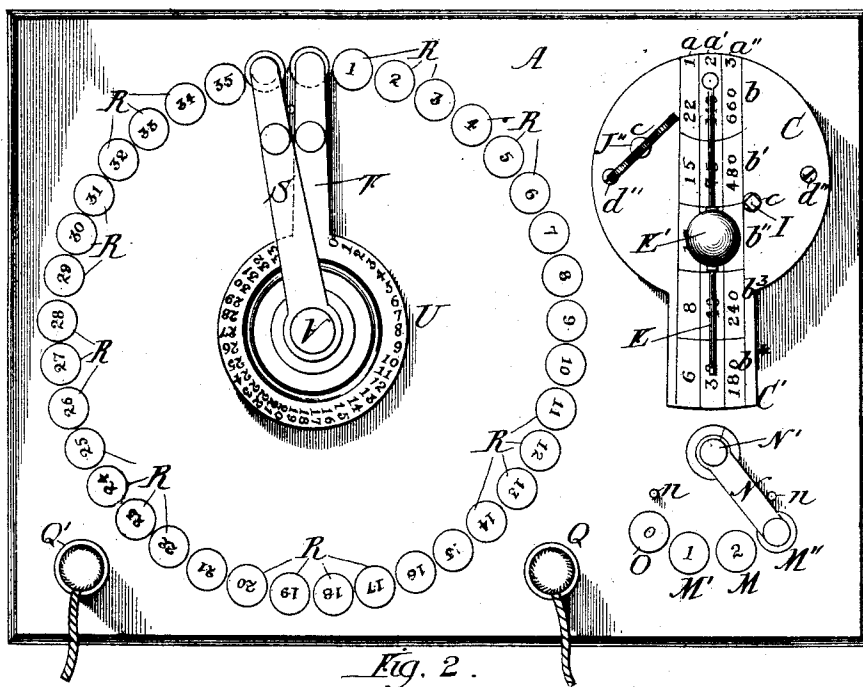
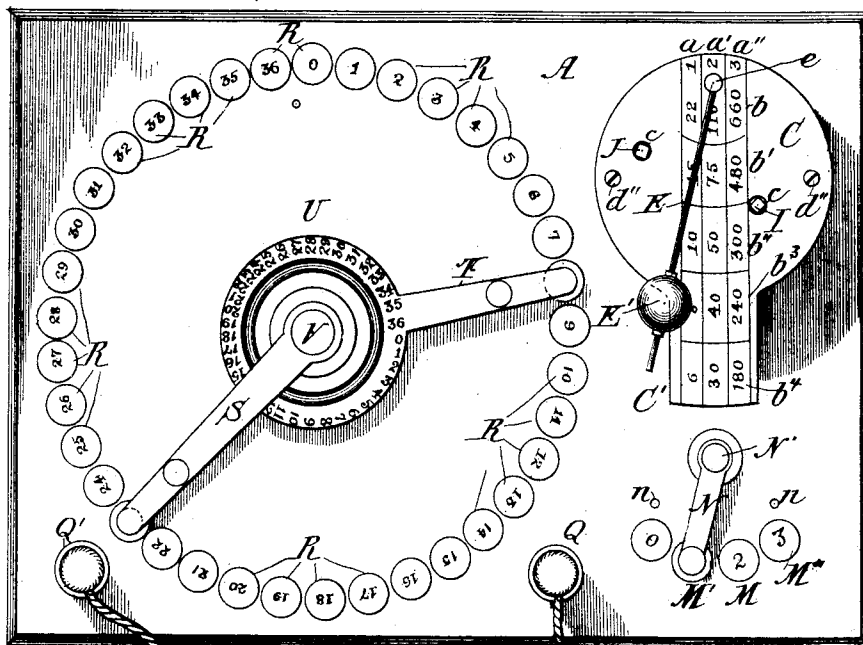


C. V. OSBORN.

THERAPEUTIC ATTACHMENT FOR GALVANIC BATTERIES.

No. 401,366.

Patented Apr. 16, 1889.

Fig. 1.*Fig. 2.*

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Harry F. Jones.

Inventor:
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By West & Bond,
His Attys.

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Fig. 4.

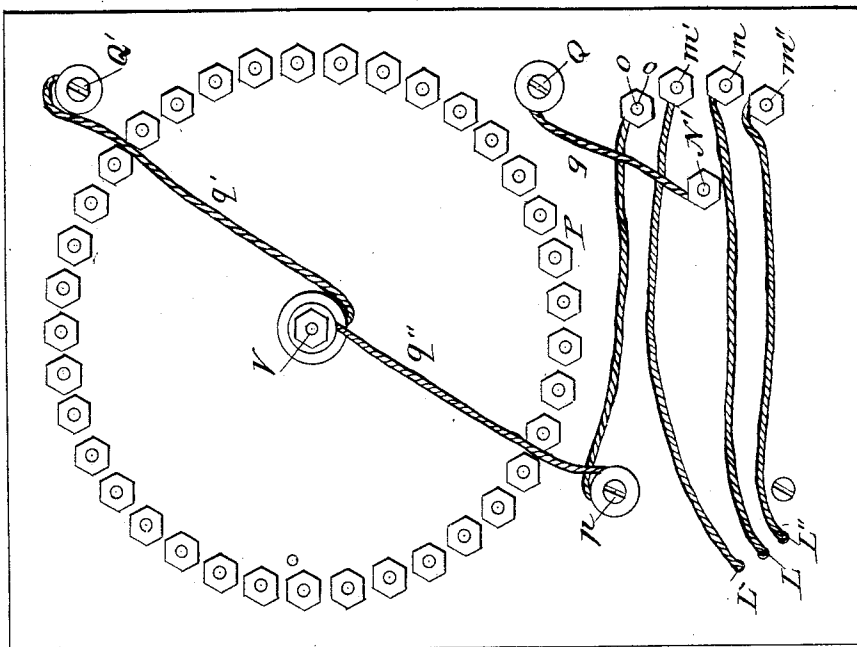
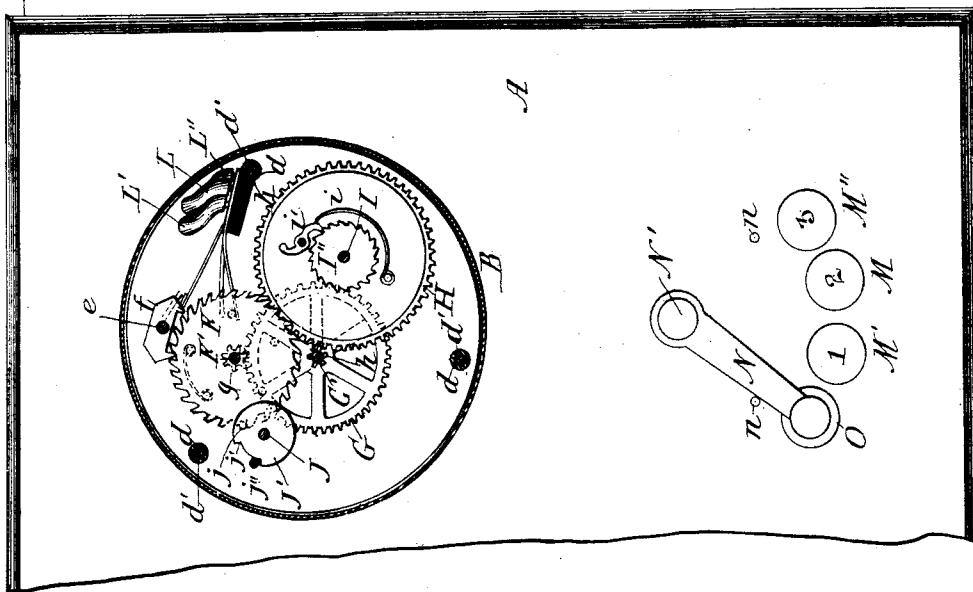


Fig. 3.



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Fig. 5.

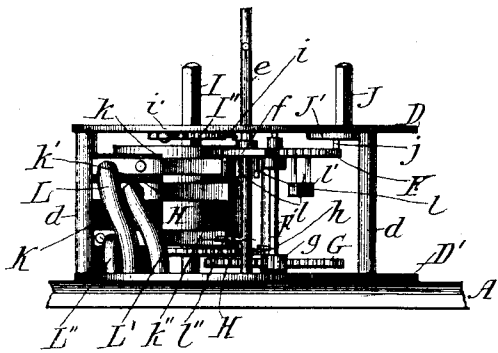


Fig. 6.

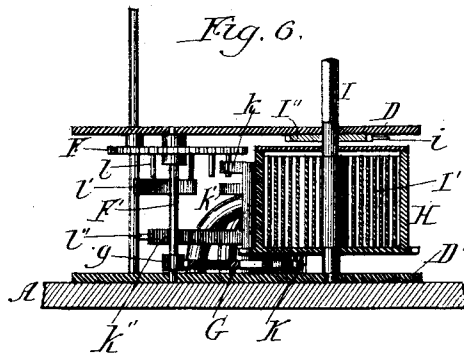


Fig. 7.

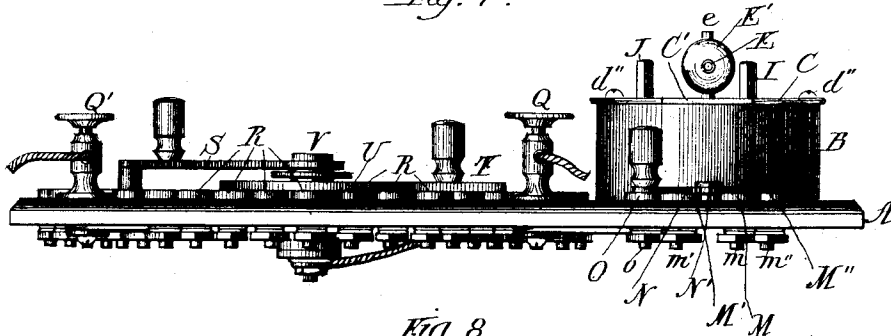
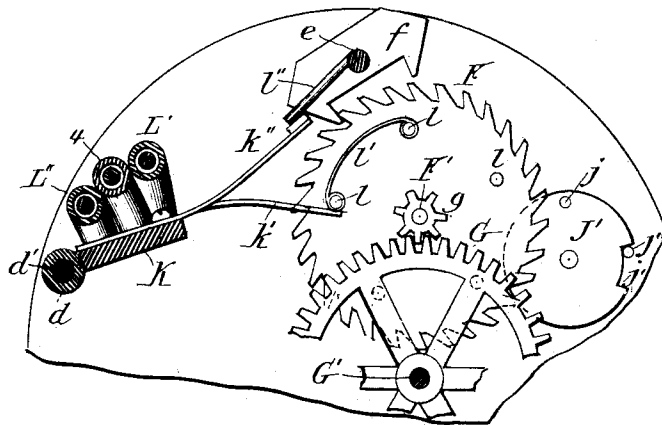


Fig. 8.



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(No Model.)

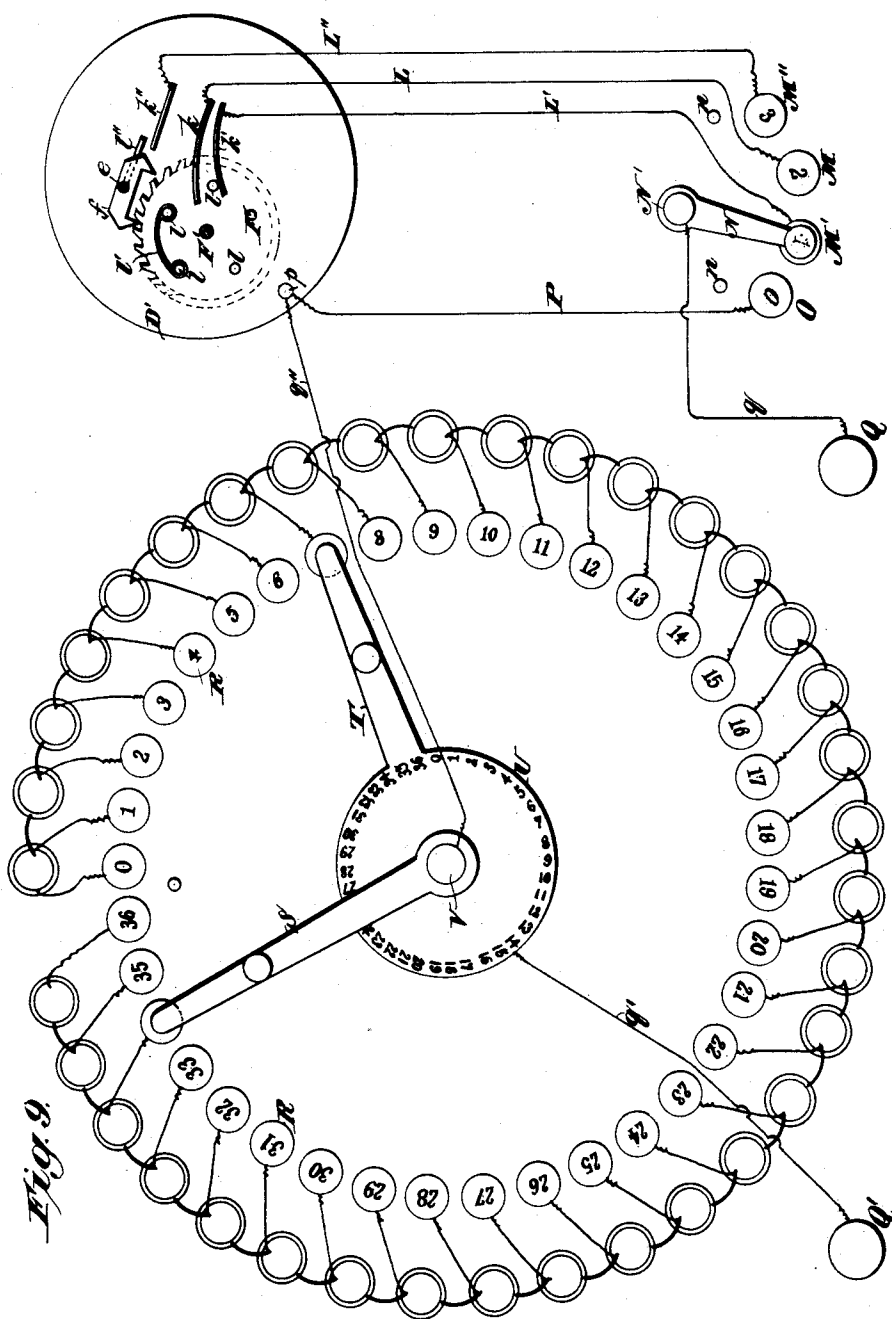
4 Sheets—Sheet 4.

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THERAPEUTIC ATTACHMENT FOR GALVANIC BATTERIES.

No. 401,366.

Patented Apr. 16, 1889.



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UNITED STATES PATENT OFFICE.

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THERAPEUTIC ATTACHMENT FOR GALVANIC BATTERIES.

SPECIFICATION forming part of Letters Patent No. 401,366, dated April 16, 1889.

Application filed May 17, 1888. Serial No. 202,462. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY V. OSBORN, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Therapeutic Attachments for Galvanic Batteries, of which the following is a full description, reference being had to the accompanying drawings, in which—

10 Figure 1 is a top or plan view showing the arm which controls the intermissions of an interrupted circuit midway between a quick and slow movement and the arm which determines the number of cells in use at the full capacity of the battery; Fig. 2, a plan view showing the arm controlling the intermissions of the interrupted circuit adjusted for a slow movement and the arms which indicate the cells in use, arranged to leave out a broken cell and still indicate the number of cells in use; Fig. 3, a cross-section through the rheotome with the current-selector broken off; Fig. 4, a bottom view of the plate, showing the manner of running the wires; Fig. 5, a side elevation of the rheotome with the outer casing removed; Fig. 6, a sectional elevation of the rheotome with the outer casing removed; Fig. 7, a side elevation of the cover with the devices thereon; Fig. 8, an enlarged detail showing the verge and the connection with the wires of the battery. Fig. 9 is a diagram illustrating the circuits and their connections.

My invention relates to that class of galvanic batteries adapted to therapeutic purposes, its only use being the application of electricity in the treatment of disease.

It is the purpose of my invention to provide novel and simple means, whereby the operator may effectually control and regulate the number of intermissions for an interrupted circuit, so that a quick or slow interruption can be had without changing the wires or connections between the battery, rheotome, and binding-posts, and without any changes in the arrangement of the parts, and to enable a broken cell to be thrown out of use, and at the same time indicate the number of cells in use, and its nature consists in the several parts and combinations of parts hereinafter described, and pointed out in the claims as new.

In the drawings, A represents a plate made of vulcanized india-rubber or other non-conducting material, and of a dimension to correspond with the dimensions of the cell-receiving receptacle for the battery.

B represents a cylindrical shell or casing made of sheet-brass or other suitable material, and of a dimension to inclose the devices belonging to the rheotome.

C represents a plate of brass or other suitable material, secured in any suitable manner to the upper edge of the shell or casing B, and having on one side an extension, C'. The top of this plate C and its extension C' are divided by lines into three spaces, *a a' a''*, on which are placed designating-figures 1 2 3, and the spaces *a a' a''* are divided by cross-curved lines into spaces *b b' b''*, on which are placed, respectively, designating-figures for the breaks.

D is a plate of a diameter to fit within the shell or case B, and D' another plate corresponding in diameter to the plate D, between which plates and within the wall or shell B is located the mechanism by which the beats or interruptions of the circuit are controlled. The two plates D D' are connected together by posts *d*, which posts at the lower ends may be permanently secured to the plate D', and to the upper ends of which posts the plate D can be secured by screws *d'*, or in some other removable manner, and to the plate D is attached the cover or plate C by screws *d''*, so that the shell B, plate C, and plates D D' are all connected.

E is a wire on which is mounted a movable ball, E', and this wire at one end is screwed into or otherwise fastened to a post, *e*, the lower end of which is stepped into the plate D', the post extending through and some distance above the plate D and the plate C.

F is a verge-wheel, with which a verge, *f*, coacts, the verge being secured in any firm manner on the post *e*. The verge-wheel F is mounted on a shaft, F', the ends of which are stepped in the plates D D'.

G is a cog-wheel mounted on a shaft, G', which shaft is stepped in the plates D D', and the wheel is so located and arranged as to mesh with a pinion, *g*, secured to the shaft F'.

H is a drum, the lower plate of which is provided with cogs to mesh with a pinion, *h*, on the shaft *G'*.

I is a winding-stem, the lower end of which is stepped in the plate *D'*, and the upper end of which extends through the plates *C D*, and is squared to receive the winding-key. This stem passes through the drum *H*, and to this stem is firmly attached one end of a coiled spring, *I'*, the other end of which is secured in any suitable manner to the drum, the spring being located within the drum and, as shown, the upper end of the drum, is closed by a suitable plate. The stem *I* below the plate *D* has secured thereto a ratchet-wheel, *I''*, which is locked against backward movement by a ratchet, *i'*, pivoted to the under side of the plate *D*, and controlled by a spring, *i*. The ratchet-wheel and ratchet allow the stem to be turned in a forward direction to wind up the spring *I'*, but lock the stem against rotation as the spring unwinds to rotate the drum *H* and impart rotation to the train of gear for operating the verge-wheel, the drum being loosely mounted on the stem *I*.

J is a stem passing up through the plates *C D*, and having its upper end squared to receive a key, and the lower end of this stem has secured thereto a disk, *J'*, from the under face of which depends a pin, *j*, so arranged as to engage with the teeth of the verge-wheel *F* and lock the verge-wheel against rotation, and, as shown, the edge of the disk *J'* is provided with a recess, *j'*, within which is a pin, *j''*, depending from the plate *D*, with which pin the edges of the disk at the ends of the recess engage to limit the movement of the disk *J'* in engaging the pin *j* with or disengaging it from the verge-wheel *F*.

K is a support, formed of vulcanized india-rubber or other insulating material, attached at its lower end to the plate *D'*, and to this support *K* is secured, by rivets or otherwise, strips of sheet-copper or other conducting material, *k k' k''*, the free ends of which are arranged to be engaged by pins on the verge-wheel *F* and rock-shaft *e*.

L L' L'' represent conducting-wires, the ends of which are connected, respectively, to the strips *k k' k''*. The strip *k* has its free end in a plane to be struck successively by a series of pins, *l*, depending from the verge-wheel *F*. The strip *k'* has its free end in a plane to be engaged by a strip, *l'*, attached to two of the depending pins *l*, the pins being of the proper length to bring the strip *l'* in line with the strip *k'*, and the strip *k''* has its free end in a plane to be struck by a pin, *l''*, projecting out from the rock-shaft *e*. The strips *k k' k''*, in connection with the pin *l*, strip *l'*, and pin *l''*, make and break successively the circuit for the wires *L L' L''*, and the making and breaking of the circuit is controlled through the weighted rod *E*, by which the movement of the rock-shaft *e* and verge *f* is regulated.

M M' M'' represent buttons located on the

upper side of the plate *A*, and each having a stem or shank for connection with the wires leading to the block *K*, the wire *L* connecting with the stem *m* of the button *M*, and the wires *L' L''* connecting, respectively, with the stems *m' m''* of the buttons *M' M''*.

N is a switch-lever, the attached end of which is connected with a pin or pivot, *N'*, the stem of which enters the plate *A* and, as shown, passes through such plate, and is held in place by a nut, (see Fig. 4,) and, as shown, the swing of the lever *N* is limited by pins *n*.

O is a button arranged in the circle of the buttons *M M' M''* so as to lie beneath the end of the lever *N*, from which button a wire leads to the connection with the battery.

P represents the wire leading from the button *O* to the screw or button *p*.

Q Q' represent the binding-posts located on the top of the plate *A*, and having a stem or shank passing through such plate, and, as shown, a wire, *q*, connects the button *Q* with the pivot *N'* of the switch-lever *N*, and a wire, *q'*, runs from the binding-post *Q'* to the disk *U* and lever *T*. From the pivot *V* of lever *S*, which is insulated from disk *U*, a second wire, *q''*, leads to the screw or button *p*, to which the wire *P* is connected, and this button or screw *p* passes into the plate *D'* of the rheotome devices, which plate is of conducting material and forms the circuit-connection between the pins *l* and the binding-post *p*.

R is a series of buttons located in a circle, and arranged on top of the plate *A* in the construction shown, which buttons start from 0, and, as shown, run to 36, inclusive; but a greater or less number can be used, the number corresponding with the cells of the battery employed. For convenience of illustration I have shown these cells as arranged in a circle and connected with the buttons *R*; but it is evident that any other form of arrangement may be adopted.

S is an arm or lever pivoted at one end and having its free end to swing in a circle above the buttons *R*, and in such relation to the buttons that the free end of the arm can be made to engage with any desired button.

T is an arm or lever insulated from lever *S*, and pivotally attached at one end and having its free end swinging in the arc of a circle corresponding to that of the buttons *R*, such free end being arranged to engage with any desired button.

U is a disk, formed with the arm or lever *T* in the form of construction shown, and having thereon a series of numbers running from 0 to 36, both inclusive, in the construction shown, or to such number as to correspond with the number of buttons *R*.

The buttons *R*, in connection with the levers or arms *ST*, are for the purpose of selecting out any given number of cells to bring within the circuit, and for this purpose the arm or lever *T* is set to have its free end engage with the button *R*, which has the 0 thereon, and the lever *S* is swung around to

bring between its end and the end of the arm T the required number of cells. For instance, if twenty cells are to be brought within the circuit the lever S is brought around so as to rest upon the button 21, leaving twenty cells in the circuit, and this fact is also indicated by the register on the plate U. So it will be seen that through the arms or levers ST any desired number of cells can be brought into a circuit, and if from any cause a cell becomes broken or disarranged—as, for instance, the cell which belongs with the button R having thereon the figure 7—the arm T can be set to have its free end engage with the button R, having thereon the figure 8, which throws out of use all of the cells up to and including the one for the button R, with the Fig. 7 thereon, and by starting from here as the counting-point the lever S can still be made to operate and bring into use any given number of cells to the full number, from 8 to 36, both inclusive, and if fifteen cells are to be brought into use, by setting the lever S as shown in Fig. 2 fifteen cells are brought into the circuit, and such fact is indicated by the register U, which shows the figure 15 at one edge of the arm S. It will thus be seen that by the use of these arms or levers S T any desired number of cells can be quickly brought into the circuit by simply setting the lever S for the desired number of cells, as indicated by the register U, and if some of the cells become broken or disarranged in any way, so as to be inoperative, the register of the number of cells in the circuit can still be quickly shown by setting the lever R to leave out of use all of the cells back of the broken one, and then setting the lever S from the point where the lever R starts. This device will be found very useful and beneficial in enabling the operator to quickly select any required number of cells, and can be applied and used with any form of galvanic battery where it is desired to have a greater or less number of cells brought into use.

The operation of the controlling device for the interrupted current is as follows: The train of gear is kept in motion by the spring I', which spring is wound up through the post I and a suitable key, and as the spring unwinds it imparts rotation to the drum H, causing the gear on the lower plate of the drum to drive the pinion h, which drives the wheel G, and through the pinion g drives the verge-wheel F, such wheel being driven intermittently by the action of the verge f, as usual, so that the verge will have a rocking movement, producing a corresponding movement for the shaft e, with which the rod E is connected, giving such rod a reciprocating or vibrating movement similar to a pendulum, and the beats of such rod are controlled by the position of the ball E' thereon. The ball located in the first circle, b, of the graduated scale allows a quick vibration or beat for the rod E. For the next circle, b¹, the vibration or

beat of the rod is a little slower, and so on, until the last circle, b⁴, is reached, when a slow beat or vibration is had for the rod, and the vibrations or beats of the rod are prevented by turning the shaft J to cause the pin j on the disk J' to interlock with the teeth of the verge-wheel F, and when such engagement is released the train of gear is free to actuate the verge-rod e and produce the vibrations or beats of the rod E. The rotation of the verge-wheel F brings the pins l successively in contact with the free end of the strip k, with which the wire L communicates, and such rotation of the wheel F brings the strip l' in contact with the strip k', with which the wire L' communicates, and the rock of the verge-shaft e causes the pin or arm l'' thereon to strike the end of the strip k'', with which the wire L'' communicates. The desired wire or current is selected by bringing the free end of the lever N in contact with that one of the buttons M M' M'' for the wire to be used, and, as will be seen, the buttons are numbered 1 2 3 to correspond with the numbered spaces 1 2 3 of the scale on top of the plate C and its extension C', so that the operator or user, by placing the end of the lever N on the button M', which has on its top face a figure 1, knows that he has selected a current or wire corresponding to the space 1 of the scale, and by following the wire L', which has connection with the button M', it will be seen that it leads to the strip k', with which the strip l' comes in contact, producing an interrupted current for a considerable time, as the strip l' is only in contact with the strip k' during a short interval compared with the entire rotation of the wheel. Such interval, however, may be increased or decreased by shortening or lengthening the strip l', and when the connection is with the wire L', strip k', and strip l' the rotation of the verge-wheel has no effect in producing a connection with the strips k and the strips k'', as such strips have no connection with their respective wires L L'' for the passage of the current. The connection is made for the wire L and strip k by placing the end of the lever N on the button M, which button has thereon the figure 2, indicating that the connection is with the current for the scale, which is figure 2 on the space a', and when the connection is with the wire L the interruptions are more frequent, as the controlling devices therefor are the pins l, which come in contact successively with the end of the strip k, producing a break and a contact intermittently, and such break and contact will occur with the passage of each pin, and the number can be varied by changing the number of pins—that is, with the pins shown five breaks are made for each revolution of the verge-wheel, but by adding more pins or using a less number a greater or less number of breaks will be had, and it will also be seen that by adding another strip, l', the breaks for the wires L' can be doubled. The connection for the wire L'' is made by plac-

ing the lever N on the button M'', which button has on its top the figure 3, corresponding with an indicating-figure 3 on the space a'' of the scale, and when this connection is made for the wire L'' the breaks and contacts will occur with each engagement and withdrawal of the pin or arm l'' and strip k''.

The rapidity of the breaks and contacts for all of the wires is controlled by the ball E', which can be adjusted in or out on the rod E to produce the required number of interruptions, as when the ball is at the inner adjustment the breaks or interruptions will be very quick, and such breaks or interruptions will be decreased as the ball is slid out, and it will be seen that with the ball located at the inner or first place the breaks for the wire L'' will be very quick, as the contact of the arm l'' with the strip k'' will be a rapid one. The breaks for the wire L will be less frequent, as there is more space between the pins l, and consequently a slower contact, and the breaks for the wire L' will be still less frequent than for the wire L, as the strip l' is in contact with the strip k' for a partial revolution of the verge-wheel only.

The graduated scale on the plate C and extension C', in connection with the numerals 1 2 3 of the spaces A A' A'', enables the operator to determine the number of beats for a given period of time with the ball or weight E' adjusted at different points, as with the switch-lever N on the button M' the operator knows that the connection is with the wire L', and that with such connection, with the ball at the limit of its outward adjustment, six breaks will occur for a given period, and these breaks will be increased in number as the ball is adjusted toward the verge-shaft, as the operator is aware that the breaks occur with the engagement and disengagement of the strip l' with the strip k', and with the lever N engaged with the button M the operator can tell by the position of the weight E' the number of breaks that will occur at the different points of adjustment in a given period, and the same is true with the lever N engaged with the button M'', as the operator knows that with the engagement of the lever N with the button M the breaks will occur with the engagement of the pins l with the strips k, and when the lever N is engaged with the button M'' the breaks will occur with each contact of the pin l'' with the strip k''. The operator is thus enabled to select any wire, and by means of the adjustable weight E' and the graduated scale on the plate C and extension C' to adjust the ball or weight to give any desired number of breaks or interruptions to the current.

The independent circuits described are for the purpose of varying the number of breaks in the circuit when in use, in order to suit the current to the different cases to the treatment of which the apparatus may be applied. For example, the circuit formed through the button M, having the numeral 1, will give a current which will be broken or interrupted at

six, eight, ten, fifteen, or twenty-two times in a minute, or other predetermined period. The current through button M, bearing the numeral 2, will be broken thirty, forty, seventy-five, or one hundred and ten times in a minute, and the current through button M'', bearing the numeral 3, will be broken one hundred and eighty, two hundred and forty, three hundred, four hundred and eighty, or six hundred times in a given period of time, the position of the weight varying the number for each circuit, the number of breaks in each circuit depending on the devices shown in Figs. 5, 6, and 8.

I have not shown the battery-cells, as these may be of any approved form and construction; but with this exception the apparatus is complete, as shown and described.

What I claim as new, and desire to secure by Letters Patent, is—

1. The rod E, adjustable weight E', verge-shaft e, and verge f, in combination with the verge-wheel F and a motive power for driving such wheel, strips k k' k'', pins l, strip l', and pin l'', for making and breaking the contact at regular intervals, substantially as specified.

2. The rod E, adjustable weight E', verge-shaft e, and verge f, in combination with the verge-wheel F, pins l, strips k, and wire L, for making and breaking the circuit of the wire L, substantially as and for the purpose specified.

3. The rod E, adjustable weight E', verge-shaft e, and verge f, in combination with the verge-wheel F, strip l', strip k', and wire L', for making and breaking the circuit of the wire L', substantially as and for the purpose specified.

4. The rod E, adjustable weight E', verge-shaft e, and verge f, in combination with the verge-wheel F, pin l'', strip k'', and wire L'', for making and breaking the circuit of the wire L'', substantially as and for the purpose specified.

5. The rod E, adjustable weight E', verge-shaft e, verge f, and verge-wheel F, in combination with the support K, wires L L' L'', strips k k' k'', pins l, strip l', and pin l'', for making and breaking the circuits of the wires, substantially as and for the purpose specified.

6. The rod E, adjustable weight E', shaft e, verge f, and verge-wheel F, in combination with the support K, wires L L' L'', strips k k' k'', pins l, strip l', pin l'', buttons m m' m'', and switch-lever N, for selecting the wire and making and breaking the circuit thereof, substantially as and for the purpose specified.

7. The combination, with a weighted rod and a rock-shaft, of a graduated scale, circuit-wires, and a switch-lever for throwing into circuit any one of several contact-springs having different rates of rupture, substantially as specified.

8. The combination, with a rheotome, of a weighted vibratory rod, E, having an adjustable weight, E', and a scale over which said rod and weight vibrate, said scale indicating the several variations in the make and break

of the circuit selected in accordance with the adjustment of the weight, substantially as described.

9. The rod E, adjustable weight E', shaft e, 5 verge f, verge-wheel F, and a motive power therefor, support K, wires L L' L'', strips k k' k'', pins l, strip l', and pin l'', in combination with the buttons M M' M'', switch-lever N, and a graduated scale coacting with the 10 weight of the vibrating rod for selecting and indicating the circuit and denoting upon said scale the breaks thereof with relation to the

adjustable weight E', substantially as specified.

10. A series of buttons arranged in a circle, 15 in combination with the levers S T and indicator U, mounted upon the central pivot carrying said levers S and T, for selecting and determining the cells in use, substantially as specified.

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