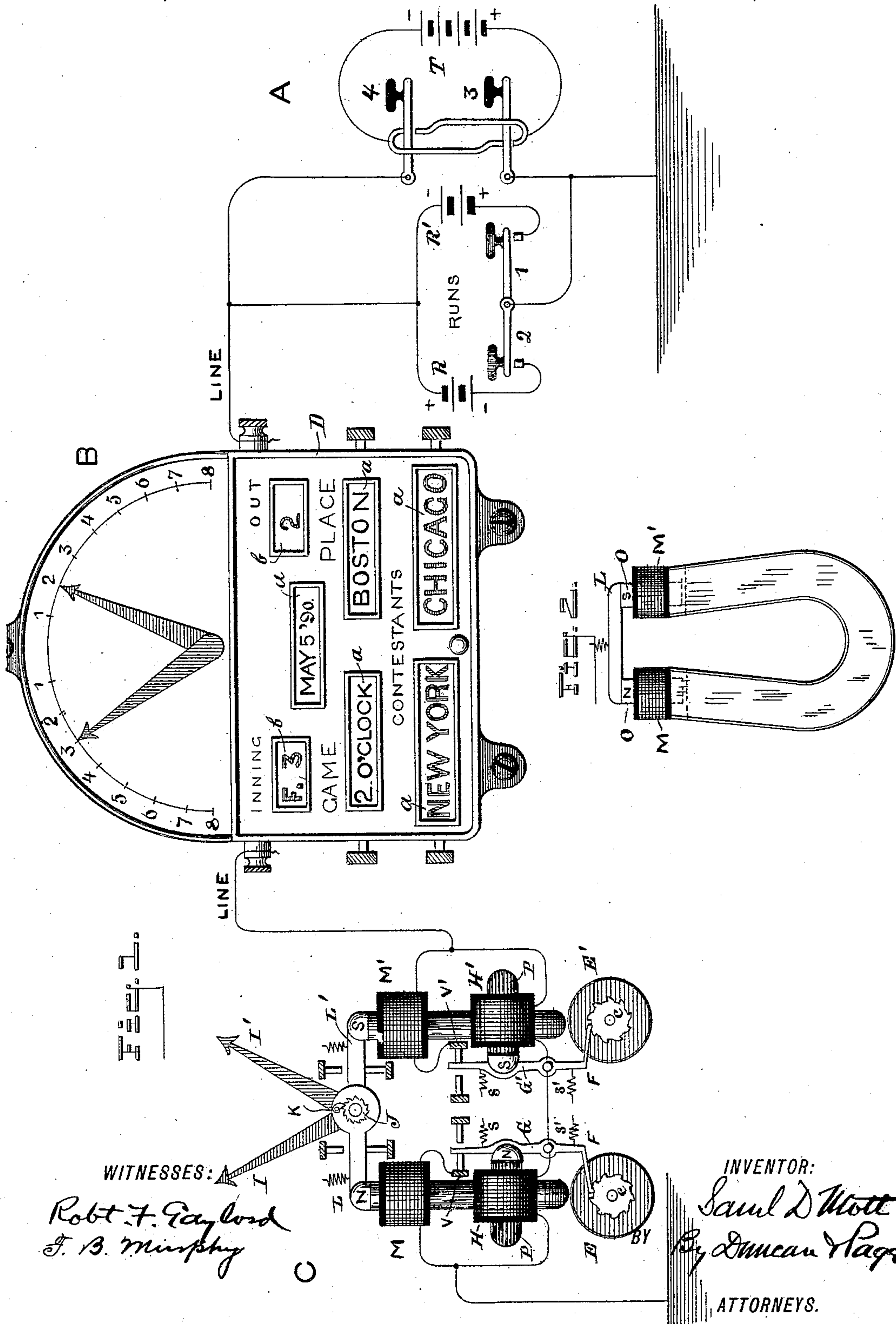


(No Model.)

S. D. MOTT.
ELECTRICAL SPORTING INDICATOR.

No. 444,453.

Patented Jan. 13, 1891.



UNITED STATES PATENT OFFICE.

SAMUEL D. MOTT, OF PASSAIC, NEW JERSEY.

ELECTRICAL SPORTING-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 444,453, dated January 13, 1891.

Application filed June 19, 1890. Serial No. 356,014. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, a citizen of the United States, residing at Passaic, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Electrical Sporting-Indicators, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

10 This invention belongs to that class of devices to which I have given the name "sporting-indicators," the general nature and object of which are more fully set forth by me in an application of even date herewith, Serial No. 356,013.

15 These instruments are designed to be used in numbers and connected with a single electric circuit, by means of which they are operated from a given point, generally on the ground where a game is in progress or at the track where a race is being run.

20 These instruments have a plurality of movable parts, which are adapted, when moved, to exhibit the various features or conditions of any given sporting event—as, for instance, a ball game, a horse-race, and the like—and their operation is effected by current impulses of varying character, some of which actuate one part of each device without affecting the others, and others of which have a converse effect.

25 The present invention consists in an instrument of this general character containing four movable or changeable elements that are adapted to be independently actuated by current impulses of different character over the same electric circuit.

30 The description of one apparatus or instrument will serve for all, as they are similar in construction and connected in series with the circuit by which they are operated.

35 In the accompanying drawings, Figure 1 is a general diagram of the system, showing at A the transmitting apparatus, at B a front view of a complete indicator, and at C the operative parts contained in one of the indicators. Fig. 2 is a view in elevation of a modified form of magnet that may be employed.

40 Each indicator consists of a suitable box or case D with a number of openings, through

which are exposed cards or cylinders upon which are printed names, dates, and the like, which said cards or cylinders are adapted to be changed or turned by hand, inasmuch as they display only facts or conditions which do not vary during the progress of a game or other event—such, for example, as the names of contestants, the place and date of the game, and the like. The openings referred to are marked *a*. The said case contains also other openings *b*, through which are exposed portions of the peripheries of two cylinders *E E'*, carrying ratchet-wheels *c*, that are engaged by pawls *F*, carried by armature-levers *G G'* of two electro-magnets *H H'*. Above the portion of the box containing these openings is a semicircular dial or index-plate divided off into spaces which are suitably numbered. Two pointers or hands *I I'* are mounted to sweep over this dial-plate. Each pointer is moved independently of the other by means of a ratchet-wheel *J* and a pawl *K* engaging therewith and carried by an armature-lever *L* or *L'* of electro-magnets *M M'*.

45 The magnets *M M'* are what are known as "slow-acting magnets"—that is to say, they are so constructed that the cores respond to a magnetizing-current passed through the coils somewhat sluggishly. Such magnets are well known, and may be made in a variety of ways—as, for example, by interposing between the core and the regular coil a closed metallic cylinder or coil. These magnets are, furthermore, polarized magnets—that is to say, either their cores are polarized or magnetized—and the armatures neutral or conversely, so that a current in a direction to increase the magnetism of one core neutralizes that of the other. The armatures *L L'* are normally attracted toward the cores by means of the permanent magnetism therein. A current impulse passed through the coils of the magnet will therefore increase the attractive effect of one of the cores, but by neutralizing the other will permit the armature to recede from the poles.

50 In Fig. 2 a form of polarized magnet is shown having a permanent magnetic core with soft-iron polar extensions *O* surrounded by the coils *M M'* and provided with a neutral armature *L*.

Electro-magnets $H H'$ are quick-acting magnets—that is to say, they are so constructed that their cores respond very sensitively to the action of a current in the coils. This may be done by making the cores P of bundled iron wire or subdividing them in other ways. The magnets $H H'$ also differ from magnets $M M'$ in respect to the strength of the current required for their operation. In other words, the magnets $H H'$, either by having fewer convolutions or by the adjustment of their armatures, require a stronger current to produce in their cores a sufficient magnetic effect to bring about the proper movement of their armatures. These magnets are connected with the circuit in the following way: Magnets $H H'$ are in series in the main line and magnets $M M'$ are in multiple or parallel with magnets $H H'$ by means of connections through the front stops of the armatures $G G'$, both of which are connected to the main line.

At the operator's station any convenient means are employed for sending over the line a current impulse in either direction and other current impulses in either direction, but of double strength. For example, I may employ a divided battery $R R'$, with two keys 1 and 2 for sending the direct and reverse currents of one strength, and a second battery T , of double capacity, in conjunction with two keys 3 and 4, with suitable circuit-connections. With this arrangement each key sends a current of different character, and the depression of any one key produces an action or operation of one of the magnets in the indicator or indicators.

In illustration of the operation of the system let it be assumed that the cylinder E contains characters to indicate the first and second half of each inning of the game and that the cylinder E' contains numbers to indicate the "outs." The pointers $I I'$ are shifted onto different numbers to indicate the runs made by each side. Taking, for example, the indicator at B, it is shown at a glance that at two o'clock of May 5, 1890, a game was called at Boston between the New Yorks and Chicagos, and the condition of the game, as shown by the indicator, is that New York is playing the first half of the third inning, that two men are out, and that they have made three runs to two for Chicago. If another run be scored by New York, the key 2, which is selected as that for indicating runs for New York, is depressed. This throws a weak impulse of current over the line, the direction of which is such that magnet M is strengthened, while magnet M' is neutralized, so that the armature-lever L' is retracted and the pointer I is moved forward one step. In the same way, to indicate a run scored by Chicago, key 1 is depressed, which sends a reverse current to line that strengthens magnet M' , but neutralizes magnet M . To operate one of the cylinders E or E' by the magnets H or H' , a current of double strength is

required. Such a current in one direction is sent by key 4 and in the opposite direction by key 3; but in order that neither of the magnets $M M'$ be operated by such current of double strength the armatures of said magnets $H H'$ are made to control the circuits of magnets $M M'$ —that is to say, the branch of the main line which passes through magnet M' terminates in a contact-stop V' , against which the armature-lever G' normally rests. A current of double strength sent over the line that neutralizes magnet H' and strengthens magnet H causes the armature G' to drop away from the stop V' before magnet M' has responded to the action or effect of such current. The circuit of magnet M' being thus neutralized, the whole current flows through the magnet H' , and the armature of the latter being retracted advances or turns the cylinder E' one step. The adjustment of the armatures $G G'$ is secured by spiral springs, (indicated by SS' .) The current which neutralizes magnet H' and cuts out magnet M' has no effect upon magnets H and M , except to increase their pull, while a current of reverse direction would have a directly opposite effect. At the beginning of a game the pointers and cylinders may be properly set by hand.

I may use with the apparatus any convenient form of transmitter, and the mechanical details of the indicator may be greatly varied.

One of the indicators, as D , may be placed near the operator, so that he can tell from it the conditions of all the others which are included in series in the circuit.

What I claim is—

1. The combination, in a sporting-indicator, of four movable parts, such as pointers or display-cylinders, adapted by changes in their position to indicate or display the various conditions in or of a game, two polarized slow-acting electro-magnets adapted to respond to a weak current for operating two of such movable parts, and two polarized quick-acting electro-magnets requiring for their operation a stronger current for operating the other of said parts, the circuits of the slow-acting magnets being controlled by the quick-acting magnets, respectively, and all of said magnets being connected with the same circuit, as set forth.

2. In a sporting-indicator, the combination, with two or more pointers or cylinders, or both, and ratchets and pawls for moving them step by step, of armature-levers carrying said pawls and oppositely-polarized electro-magnets for said armatures connected with the same circuit and of different degrees of sensitiveness to the action of a current, as set forth.

3. In a sporting-indicator, the combination, with two or more pointers or cylinders and ratchets and pawls for moving them step by step, of armature-levers carrying said pawls and polarized electro-magnets, two of which respond slowly to a weak current and two re-

spond quickly to a stronger current, the circuit of the former being controlled by the latter, and all of said magnets being connected with the same electric circuit, as described.

5 4. In a sporting-indicator, the combination, with movable pointers and cylinders, of four electro-magnets separately connected with the same for moving or turning them, said magnets being polarized, whereby they will
10 be operated or not according to the direction of the current, two of said magnets being sluggish or slow-acting, but capable of responding to a comparatively weak current,

the others being quick-acting magnets requiring a current of greater strength than the 15 others to effect their operation, the latter being connected in series in the circuit and the slow-acting magnets being included in normally-closed branches around the other two, respectively, said branches being formed in part by 20 the vibrating armatures of the quick-acting magnets, as and for the purpose set forth.

SAMUEL D. MOTT.

Witnesses:

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HENRY F. NEWBURY.