May 12, 1936. M. MATHIAS 2,040,702

COUNTING MECHANISM

Filed May 22, 1933

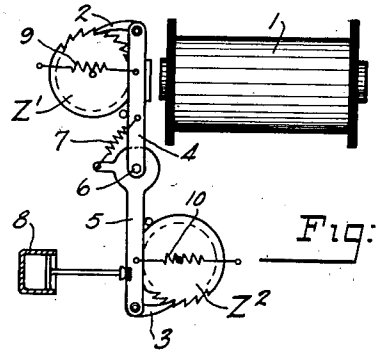

Fig: 1

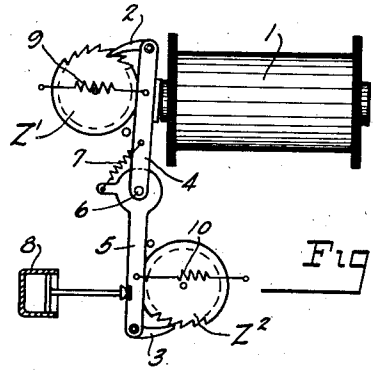

Fig: 2

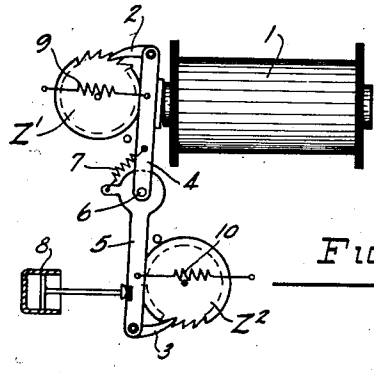

Fig: 3

Inventor

Maximilian Mathias

Wm. Watts Ower.

Atty.

Patented May 12, 1936

2,040,702

UNITED STATES PATENT OFFICE

2,040,702

COUNTING MECHANISM

Maximilian Mathias, Berlin, Germany, assignor to Siemens & Halske Aktiengesellschaft, Siemensstadt, near Berlin, Germany

Application May 22, 1933, Serial No. 672,336
In Germany May 24, 1932

7 Claims. (Cl. 235—92)

The invention relates to an electromagnetic counting device with several counting mechanisms and its object is to provide a simple and therefore reliably operating arrangement for different kinds of counting operations, more particularly for different kinds of telephone connections. It is, however, also suitable with equal advantage for other purposes which require different kinds of counting operations. According to the invention, this is effected in that in accordance with the control of the counting device one or more counting mechanisms are operated.

It is desirable in telephone systems among other things to indicate separately the fees for connections of different kinds, for example, for local and toll connections, in order on the one hand to provide a supervision showing how the individual fees are divided for the different kinds of connections set up by a subscriber and at the same time to provide the possibility of enabling the subscriber to calculate the differently valued connections in agreement with the actual number and kind of conversations. Counting devices arranged in the manner previously described are used for this purpose and thus permit these facilities to be provided in a simple manner. An embodiment of the invention is shown in the drawing.

Fig. 1 shows the counting device in its normal position; Fig. 2 in its working position under the control of the operating magnet by an impulse of short duration; and Fig. 3 in another working position under the influence of impulses of long duration.

The operating magnet 1 is provided with two counting mechanisms Z1, Z2 which are positioned by the pawls 2, 3. The pawls are attached to rotatably mounted levers 4, 5 for which a common pivot 6 is provided. The lever 4 at the same time forms the armature of electromagnet 1. For this purpose it is provided with a pole piece and is thereby placed under the direct influence of the operating magnet 1. The other lever 5, which carries the pawl 3 of the counting mechanism Z2, is connected with the lever 4 by a spring 7 so that it can be moved together with the lever 4 when this is operated. This, however, is only possible if the impulse which operates the operating magnet 1 is of long duration so that the delay device formed of the pneumatic cylinder 8 with which the lever 5 is connected can be operated by the tension of the spring 7. In this case, after the deenergization of the magnet 1, both the counting mechanisms Z1 and Z2 are advanced one step by means of the restoration springs 9 and 10 producing backward movement of the levers 4 and 5.

Fig. 3 shows the counting device in this position shortly before the magnet releases.

If, however, the impulse is of short duration, the spring 7 due to the movement of the lever 4 does not affect, or does not affect long enough, the pneumatic cylinder 8 so that the lever 5 is not operated and an advance of the counting mechanism Z2 is prevented as is shown in Fig. 2. The delay device 8 shown here can naturally be replaced by other known delay devices.

As appears from the method of operation described, such a counting device which operates in dependence upon the length of the impulses by which its operating magnet is controlled permits different kinds of control of the counting device so that it is possible to obtain an exact account of the differently valued connections which a subscriber has established by a simple calculation of the readings of the individual meters.

Such a counting device can naturally also be used with advantage for other purposes in which such different kinds of counting are desirable or necessary.

What is claimed is:

1. An electromagnetic device including a first and a second counting mechanism, a relay common to both said mechanisms, said relay operated differently in response to the receipt of impulses of different lengths, means controlled by said relay for operating said first mechanism in case the impulses received are of one length and for operating both said mechanisms in case the impulses received are of a greater length.

2. An electromagnetic device including a first and a second counting mechanism, a relay common to both said mechanisms, said relay operated differently in response to the receipt of impulses of different length, and means controlled by said relay for operating only one or both said mechanisms dependent upon the kind of impulses received.

3. An electromagnetic counting device including a first and a second counting mechanism, a relay common to both said mechanisms, an armature of said relay operated in response to the receipt of impulses, said armature having means for controlling the operation of said first counting mechanism for each impulse received, a switching lever operative responsive to the operation of said armature, said lever having means for controlling the operation of said second counting mechanism, and a delay device for delaying the operation of said lever to prevent the oper-

ation of said second counting mechanism during impulses of short duration.

4. An electromagnetic counting device including a first and a second counting mechanism, a relay common to both said mechanisms, an armature of said relay operated in response to the receipt of impulses, said armature having means for controlling the operation of said first counting mechanism for each impulse received, a switching lever operative responsive to the operation of said armature, said lever having means for controlling the operation of said second counting mechanism, a delay device for delaying the operation of said lever to prevent the operation of said second counting mechanism during impulses of short duration, and a common axis for pivoting said armature and lever.

5. An electromagnetic counting device, a first and a second register, an operating device for each register, an operating magnet, means operated by each energization of said magnet for operating the first device to operate its register, and means operated by the magnet only when energized for more than a predetermined time for operating the other device to operate its register.

6. An electromagnetic counting device including a first and a second register, an operating magnet for said device, a pair of pawls controlled by said magnet, and means associated with said magnet for causing said pawls to operate either the first or both of said registers dependent upon the length of time said magnet is operated.

7. An electromagnetic counting device including a first and a second counting mechanism, a common operating magnet having short and long periods of operation, and mechanical means controlled by said magnet for operating only one of said mechanisms responsive to a short period of operation of said magnet, both said mechanisms responsive to a longer period of operation of said magnet.

MAXIMILIAN MATHIAS.