

(No Model.)

H. P. PRATT.

2 Sheets—Sheet 1.

ELECTRIC BELT.

No. 388,581.

Patented Aug. 28, 1888.

Fig. 1.

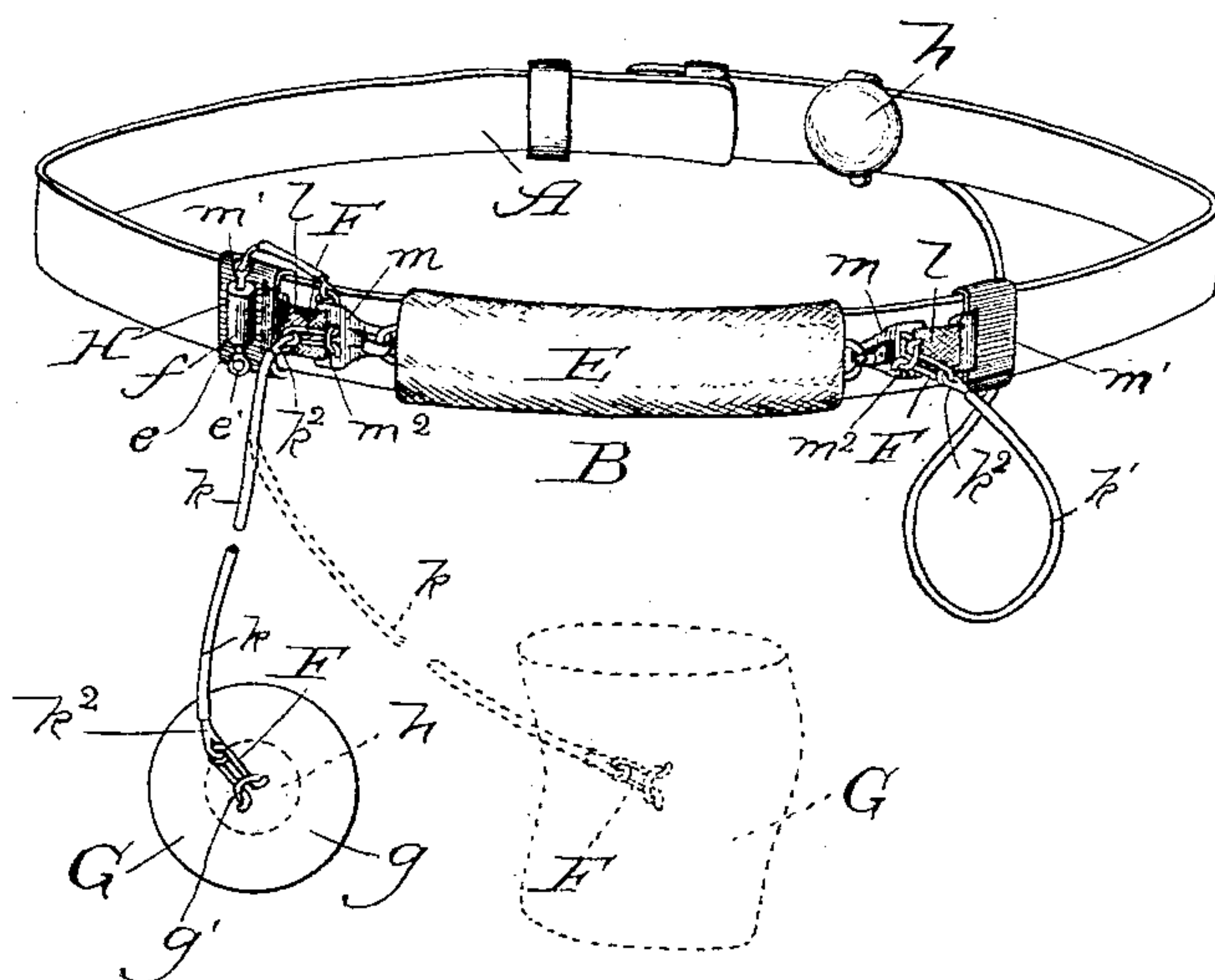


Fig. 2.

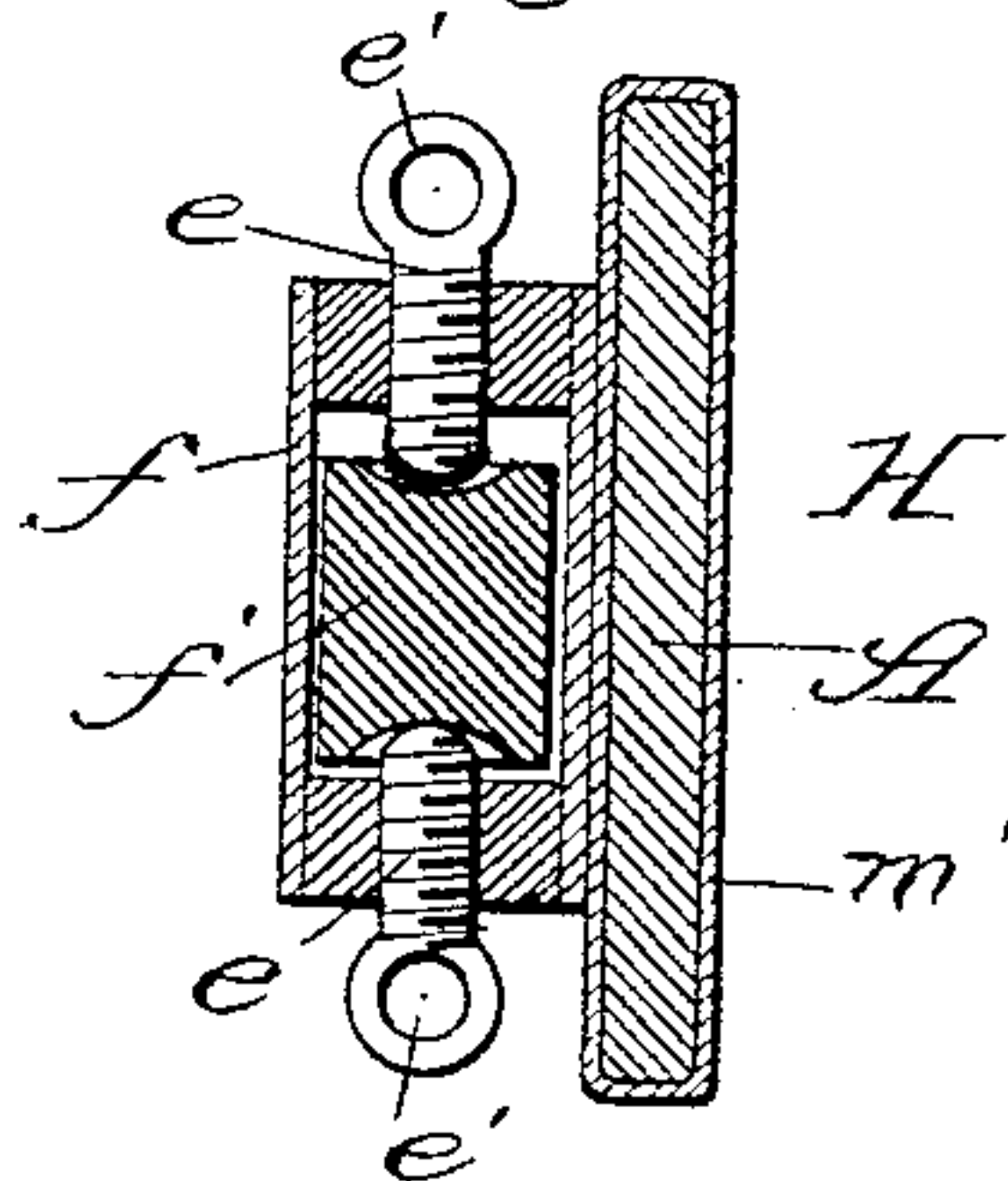
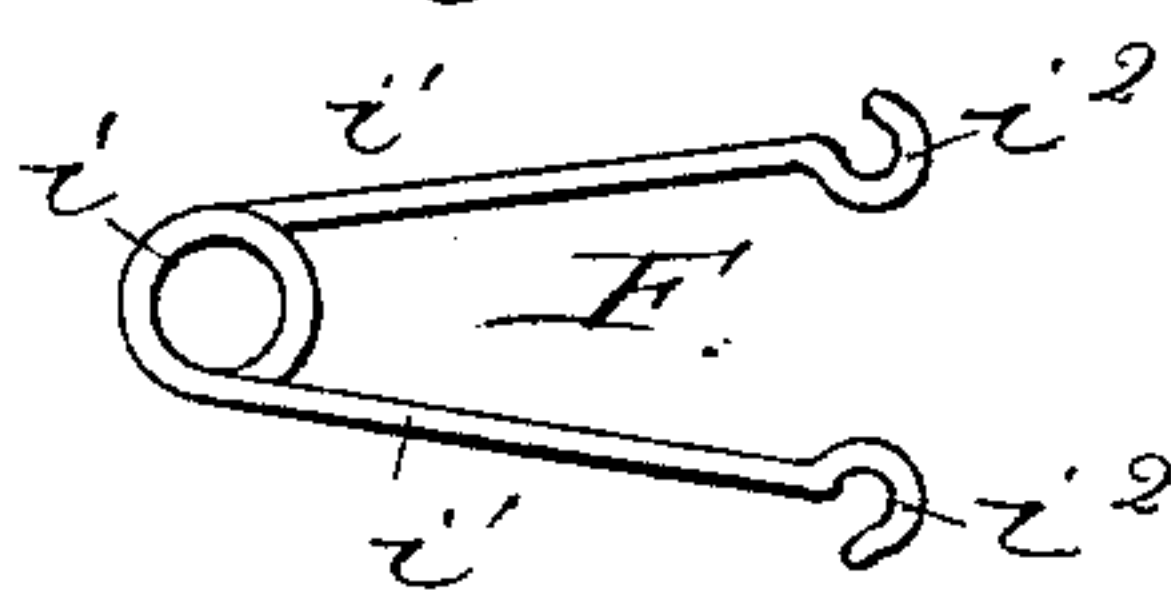


Fig. 3.



Witnesses:

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*J. W. Dymond,*

Inventor:

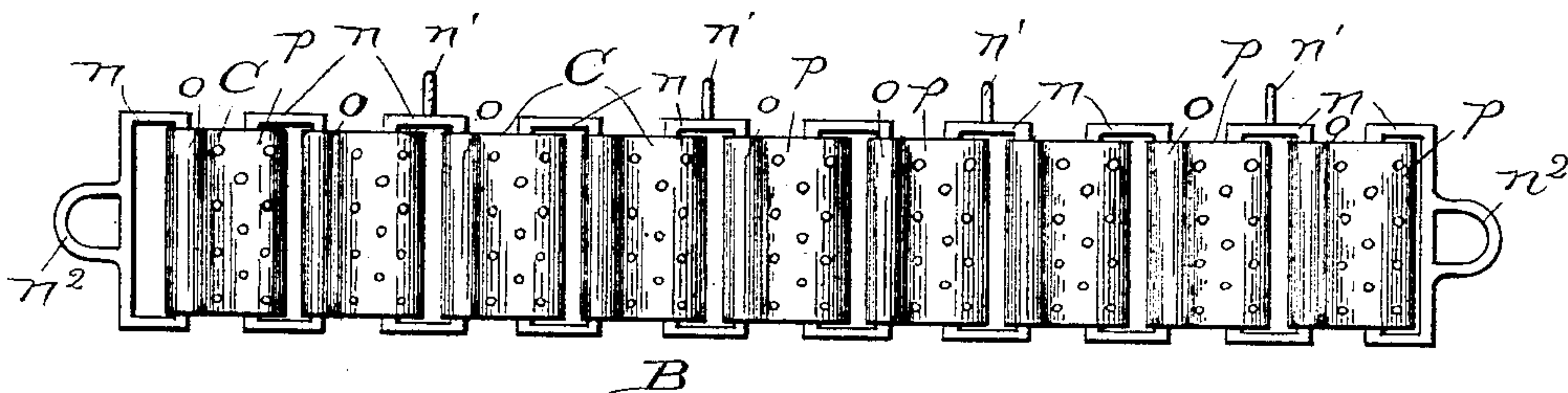
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H. P. PRATT.  
ELECTRIC BELT.

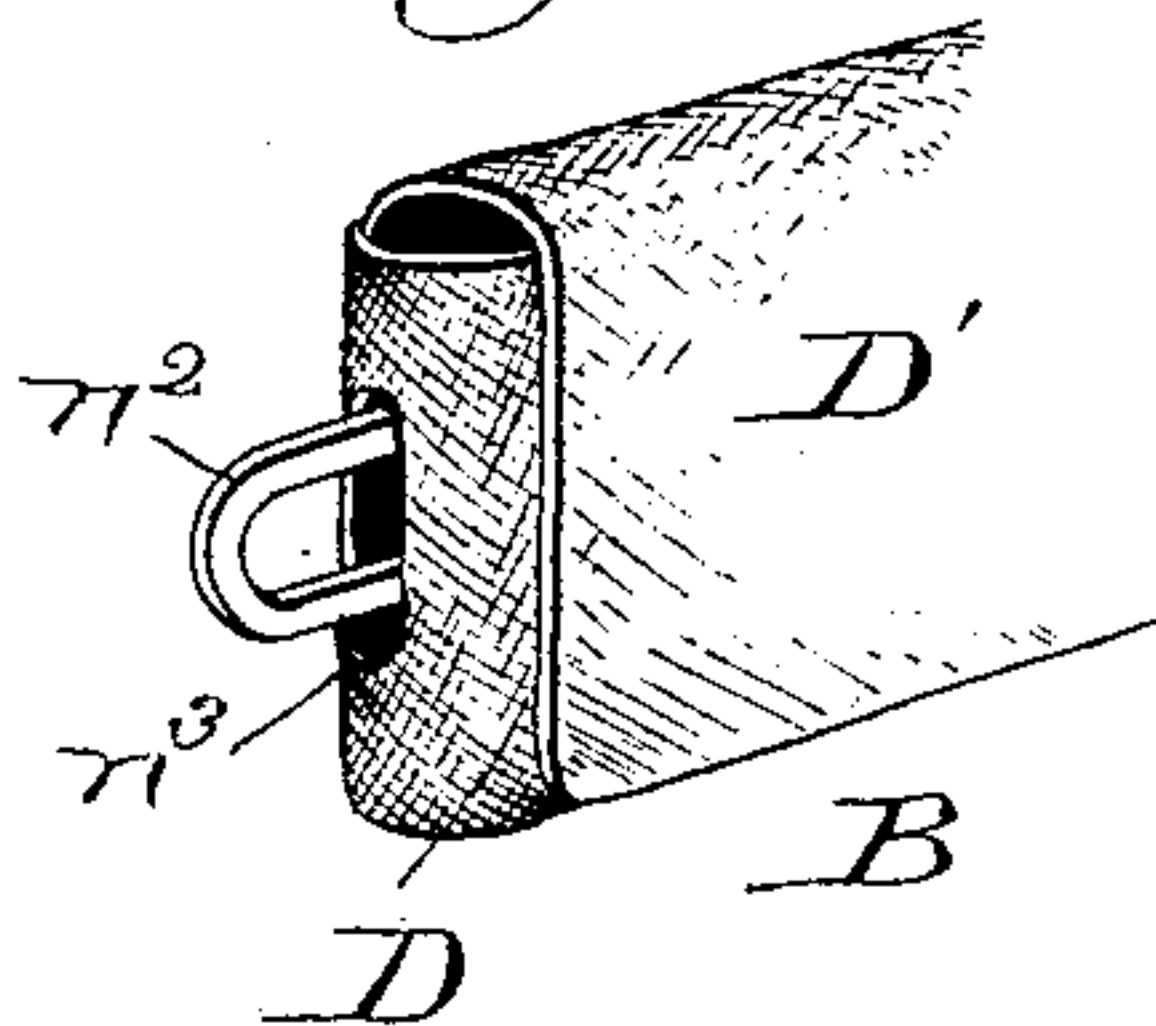
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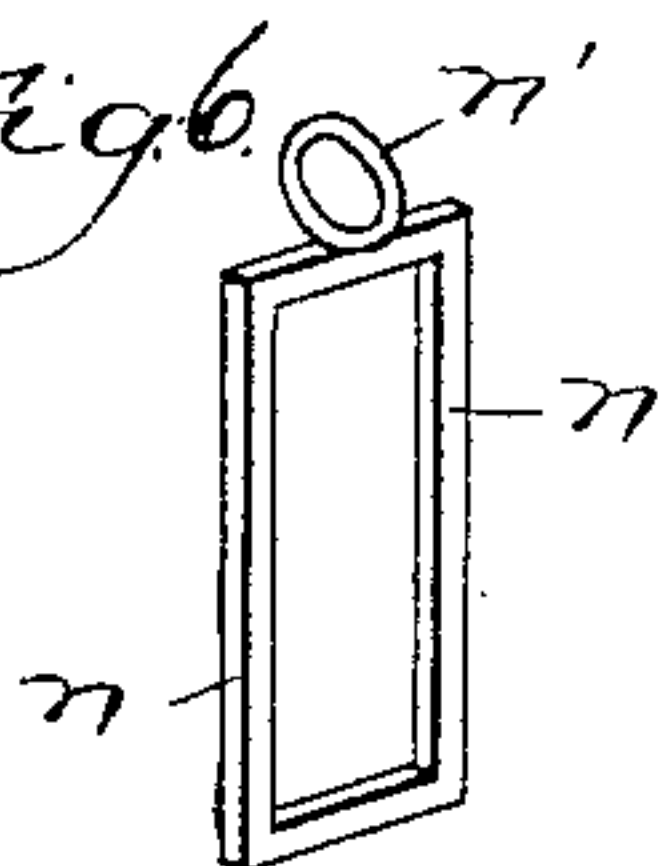
*Fig. 4.*



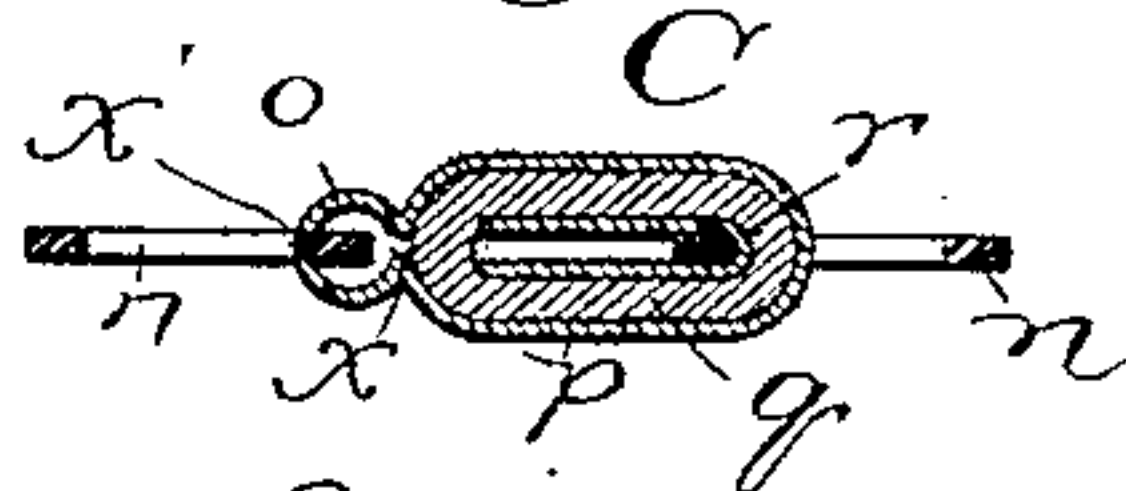
*Fig. 5.*



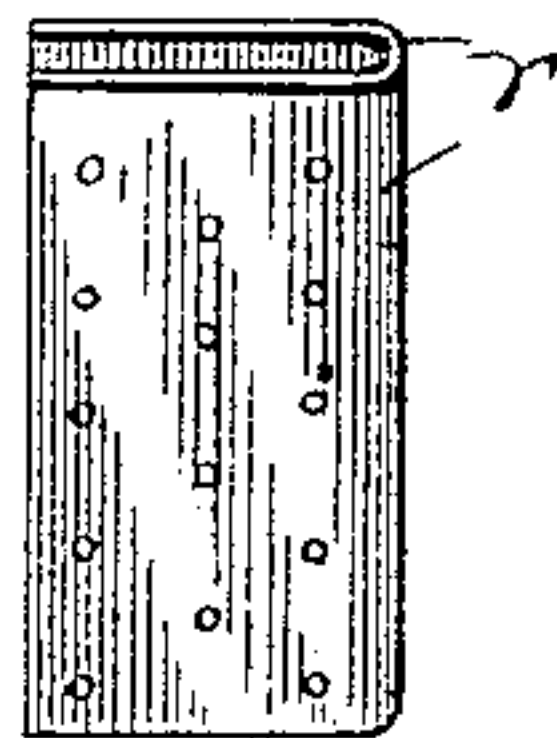
*Fig. 6.*



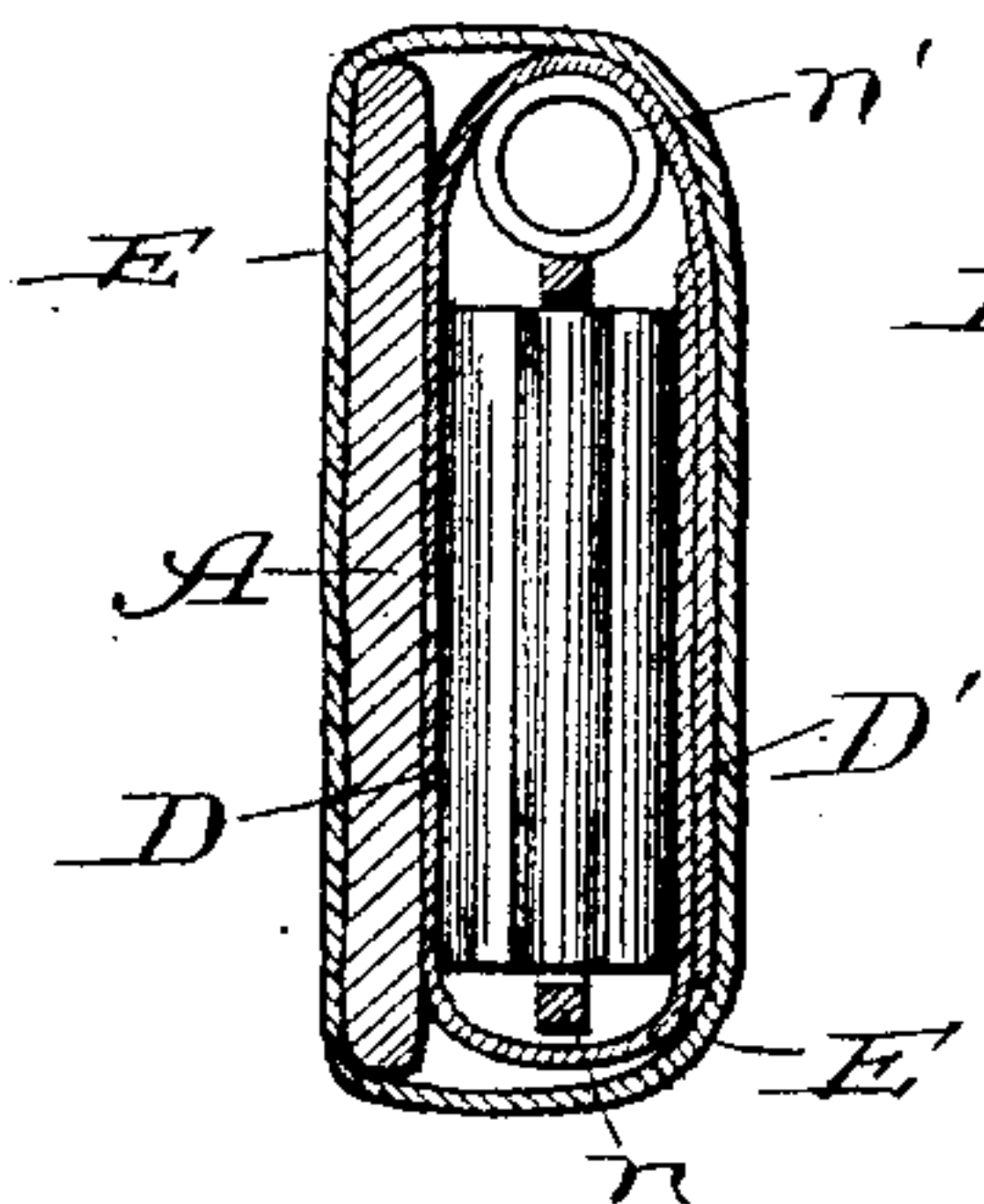
*Fig. 7.*



*Fig. 8.*



*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

HARRY P. PRATT, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE PRATT ELECTRO THERAPEUTIC SUPPLY COMPANY, OF SAME PLACE.

## ELECTRIC BELT.

SPECIFICATION forming part of Letters Patent No. 388,581, dated August 28, 1888.

Application filed April 10, 1888. Serial No. 270,191. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY P. PRATT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric Belts, of which the following is a specification.

My invention relates to improvements in the class of electro-therapeutic belts which involve as essential features a series of galvanic cells connected with a girdle for attachment to the person, and having the poles connected by suitable conductors with electrodes to be applied to the body of the wearer.

As commonly constructed, electric belts of the class referred to are necessarily applied in direct contact with the body of the wearer, since the electrodes as hitherto provided have to be supported by it or from it, as in the case (to cite one instance of construction) of their adjustment on shoulder-braces extending from the girdle portion of the device.

One of the objects of my improvement is to have the electrodes attachable directly to the body without support at their points of application from any extraneous medium, such as the girdle or parts connected therewith.

Further objects are to provide a longitudinally-expandible battery which shall be expanded when the belt is adjusted on the person, and by the act of its expansion operate to strengthen the battery-current; to provide a mechanically-operated circuit breaking or interrupting attachment for the battery, whereby when the belt is in operative position the battery-circuit may be normally open, and shall, while the belt is being worn, undergo continual interruption, produced by the motions of the body of the wearer; and, further, to provide a generally-improved electric belt, both as to its broad construction and as to details thereof.

My invention consists in the general construction of the battery, whereby it is rendered expandible longitudinally, and in so expanding operates to compress the absorbent material in each cell saturated with the exciting-liquid, and thereby free sufficient of the latter to increase by its access to the positive and negative elements the strength of the battery.

It also consists in the general construction of electrodes connected with the battery, whereby they are attachable directly on the body of the wearer; also in having a mechanically-operated circuit breaking or interrupting attachment to the battery; also in the general construction of means for connecting the battery and girdle portions of the belt.

My invention further consists in details of construction and combinations of parts.

In the drawings, Figure 1 is a perspective view of my improved electric belt, showing by dotted lines a modified form of electrode connected with the battery. Fig. 2 is an enlarged view, in sectional elevation, of a circuit-interrupting attachment; Fig. 3, a plan view of a clamp detail; Fig. 4, a view in elevation of the battery; Fig. 5, a perspective view showing an end portion of the battery increased; Fig. 6, a similar view of the connecting-link detail for the cells of the battery; Fig. 7, a horizontal section through a battery-cell and its connecting-links, showing details of construction; Fig. 8, an enlarged view, in side elevation, of the internal zinc or negative element of a battery-cell; and Fig. 9, an enlarged sectional view taken transversely at any line through the battery and belt.

A is the belt, which I prefer to form of elastic material. B is the battery, composed of cells C, each comprising a central (zinc) plate, *r*, preferably perforated and folded upon itself, as shown in Figs. 9 and 10, absorbent material *q*—such as felt or asbestos—wrapped transversely around the element *r*, and a plate, (copper,) *p*, surrounding the absorbent material in a manner to leave the ends exposed. The element *p* is of thin sheet metal, also preferably perforated, and mainly of the substantially oval form in cross-section shown in Fig. 9, with the tubular extension *o* at one edge open or split longitudinally, as shown at *x* and *x'*, but soldered together at *x'*. As will hereinafter more fully appear, this construction of the battery-cells is of great importance, inasmuch as to it is due the function of strengthening the battery by tension exerted lengthwise of the battery from opposite poles. The battery comprises any desired number of cells, C, connected together by metallic (copper) links *n*, surmounted alternately, as shown, on



each by rings  $n'$  of the same material. Each link serves to connect the element  $r$  of one cell, to which it is secured, preferably by soldering, with the element  $p$  of an adjacent cell in the tubular extension  $o$ , in which it has a limited transverse play, and the links  $n$  of the end cells, connected, respectively, with the copper and zinc elements thereof, have lateral extensions, forming eyes  $n^2$ , at which to connect metallic clasps  $m$ , Fig. 1, secured to elastic straps  $l$ , the opposite ends of the straps  $l$  being fastened to sliding clamp-buckles on the belt, which clamp-buckles are of an ordinary form and construction, being the same as those commonly employed on suspenders, and to which the suspender-ends are clasped. Each clasp  $m$  carries a metallic eye,  $m^2$ , at which the conductors carrying electrodes are connected by means hereinafter described.

The battery  $B$  is inclosed within a case,  $D$ , formed, preferably, of rubber or oiled silk to render it impervious to the moisture of the battery, (a suitable acid with which the absorbent material is saturated,) and having a flap,  $D'$ , to cover it, and the eyes  $n^2$  on the end cells extend through openings  $n^3$  in the ends of the case  $D$ . A case,  $E$ , of cloth or any other suitable material, open at both ends, is provided on the belt, and may be slipped thereon to any position to which it is desired to move the battery, which, and the case  $D$ , it incases, and by slipping the case  $E$ , as described, access is readily had to the battery for any purpose without requiring the said case to be removed from the belt to gain such access.

The insulated conducting-wires  $k$  and  $k'$ , to which the electrodes, hereinafter described, are attached, are provided at their extremities with suitable clasps,  $k^2$ , carrying my improved form of connecting-clamp  $F$ , Fig. 5, for connecting the conductors with the battery and the electrodes to the conductors. The clamp  $F$ , which is formed of springy metal, comprises the coil  $i$  at its base, from the ends of which extend the arms  $i'$ , terminating in hooks  $i^2$ , which open outward, as shown. By compressing the arms  $i'$  they are brought closely enough together to permit the insertion of the hooks  $i^2$  with an eye, as the eye  $m^2$ , on a clasp,  $m$ , with which, on releasing the clamp  $F$ , the hooks engage and produce perfect electrical connection.

If it be desired to cut out any of the battery-cells for the purpose of utilizing only a portion of the battery force, a conductor carrying an electrode may be connected at its clamp  $F$  with a ring,  $n'$ , on a link,  $n$ , and to permit such connection to be made it is only necessary, in order to gain access to the battery for the purpose, to slip aside the case  $E$  on the belt and turn up the flap  $D'$ , the case  $D$  and battery, of course, being sustained on the belt by suspension from the clasps  $m$ .

The electrodes for use with my improved battery may be of common construction as to their general form, which is that of a metallic disk,  $h$ , provided on its rear side with means

for attaching it to a support which holds it in contact with the part of the body to which it is applied, as on the belt  $A$ , as shown in Fig. 1. The kind of electrode, however, which I desire to claim in the present application is shown at  $G$  in Fig. 1, and comprises, broadly stated, one which is self-supporting on the part of the body to which it is applied, and to this end is formed, preferably, of an adhesive plaster,  $g$ , carrying on its adhesive surface an electrode,  $h$ , (or two electrodes, if the same appliance is desired to form both the positive and negative terminals of the battery,) having an eye,  $g'$ , on its rear side extending through the plaster, and at which connection is made with a conductor by means of a clamp,  $F$ , in the manner already described, and shown in Fig. 1. This form of electrode constitutes a very important feature in my invention, inasmuch as, owing to its self-supporting quality by adhesion to the part, it obviates the necessity of applying the belt or medium, which would have to be provided for its support were it not self-supporting, directly to the person of the wearer, which entails discomfort. The same end may be subserved by the construction of electrode  $G$ , (shown by dotted lines in Fig. 1,) and comprising a band, preferably elastic, formed with conducting material (as metallic net-work) adapted to surround and fit the part of the body to which it is applied, and provided, if desired, with a metallic eye,  $g'$ , at which to attach the conductor, as in the manner already described. Either form of electrode  $G$  may be used; or both may be used together, as terminals of the same or of different poles of the battery, or either may be used with any other suitable form of electrode.

My improved belt may be provided with a circuit breaker or interrupter,  $H$ , which I prefer to construct as shown in detail in Fig. 4, comprising a housing,  $f$ , secured to the belt in any convenient position, as on a buckle,  $m'$ , and containing loosely a block,  $f'$ , of conducting material—such as carbon—concave at its opposite ends, and metallic set-screws or contacts  $e$ , having eyes  $e'$  in their ends, are inserted through the heads of the housing  $f$  into the concavities in the block  $f'$ . One screw,  $e e'$ , may be connected permanently, as shown, with a clasp,  $m$ , while the other affords means for attaching to it the electrode  $G$  when it is desired to include the interrupter in the circuit.

A conductor may be connected directly with the battery, as shown in Fig. 1, when the interrupter is not in the circuit; or it may be connected indirectly therewith by adjusting the clamp  $F$  on a conductor into the eye  $e'$  of the set-screw  $e$ , not connected with a clasp,  $m$ , whereby the movements of the wearer of the belt, by vibrating the block  $f'$ , which brings the sides of the concavity in the upper end of the latter into and out of contact with the end of the adjacent set-screw  $e^3$ , continually make and break the circuit, producing the well-known therapeutic effect of an interrupted current. The circuit breaker is thus operated me-



chanically, in contradistinction to other circuit-breakers on electric belts known to me, which are actuated by the battery-current to make and break the circuit, and thus throw induced currents from an induction-coil to the electrodes. With my device it is not an induced current, as commonly understood, which is generated by the circuit-breaker, but the body of the wearer of the belt is subjected to the different desirable influence of the make and break in the battery-current.

By means of the clamp-buckles  $m'$  the battery and case D may be readily adjusted to any desired position on the belt, whereby when an electrode of the common form referred to is applied to the casing around the battery, as it may be, it is carried with the battery to any part of the body encircled by the belt to which it is desired to apply the electrode.

By tightening the girdle A on the person the thin metal elements  $p$  of the cells of the battery are extended longitudinally, thus compressing or reducing the diameters of the elements  $p$  transversely, and squeezing the absorbent material  $q$ , whereby the acid with which it is saturated is pressed out and flows upon and through the parts  $r$  and  $p$ , and accordingly increases the strength of the battery.

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

1. In an electric belt, the combination of a girdle portion, A, a longitudinally-expansible and transversely-compressible battery, B, comprising cells C, flexibly connected together, and electrodes connected by suitable conductors with the opposite poles of the battery, substantially as described.

2. In an electric belt, the combination of a girdle portion, A, a longitudinally-expansible and transversely-compressible battery, B, comprising cells C, flexibly connected together, clasps  $m$ , attached to the opposite poles of the battery, buckles  $m'$  on the girdle portion, elastic bands  $l$ , connecting the clasps  $m$  and buckles, and electrodes connected by suitable conductors with the clasps  $m$ , substantially as described.

3. In an electric belt, the battery B, comprising, in combination, cells C, composed each of an element,  $r$ , surrounded by absorbent material,  $q$ , to contain the exciting-liquid, and an element,  $p$ , of substantially the oval form shown, and provided with the extension  $o$ , links  $n$ , connecting the cells from opposite elements, and end links,  $n$  having eyes  $n^2$ , substantially as described.

4. In an electric belt, the battery B, comprising, in combination, cells C, composed each of an element,  $r$ , surrounded by absorbent material,  $q$ , to contain the exciting-liquid, and an element,  $p$ , of substantially the oval form shown, and provided with the extension  $o$ , links  $n$ , connecting the cells from opposite elements, rings  $n'$  on some or all of the links, and end links,  $n$ , having eyes  $n^2$ , substantially as described.

5. In an electric belt, the combination, with

the girdle portion A, of a battery, B, inclosed in a moisture-proof case and having its terminals projecting from opposite ends of the said case and connected with the girdle portion, a shifting case, E, on the girdle portion, disconnected from the said moisture-proof case, whereby the case E may be shifted to cover or uncover the case containing the battery, and electrodes connected by suitable conductors with the opposite poles of the battery, substantially as described.

6. In an electric belt, the combination, with the battery, of a mechanically-operated circuit breaker or interrupter, substantially as described.

7. In an electric belt, the combination, with the battery, of a circuit breaker or interrupter, H, comprising a housing,  $f$ , containing loosely conducting material,  $f'$ , and contacts  $e$ , extending into the housing, substantially as described.

8. In an electric belt, the combination, with the battery, of a circuit breaker or interrupter, H, comprising a housing,  $f$ , containing loosely conducting material,  $f'$ , and contacts  $e$ , extending into the housing and provided with eyes  $e'$ , substantially as described.

9. In an electric belt or the like, the combination, with the battery, of a conductor to which an electrode is connected, and a clamp, F, at an end of the conductor, formed with spring-arms  $i'$ , having hooks  $i''$  at their extremities, extending outwardly in opposite directions, substantially as described.

10. In an electric belt or the like, the combination, with the battery, of a conductor to which an electrode is connected, and a clamp, F, at the end of the conductor, formed with a coil,  $i$ , and spring-arms  $i'$ , having hooks  $i''$  at their extremities, extending outwardly in opposite directions, substantially as described.

11. In an electric belt or the like, the combination, with the battery, of an electrode, G, connected with a pole of the battery by a suitable conductor and self-supporting on the part of the body to which it is applied, substantially as described.

12. In an electric belt or the like, the combination, with the battery, of an adhesive electrode, G, connected with a pole of the battery by a suitable conductor, substantially as described.

13. In an electric belt or the like, the combination, with the battery, of an adhesive electrode, G, comprising a plaster having a metallic plate on its adhesive surface and an eye,  $g'$ , extending from the said plate through the plaster, and a conductor connected at one end with a pole of the battery, and carrying at its opposite end a clamp, F, formed with spring-arms  $i$ , terminating in hooks  $i''$ , inserted into the eye  $g'$ , substantially as described.

HARRY P. PRATT.

In presence of—

J. W. DYRENFORTH,  
CHAS. E. GAYLORD.