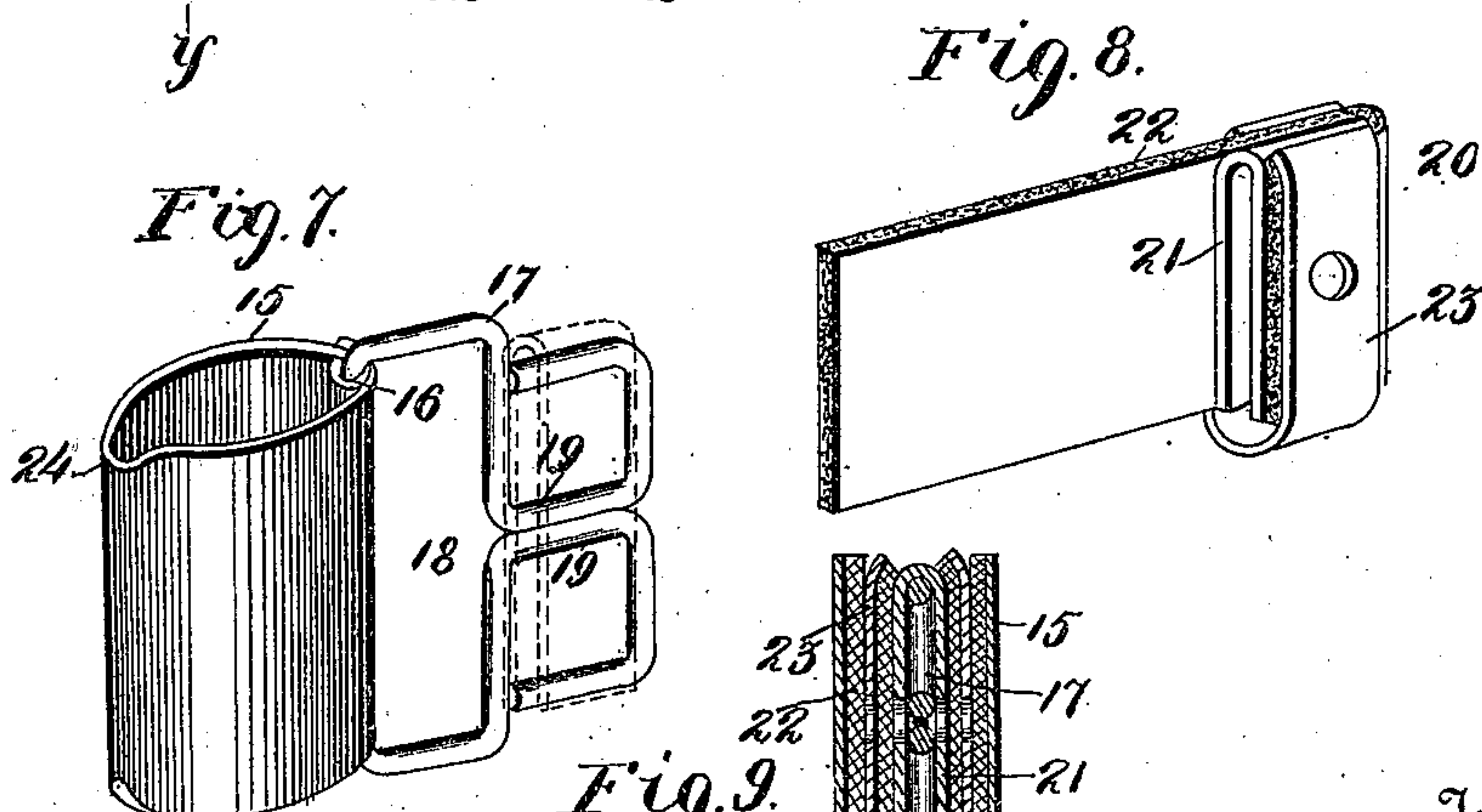
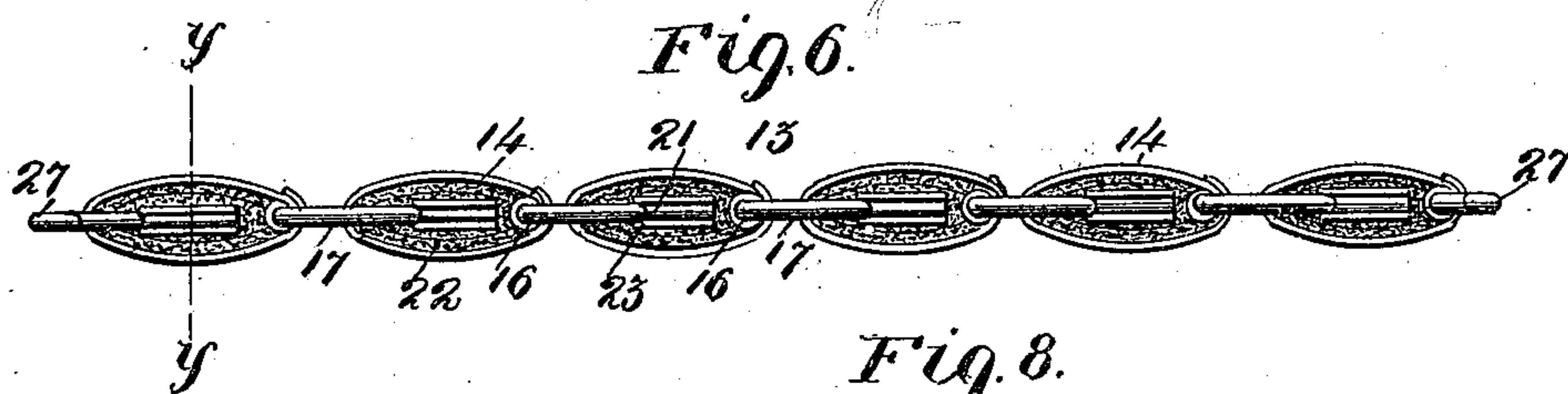
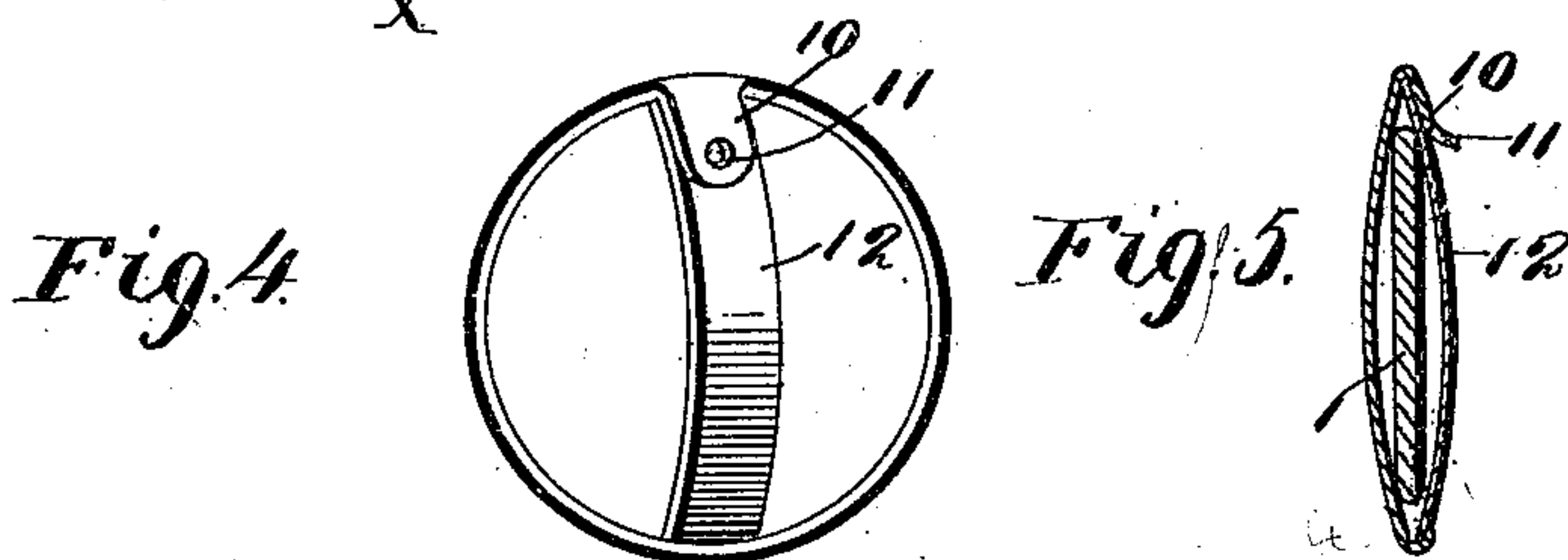
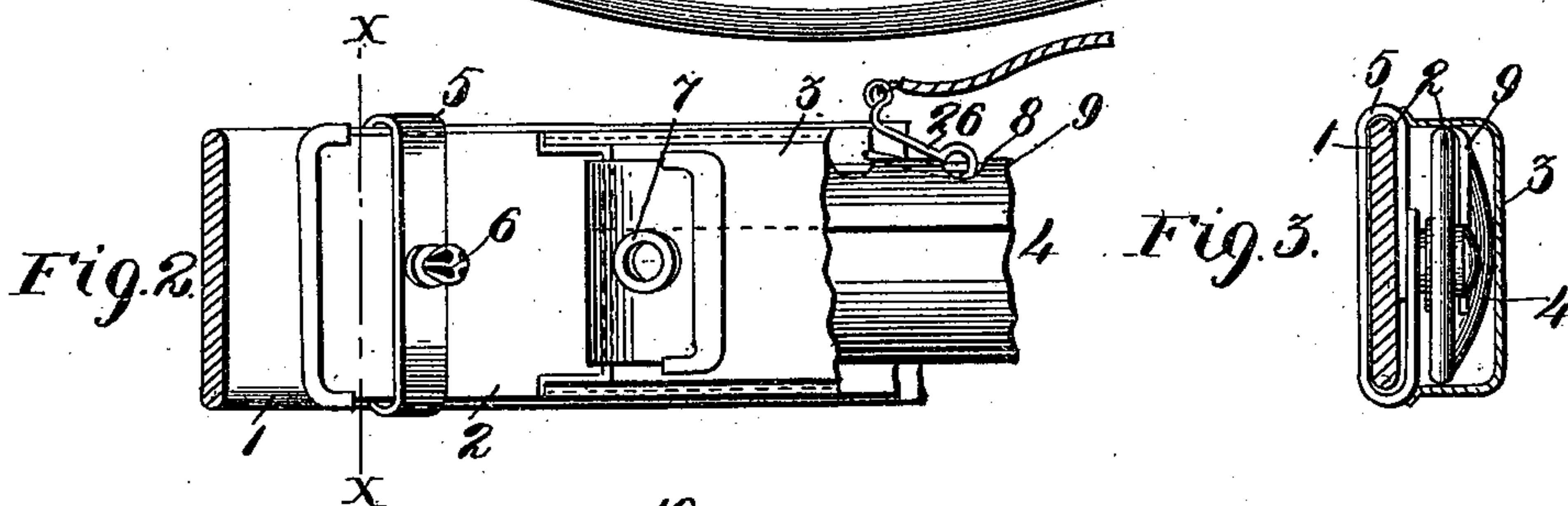
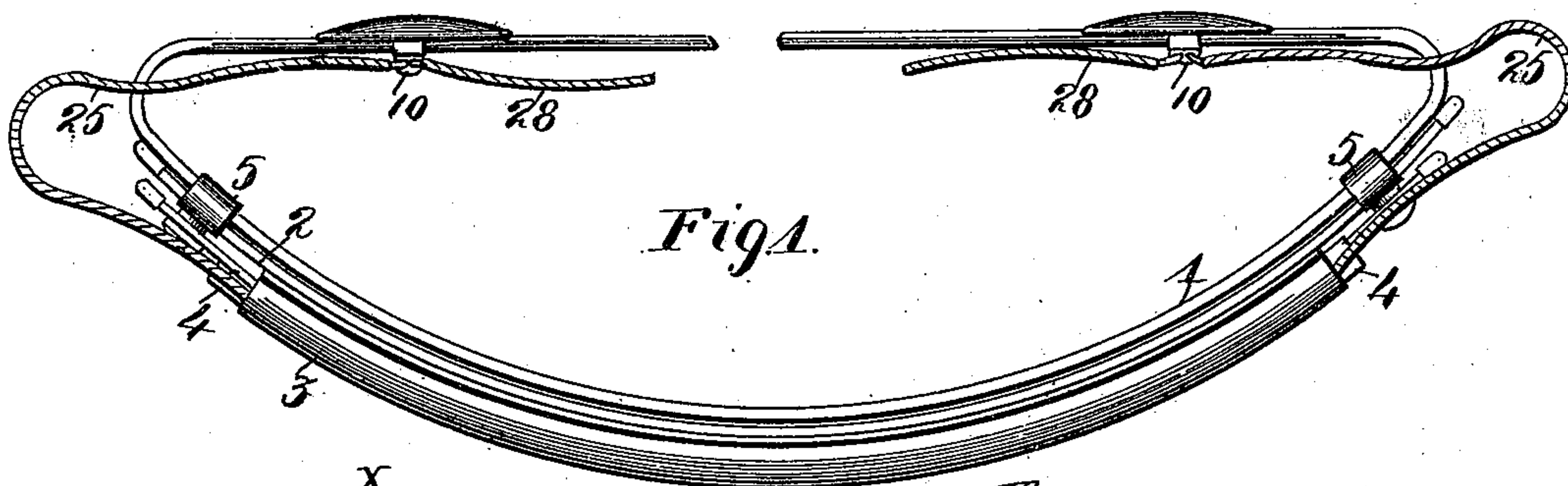


(No Model.)

D. P. ANDRUS.
ELECTRIC BELT.

No. 502,804.

Patented Aug. 8, 1893.



Witnesses
James J. McDonough
Edw. Beckmann Jr.

Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Inventor
Duane P. Andrus.
By his Attorneys
Keller & Starek

UNITED STATES PATENT OFFICE.

DUANE P. ANDRUS, OF ST. LOUIS, MISSOURI.

ELECTRIC BELT.

SPECIFICATION forming part of Letters Patent No. 502,804, dated August 8, 1893.

Application filed October 31, 1892. Serial No. 450,457. (No model.)

To all whom it may concern:

Be it known that I, DUANE P. ANDRUS, of the city of St. Louis, State of Missouri, have invented certain new and useful Improve-
5 ments in Electric Belts, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in
10 electric belts and consists in the novel arrangement and combination of parts more particularly set forth in the specification and pointed out in the claims.

In the drawings Figure 1 is a plan view of
15 a belt constructed according to my invention. Fig. 2 is a detailed perspective view of that portion of the belt to which the removable pocket is attached and also the means for adjusting the same upon the belt. Fig. 3 is
20 transverse section taken on the line $x-x$ of Fig. 2. Fig. 4 is a perspective view of the electrode and the steel bar in connection therewith. Fig. 5 is a transverse section of the electrode and bar in position upon the
25 belt. Fig. 6 is a top plan view of the battery showing a number of cells in electrical connection. Fig. 7 is an enlarged perspective view of the copper element of a battery or cell and connections for the same. Fig. 8 is
30 a perspective view of the oxidizable elements of the battery with the absorbent material in position to be wrapped around the same; and Fig. 9 is a transverse section of one of the cells and taken on the line $y-y$ of Fig. 6.

35 My present improvement presents the following advantages: First, the oxidizable element may be easily removed or replaced when necessary without injury to the battery in any way thus forming a permanent battery; second,
40 the battery is very compact, has greater power quantity and intensity, and is very durable; third, the battery may be easily reversed within its casing; fourth, the case for the battery and the pocket for supporting the
45 same may be adjusted to any part of the belt or suspended (not shown) below the belt; fifth, the electrodes are fastened to the belt by a suitable steel bar; sixth, the electrodes are movable and adjustable to any part of
50 the belt; seventh, the conducting cords from the positive and negative ends of the battery connect with one or more electrodes, and any

number of cells may be used or cut out; and eighth, the electrodes may be easily placed
55 on any part of the body, arms or legs.

Referring to the drawings 1 represents a common belt constructed of suitable material and adapted to be worn about the waist, and the ends of which are united in any well
60 known manner.

2 represents a strip of suitable material which is provided with a pocket 3 the ends of which are open for the reception of the casing 4 containing the battery. The strip
65 2 and the parts carried thereby are adjustable upon the belt 1 by means of metallic bands 5 which are fastened to the opposite ends of the said strip as best shown in Fig. 1, and said bands are of such a size as to freely admit the belt.
70

6 represents one member of a snap fastener which is fixed to the loop or band 5, and is adapted to be received by the other member
75 7 of the fastener fixed to the end of the casing 4 whereby the said casing is fastened to the said strip 2 within the pocket 3 after the battery has been placed in position, the conducting cords being attached to the battery through openings 8 formed at predetermined
80 distances apart in the upper edge or flap 9 of the casing 4 as best seen in Fig. 2.

The electrodes which I employ are formed from a flat sheet of metal the edges of which are turned presenting a smooth surface, and formed with the said electrodes are lips 10
85 having perforations 11 for attaching one end of the conducting cords.

12 represents a suitable metallic bar preferably formed from spring steel one end of which is held by the lip 10 and the opposite
90 end held by the turned edge of the electrode, both ends of which are however in electrical connection with the electrode. When the electrode and the bar 12 are united as shown in Figs. 4 and 5, a space of sufficient dimensions is left to admit the belt 1 allowing the
95 said electrodes to be readily adjusted to any position upon the belt.

13 represents the battery which is composed of a suitable number of cells 14 each of which
100 cells are similarly constructed and which construction I shall now describe.

15 represents the copper element of the cell which forms the casing for the same, and is

made of a single piece of metal conforming to the shape as best shown in Fig. 7, and is adapted to receive the zinc or oxidizable element together with the absorbent material. One edge of the copper element 15 is provided with a loop 16 which is located within the space formed by the same, and the opposite edge of said element is bent over said loop snugly whereby the ends are permanently united.

17 represents the wire connection for uniting one or more cells, and which is of a single piece, the medium portion of which is received by the loop 16 and in electric continuity with the copper element 15. The wire is bent to form a loop 18, having the contiguous ends 19 united for a portion of their length, and finally the free ends are bent back in opposite directions respectively upon the loop as clearly shown in Fig. 7. Thus it will be seen that the wire 17 may be turned independent of the copper 15 which is very desirable, especially in bunching the cells when occasion arises to immerse them in the proper acid for replenishing the battery.

It is well known that the zinc element is the one that is consumed and must be replaced; and hence my invention is so constructed that the said element or parts composing the same may be easily replaced without injuring the battery and with but little inconvenience. 20 represents the zinc element which is composed of two parts each of which are U-shaped and formed from sheet metal.

21 represents one of said U-shaped parts of the zinc element which is placed upon the bent contiguous ends of the wire 17 and in contact with the same as shown in dotted lines in Fig. 7; after which one end of the absorbent material 22 is wrapped around the same in a manner shown in Fig. 8. The second U-shaped part 23 of the zinc element is now clasped over the absorbent material thus wrapped around the first zinc element, after which the remaining portion of the absorbent material is wrapped around the whole.

Of course the above construction refers particularly to the manufacture of the battery, but when it is desired to replace either part of the zinc element, this can be accomplished without removing the absorbent material, by first replacing the part 21 and afterward replacing the part 23, reference being had particularly to Fig. 9. Formed in the said parts composing the zinc element are circular openings for the passage of the fluid employed in the cells.

That part of the upper edges of the copper element 15 of the cell opposite the loop 16 of the same is cut away as shown at 24 in order to prevent the said copper from coming in contact with the wire 17 at that portion of the same.

25 represents the two conducting cords one end of each of which is in electrical connection with the lips 10 of the electrodes and the opposite ends of said cords are each provided

with a hook 26 for connection with the battery, one leading from the positive pole, and the other from the negative. By the employment of the hooks 26 any number of cells may be cut out or included and thus the intensity of the current increased or diminished as occasion requires. When the full strength of the current is desired the hooks carried by one end of each of the conducting cords 25 are hooked into the ends 27 of the wires 17 comprising a portion of the battery; but should the intensity of the current be too great, one of said hooks may be hooked over any one of the intermediate wires 17 connecting the cells, and thus cutting out a sufficient number of cells.

28 represents two conducting cords one end of each of which is in electrical connection also with the lips 10 of the electrodes, and their opposite ends may be attached in a similar manner to two more electrodes (not shown) in a like manner.

Having fully described my invention, what I claim is—

1. In an electric belt, a cell composed of an outer copper casing forming one element thereof, and an inclosure for the oxidizable metal and absorbent material, a wire hinged to the same forming a connection and support for the oxidizable metal, said oxidizable metal being U-shaped and adapted to be withdrawn from the copper inclosure, and also adapted to embrace said wire, substantially as set forth.

2. In an electric belt a cell composed of a copper inclosure 15, a loop 16 formed in one edge thereof, a wire 17 received by said loop having its contiguous ends in contact for a portion of their length, and bent back in opposite directions on said loop, the oxidizable metal 20 composed of two U-shaped parts 21 and 23 respectively, the former of which parts is in contact with the said wire 17 and absorbent material 22 located between said parts, and adapted to be wrapped around the whole, substantially as set forth.

3. In an electric belt, an electrode having its edge turned, a lip 10 formed with the same, and a steel bar 12 one end of which is adapted to be received by the said edge and the other end by the said lip leaving a space between said bar and electrode for the belt, substantially as set forth.

4. In an electric belt a strip of material 2 carrying metallic bands 5 for the passage of the belt, a pocket 3 fixed to the said strip and having open ends, a casing 4 removably located within the same for the reception of the battery, and snap fasteners, one member of which is carried by one end of the said casing, and the other member carried by the metallic band 5, whereby the said casing is held in position within the pocket, and adjustable in any position upon the belt, substantially as set forth.

5. In an electric belt, a cell composed of a copper casing 15, one end of which is provided

with a loop 16, a wire 17 received by the said loop and forming a movable connection, the contiguous ends 19 of said wire being in contact for a portion of their length, and bent
5 back in opposite directions on the loop formed by said wire, an oxidizable element 20 supported by said wire and located within the casing 15, a U-shaped part 21 normally in contact with the said wire and adapted to be
10 removed from one end of the cell, a second U-shaped part 23 inserted into the cell from the opposite side of the same, absorbent material 22 located between the said parts,

and adapted to be wrapped around the said oxidizable material, and the wire, openings 15 formed in the said parts for the passage of the liquid, and cutaway portions 24 formed in the said copper 15 opposite the loop 16, substantially as set forth.

In testimony whereof I affix my signature in 20 the presence of two witnesses.

DUANE P. ANDRUS.

Witnesses:

C. F. KELLER,
EMIL STAREK.