W. F. STRAUB.

INDICATOR SYSTEM.

APPLICATION FILED JAN. 19, 1914.

1,258,497. **Patented Mar. 5, 1918.**

2 SHEETS—SHEET 1.

Fig. 1.

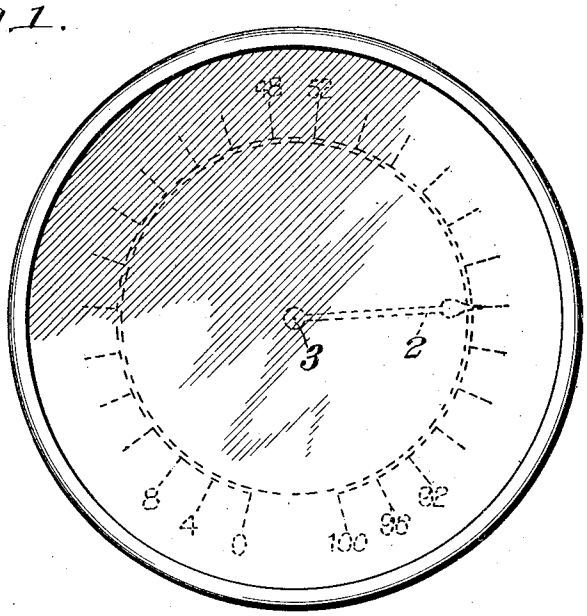
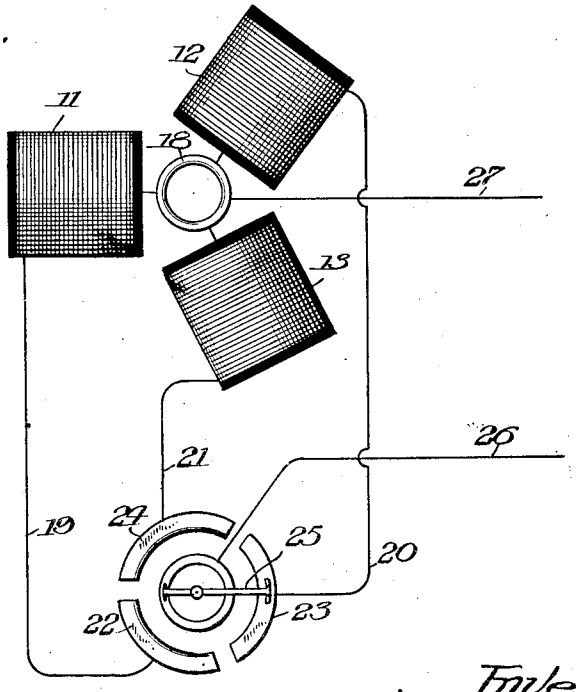


Fig. 2.



Witnesses
O. W. Wernich
H. A. Jones.

Inventor
William F. Straub
by Wray W Zabel
Atty.

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Fig. 2.

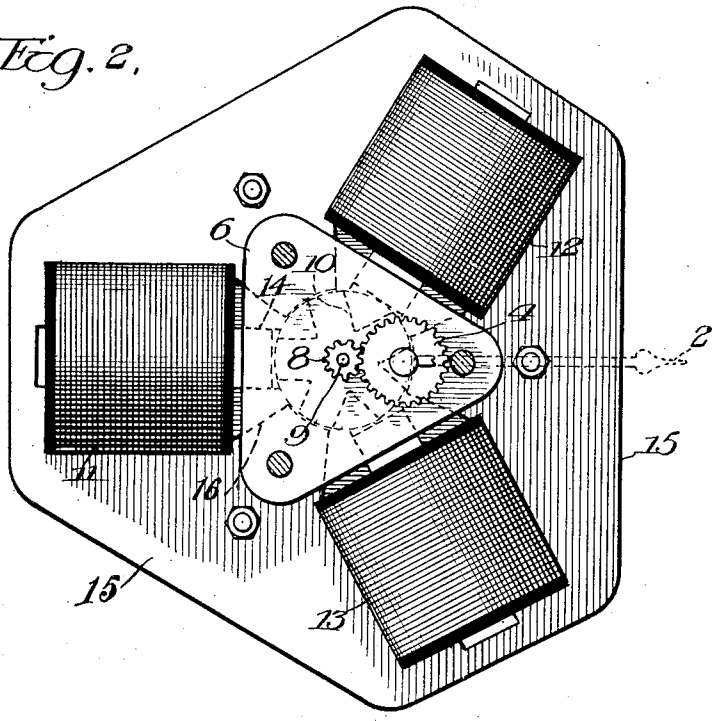
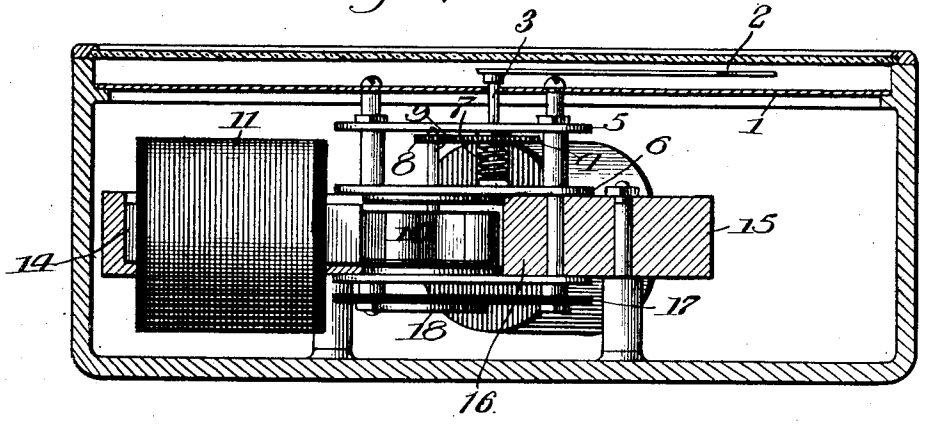


Fig. 3.



Witnesses
M. Wemich
H. A. Jones.

Inventor
William F. Straub
by Illay W Zabel
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM F. STRAUB, OF CHICAGO, ILLINOIS, ASSIGNOR TO ELECTRIC TIME RECORDER COMPANY, OF CHICAGO, ILLINOIS.

INDICATOR SYSTEM.

1,258,497. Specification of Letters Patent. Patented Mar. 5, 1918.

Application filed January 19, 1914. Serial No. 813,133.

To all whom it may concern:

Be it known that I, WILLIAM F. STRAUB, 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 Indicator Systems, 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 indicator systems and is more particularly an improvement over indicator systems and devices disclosed by me in my application Serial No. 747,653, filed Feb. 11, 1913, and application Serial No. 747,654, filed Feb. 11, 1913.

Systems of this general nature utilize an armature which is acted upon by a plurality of electromagnets successively so as to occupy a plurality of different resting positions in accordance with the different energizations of said electro-magnets. The electro-magnets may then be suitably energized in any desired rotation in accordance with the movement of some master mechanism preferably remote from this secondary mechanism. I have found difficulty in operating the secondary mechanism with sufficient rapidity to permit of their use in systems where the movements of the master mechanism are extremely rapid.

It is the object of my prevent invention to so construct a secondary device that it will respond to extremely rapid changes of energization of the electromagnets and that it would be accurately responsive to such changes. The device which forms the subject matter of the present application, and which is one specific form of carrying out my invention can operate to occupy forty positions during a second.

I will explain this specific form which my invention may take by referring to the accompanying drawing, in which—

Figure 1 is a top view of my improved device showing the dial used in connection therewith;

Fig. 2 is a plan sectional view of the device;

Fig. 3 is a side view with portions broken away more clearly to reveal features of construction, and

Fig. 4 is a diagrammatic view illustrating the circuit arrangements.

My improved device is adapted for use in connection with a dial 1 and hand 2. The hand is suitably mounted upon a spindle 3, which spindle carries and has fixedly secured thereto the pinion 4. This spindle 3 is pivotally mounted between the two plates 5 and 6 and a spring 7 is interposed between the plate 6 and the pinion 4. This spring acts as a brake by pressing against the pinion 4 and thus holds the hand 2 and the other moving parts associated therewith in whatever position they may be placed, thereby to avoid the effects of momentum and inertia. The pinion 4 is driven by a pinion 8 also pivotally carried by the plates 5 and 6 through the agency of the spindle 9. The spindle 9 carries a five toothed armature 10. This five toothed armature is under the control of three electromagnets 11, 12 and 13, which magnets are suitably provided with cores 14. These cores are all associated with a magnetic framework 15 suitably recessed to accommodate not only the cores but also the solenoids and having inwardly projecting arms 16 to complete the magnetic circuit to the armature 10. The armature 10 is of low moment of inertia so that it can travel very rapidly under the impulse of the electromagnets.

From an inspection of Fig. 2 it will be seen that the five toothed armature is in such position with respect to the cores 14 that if the electromagnets 11, 12, 13 are energized in rotation that the armature 10 will rotate in a direction depending upon the sequence of energization of these electromagnets.

By the construction thus far pointed out I have been enabled to secure a construction of secondary device which permits me to operate this secondary device at a greatly increased speed of operation over that which I have been able to obtain over other secondary devices. The moving parts for the armature 10 to the pointer 2 will respond to this rapid moving and will not be carried past the position depending upon the energization of the electromagnets. The spring 7 has a braking influence as stated to hold the moving parts in the position into which these moving parts are placed by the successive energizations of the electromagnets.

In the operation of the device, of course, it happens that the master mechanism may be operated for a certain period of time and then be suddenly stopped, and it is then of

course essential that the moving parts of the secondary device stop in their allotted position without being carried past such position. I find that the structure herein disclosed meets these requirements at least up to the speed heretofore given.

An insulating plate 17 is provided on which a metallic ring 18 is mounted, which metallic ring is connected with one terminal of each of the electromagnets 11, 12 and 13. This is seen more clearly from the diagrammatic illustration of Fig. 4 which illustrates my improved secondary structure diagrammatically and shows the connection of the electromagnets to the metallic ring 18. The other terminals of the electromagnets are connected respectively by means of conductors 19, 20 and 21 with contact segments 22, 23 and 24 respectively. A contact brush 25 serves alternately to energize the segments 22, 23 and 24 as this brush is connected to a line wire 26 leading from a source of supply; the other line wire 27 leading from the source of supply extends directly to the plate 18. It will thus be seen that if the contact brush 25 is rotated in any given direction of rotation the electromagnets 11, 12 and 13 are energized in the same rotation and the armature 10 rotates in conformity with such energization. It will thus be seen that the secondary device operates in accordance with the movements of the master mechanism and by reason of the particular secondary structure outlined, this movement may be very rapid.

From what has been described it is thought the nature of my invention will be entirely clear to those skilled in the art, and it will also be clear that many modifications may be made without departing from the spirit of my invention as herein disclosed. Having however thus described one form which my invention may take, what I claim as new and desire to secure by Letters Patent is:

1. A high speed indicator comprising a plurality of concentrically mounted electromagnets, a concentrically mounted armature under the control of said electromagnets having a number of arms unlike the number of said electromagnets whereby said armature is adapted to rotate in a given sequence depending upon the energization of said electromagnets, a pointer movable with said armature, reduction gears interposed between said armature and said pointer, and a brake acting continuously with an unvarying effort on said pointer.

2. A high speed indicator comprising a plurality of concentrically mounted electromagnets, a concentrically mounted armature under the control of said electromagnets having a number of arms unlike the number of said electromagnets whereby said armature is adapted to rotate in a given sequence depending upon the energization of said electromagnets, a pointer movable with said armature, reduction gears interposed between said armature and said pointer, and a brake acting continuously with an unvarying effort on said pointer, said brake including a helical spring.

3. A high speed indicator comprising a plurality of concentrically mounted electromagnets, a concentrically mounted armature under the control of said electromagnets having a number of arms unlike the number of said electromagnets whereby said armature is adapted to rotate in a given sequence depending upon the energization of said electromagnets, a pointer movable with said armature, and a brake acting continuously with an unvarying effort on said pointer.

In witness whereof, I hereunto subscribe my name this 26th day of November A. D., 1913.

WILLIAM F. STRAUB.

Witnesses:
J. A. LJUNGGREN,
A. L. CHEUBERG.