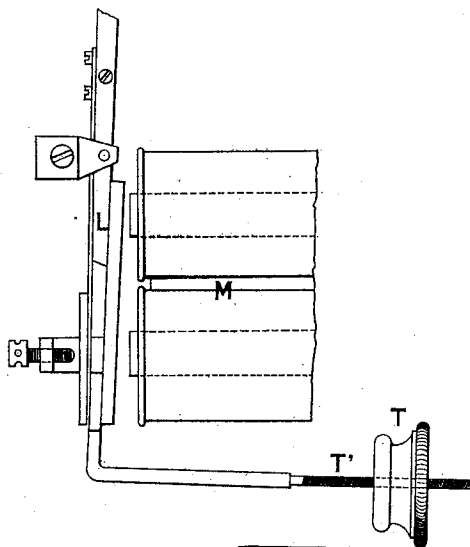


FIG. 3

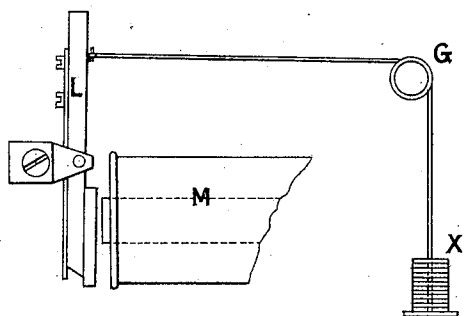
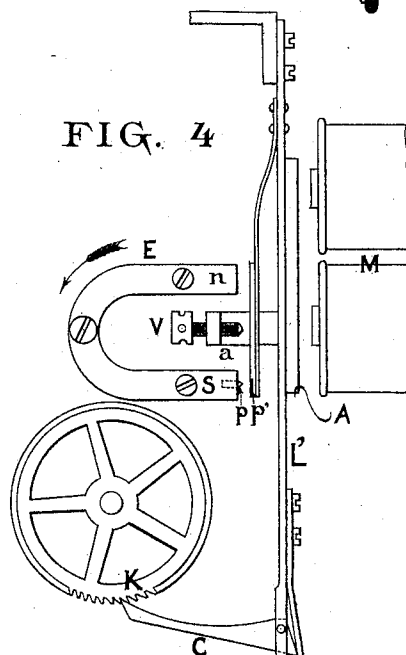


FIG. 4



Witness:
W. D. Studiford
Francis C. Gray.

Inventor:
G. Kornmüller.
By H. W. Patzky.

UNITED STATES PATENT OFFICE.

GUSTAV KORNMÜLLER, OF GHENT, BELGIUM.

APPARATUS FOR THE TRANSMISSION OF ELECTRICAL ENERGY.

SPECIFICATION forming part of Letters Patent No. 371,331, dated October 11, 1887.

Application filed January 8, 1887. Serial No. 223,605. (No model.) Patented in Belgium September 23, 1886, No. 74,474.

To all whom it may concern:

Be it known that I, GUSTAV KORNMÜLLER, of Ghent, in the Kingdom of Belgium, have invented a new and useful Improvement in Apparatus for the Transmission of Electrical Energy, of which the following is a specification, reference being had therein to the accompanying drawings, no patents being obtained by me anywhere for this invention, save in Belgium, No. 74,474, dated September 28, 1886.

This invention relates to improvements in electric apparatus, consisting of an electro-magnet with its armature, which latter is so arranged that it breaks the current as soon as it is attracted toward the magnet by it. These apparatus are known under the name of "vibrating contact-breakers," and their action is also well known—i. e., as soon as the armature is attracted it breaks the circuit, the attraction ceases, and a spring draws the armature back, which completes the circuit, when it will be attracted again, &c. The succession of these alternative movements is extremely rapid and results in a sort of energetic vibratory movement of the armature.

The vibratory and rapid movement of the armature has two great inconveniencies:

First. The durations of the successive interruptions are perceptibly the same as those of the closing of the current, and are extremely short. There results a great consumption of the current and eventually a rapid polarization of the battery.

Second. In case the above-named mechanism is used for the transmission of power to mechanical work this rapid vibratory movement will not adapt itself readily to a certain and regular transmission.

This invention has for its object to obviate these inconveniencies and to render the periods of interruption long, even while the contacts and the attractions remain rapid and short.

Figure 1 shows the new apparatus. Figs. 2 and 3 show lever modifications. Fig. 4 shows the lever replaced by a spring.

One form of apparatus realizing this object consists, essentially, of an electro-magnet, M, the armature A of which is fixed to the lower end of a lever, L, pivoted about the middle at P. The upper end of this lever is forked, and

in this fork is pivoted a pawl, C, which is held against the teeth of a ratchet-wheel, K, by a spring, *r*, fixed to the lever L by two screws, *v' v'*. In about the middle of this lever L, and extending downward, another spring, R, is fixed by two screws, *v v*, which spring carries at its lower and free end a small soft-iron armature, *a*. This armature is opposed to a small permanent horseshoe-magnet, E, the S pole of which is at the bottom. To this S pole is fixed a small platinum contact-point, *p*, corresponding with a small platinum plate, *p'*, let into the armature *a*. Lastly, a kind of bridge encircling the armature *a* and provided with an opening through which passes an adjusting-screw, *v*, is attached to the armature A of the electro-magnet M.

A spiral spring, B, draws the armature A back when it ceases to be attracted by the electro-magnet M.

The arrows show the direction the electrical current goes in through the apparatus. Supposing the platinum points *p p'* are in contact, the current coming from the positive pole attached to the electro-magnet M will pass through this, the spiral spring B, the pivoted lever L, the thereto-attached spring R, with its small armature *a*, the platinum contact *p p'*, and the horseshoe-magnet E, and returns to the negative pole attached to the latter. The circuit being thus completed, the electro-magnet M will attract its armature A, which, being attached to the pivoted lever L, will draw the latter slightly away from the fixed end of the flexible spring R, which is attached thereto, while the small armature *a* of this spring remains in contact with the permanent horseshoe-magnet E. Thus a slight prolongation of the attraction is effected, which can be limited at will by a convenient adjusting of the screw *v* in the bridge encircling the small armature *a* of the permanent horseshoe-magnet, which screw strikes this small armature *a* and instantly disconnects it from the horseshoe-magnet E, and thus breaks the circuit. By this means the amplitude of the vibration of the armature is increased, and a sufficient movement is transmitted to the pawl C to let it pass over certain number of teeth of the ratchet-wheel K, while the pivoted lever L, under the influence of the spiral spring B, will move

the pawl C forward, and thus move the ratchet-wheel K a certain distance. On the other hand, when the armature A of the electro-magnet M moves away from the latter and the small armature *a* arrives within a certain distance of the horseshoe-magnet E, this armature will separate briskly from the pivoted lever L and bring the platinum points *pp'* into contact a little before the pawl C has arrived at the end of its course. The electro-magnet M will now at once attract its armature A, again breaking the inertia of the pivoted lever L, and this without any detrimental shock to the regularity of the movement. By this arrangement the enduring of the closing contact *pp'* can be regulated exactly, by means of the screw *v*, so that the pawl actuates *a* in the desired manner.

The above-described arrangement thus well realizes the transmission of the electric energy to a mechanical movement by means of an electro-magnet acting upon an armature in such a manner that the removal of the latter is slow, while its attraction remains brisk and rapid.

Instead of using a spiral spring B to act upon the pivoted lever L, a weight, *x*, may be used suspended from a cord passing over a grooved pulley, G, and attached to the pivoted lever L, as indicated in Fig. 3; or the lever L may be extended downward and bent and an adjustable weight, T, screwed into the end like a nut and held in position by a lock-nut, T'. (See Fig. 2.) Rigid lever L can also be replaced by a spring, L', being strong enough and fixed by its upper part, Fig. 4. The ratchet-wheel is then applied to the under part of the spring L'. The applications of this novel arrangement are numerous; but in the first instance it is particularly applicable to work electric time piece or clocks. Experience has shown that two cells of any constant system, like Daniels or Meidinger and the like, are sufficient to work a clock for fifteen months without being touched. If several clocks are connected up in the same circuit, it is sufficient

to provide one clock only with the permanent horseshoe-magnet E, its armature *a*, and the spring R, acting upon the latter. For the others a simple mechanism consisting of an electro-magnet with an armature provided with spring or weight suffices. Finally, this new system could be applied easily for watches, the operating of them being done by piles of small size that would be placed anywhere in the clothes. The watch-chain serves then for electrical conduit.

This particular application of the invention has been described because it is the most applicable one; but it is well understood that the transmission of electrical energy by an apparatus constructed as above described and coming from any service can be applied to other mechanical purposes without deviating from the principle of the invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

In an apparatus for transforming electrical into mechanical energy, the combination of an electro-magnet, M, with an armature, A, the latter being fixed to a lever, L, which, oscillating at a middle point, P, and having on its upper end a pawl, C, which works a ratchet-wheel, receives a back motion from a spring, B, which spring B serves as an electrical conductor from the coil of the electro-magnet M to the small armature *a*, attached to a thin spring, R, of a permanent magnet, E, this armature *a* and magnet E being disposed so as to complete the electrical circuit, while an adjustable screw, V, fixed to the armature A, will force away the armature *a* from the magnet E when needed, all substantially as described and represented, and for the purposes set forth.

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

GUSTAV KORNMÜLLER.

Witnesses:

ADOLF STEIN,
GEORGE BEDE.