

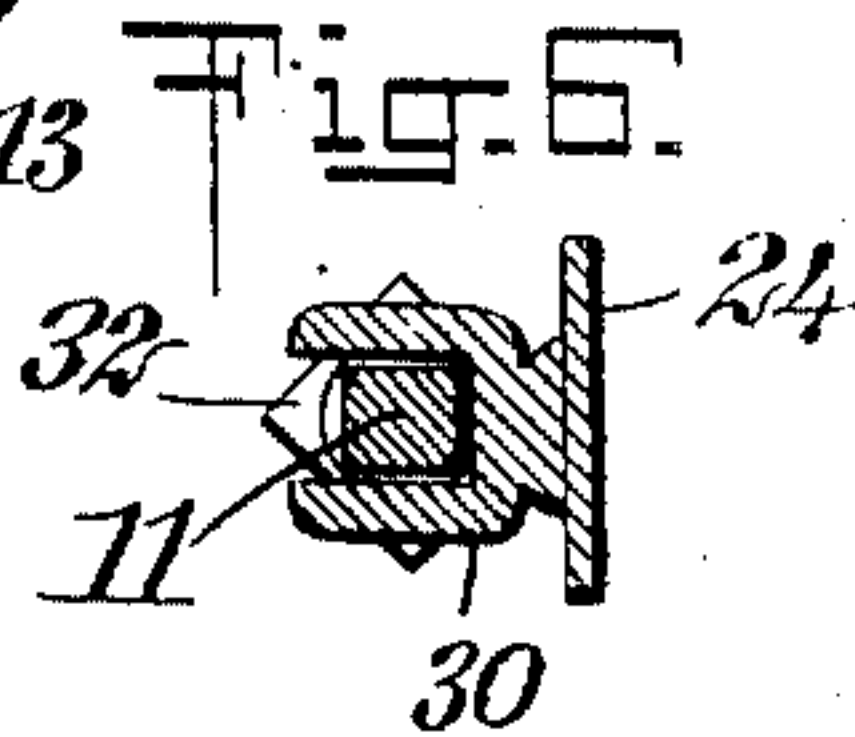
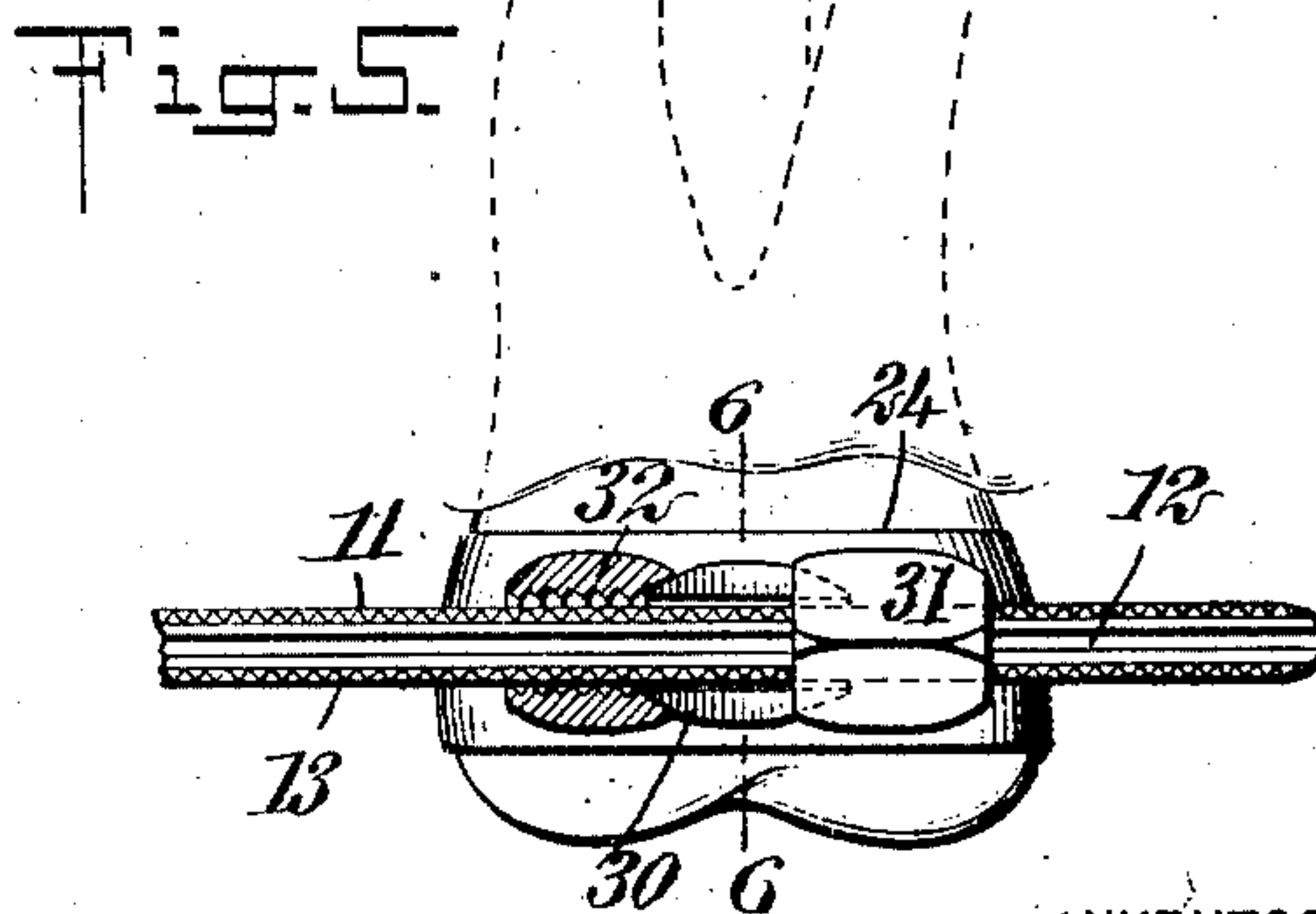
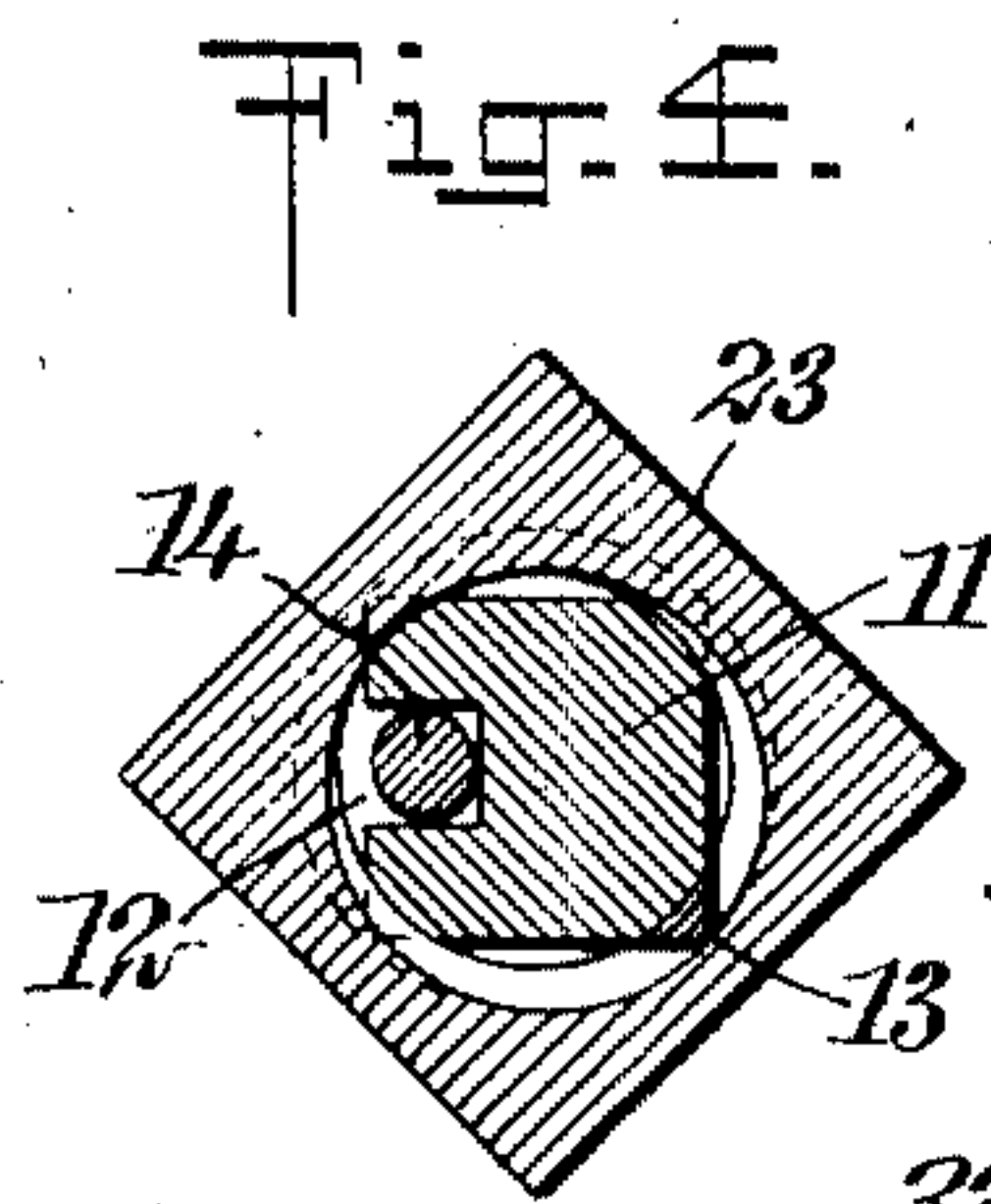
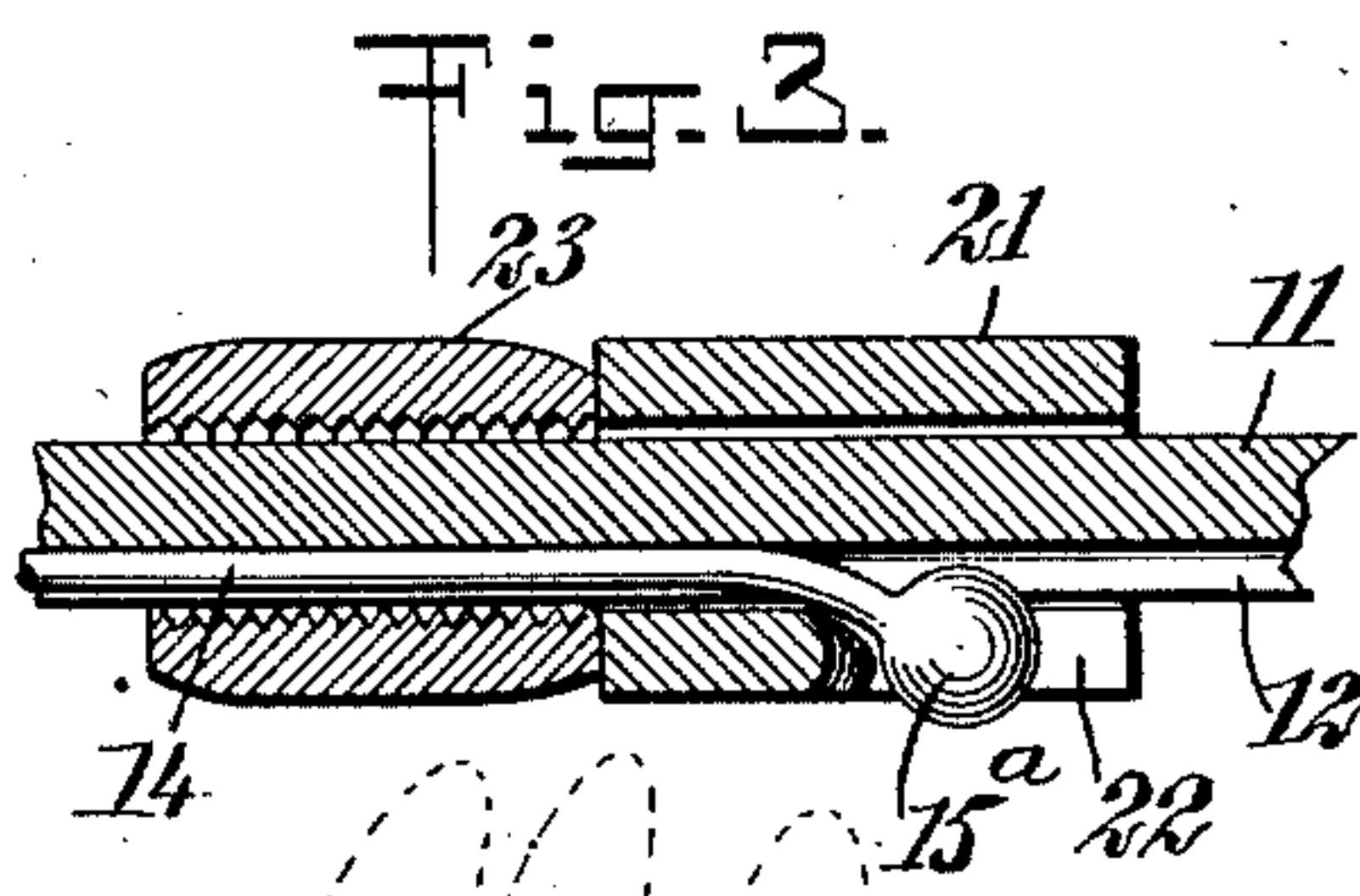
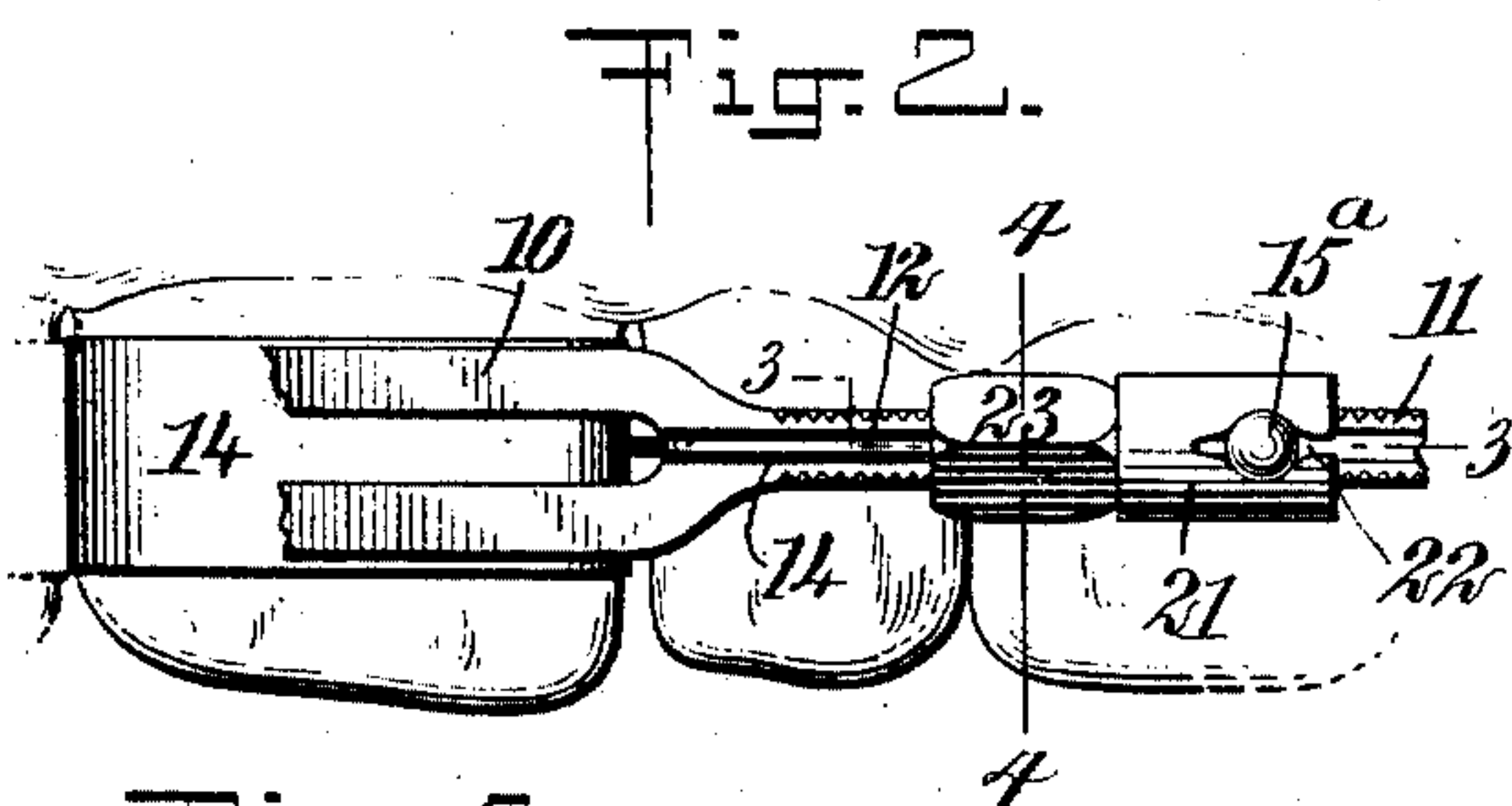
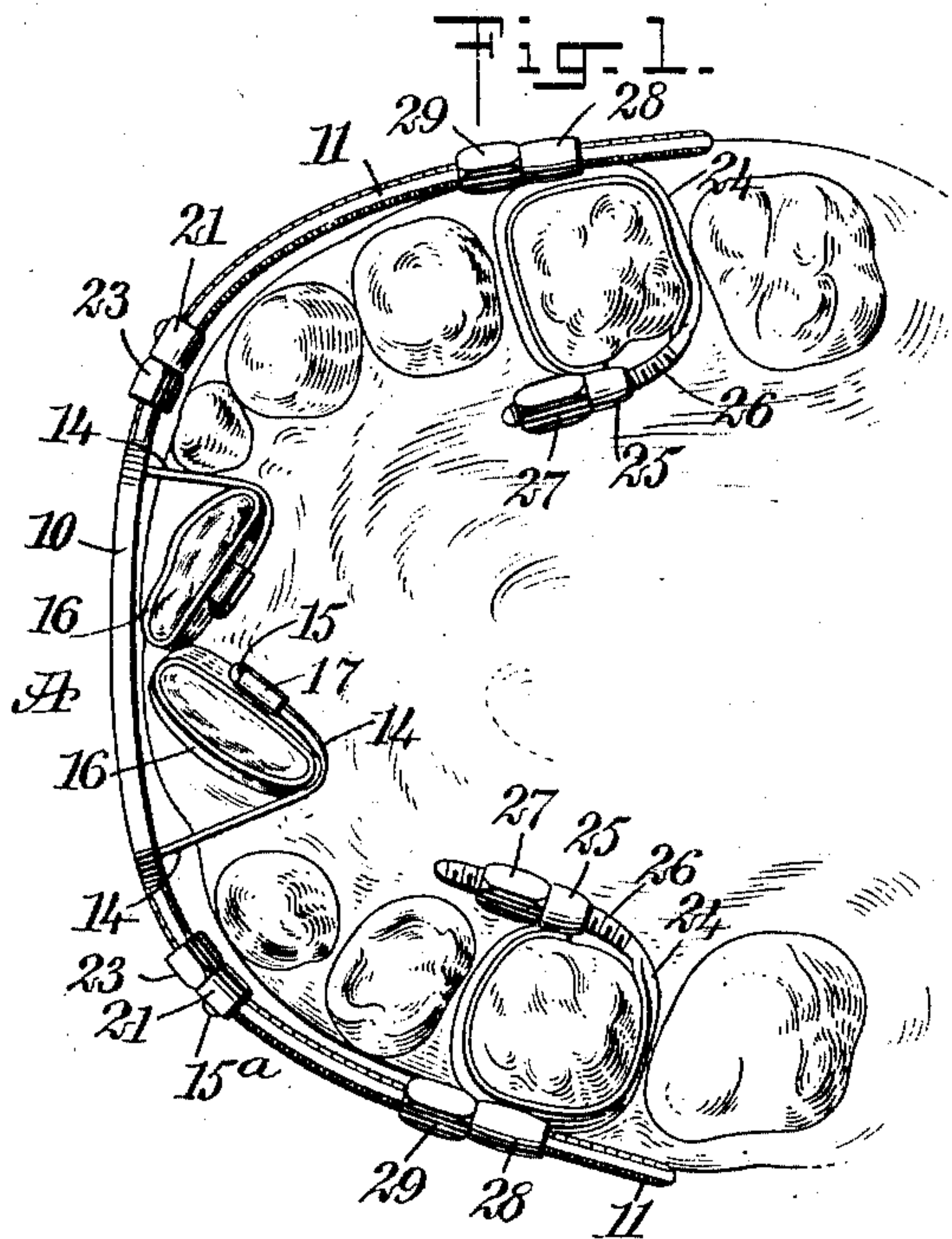
No. 868,628.

PATENTED OCT. 15, 1907.

E. M. FLAGG.  
DENTAL REGULATOR AND SPACER.

APPLICATION FILED OCT. 5, 1906.

2 SHEETS—SHEET 1.



WITNESSES  
*E. M. Flagg*  
*J. H. Flagg*

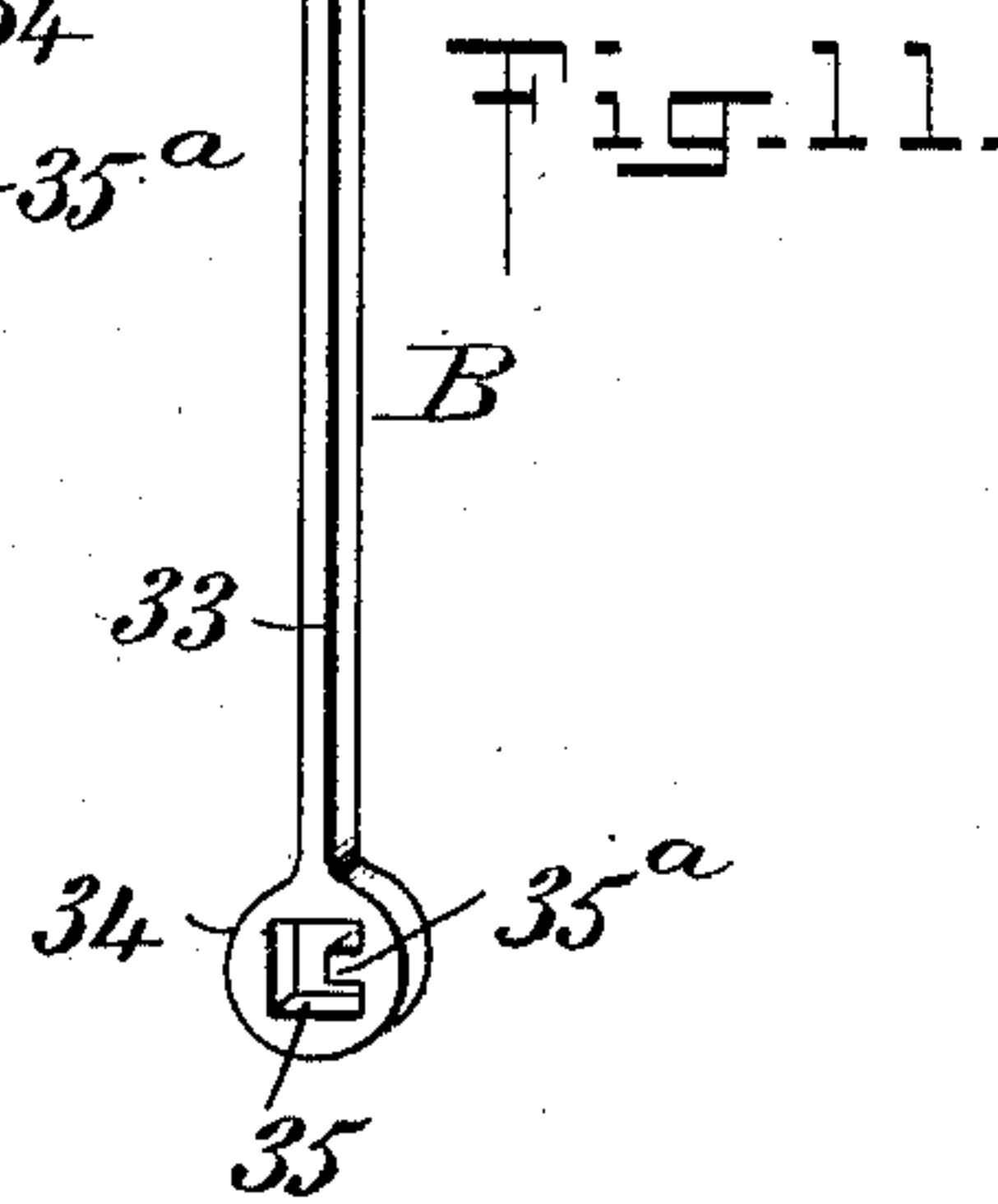
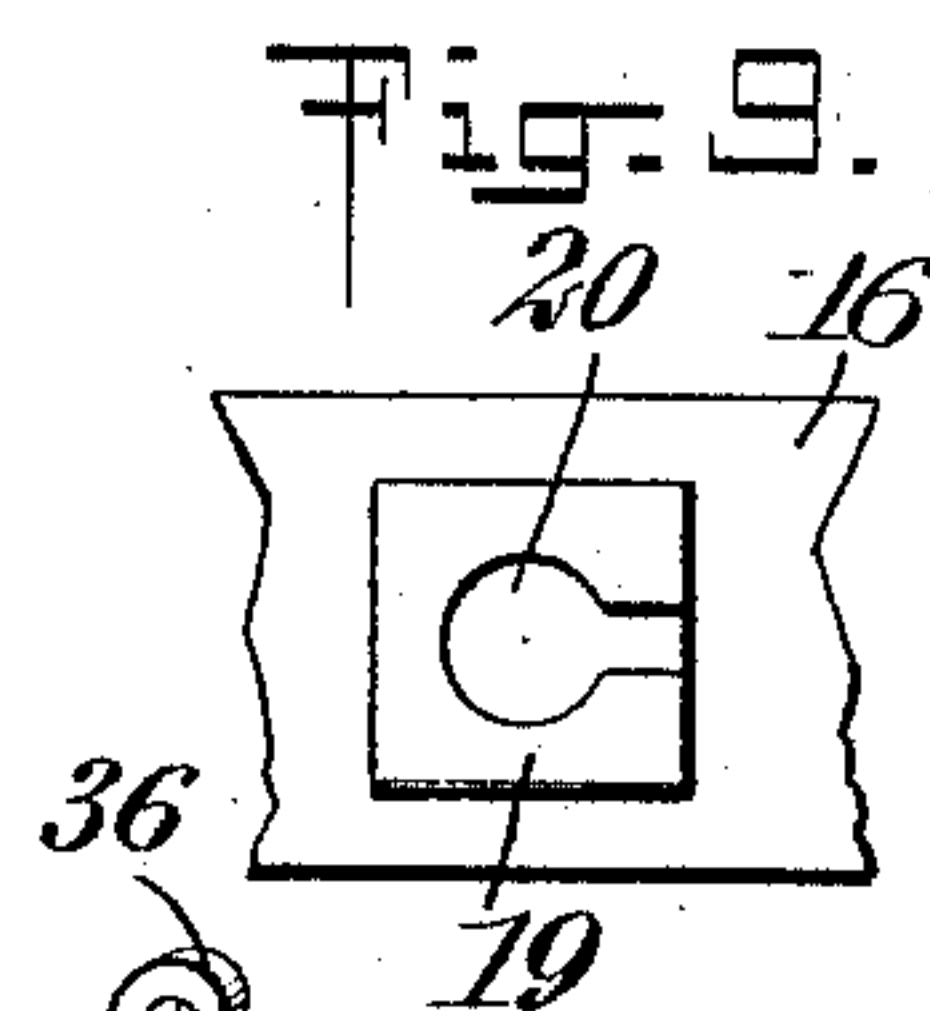
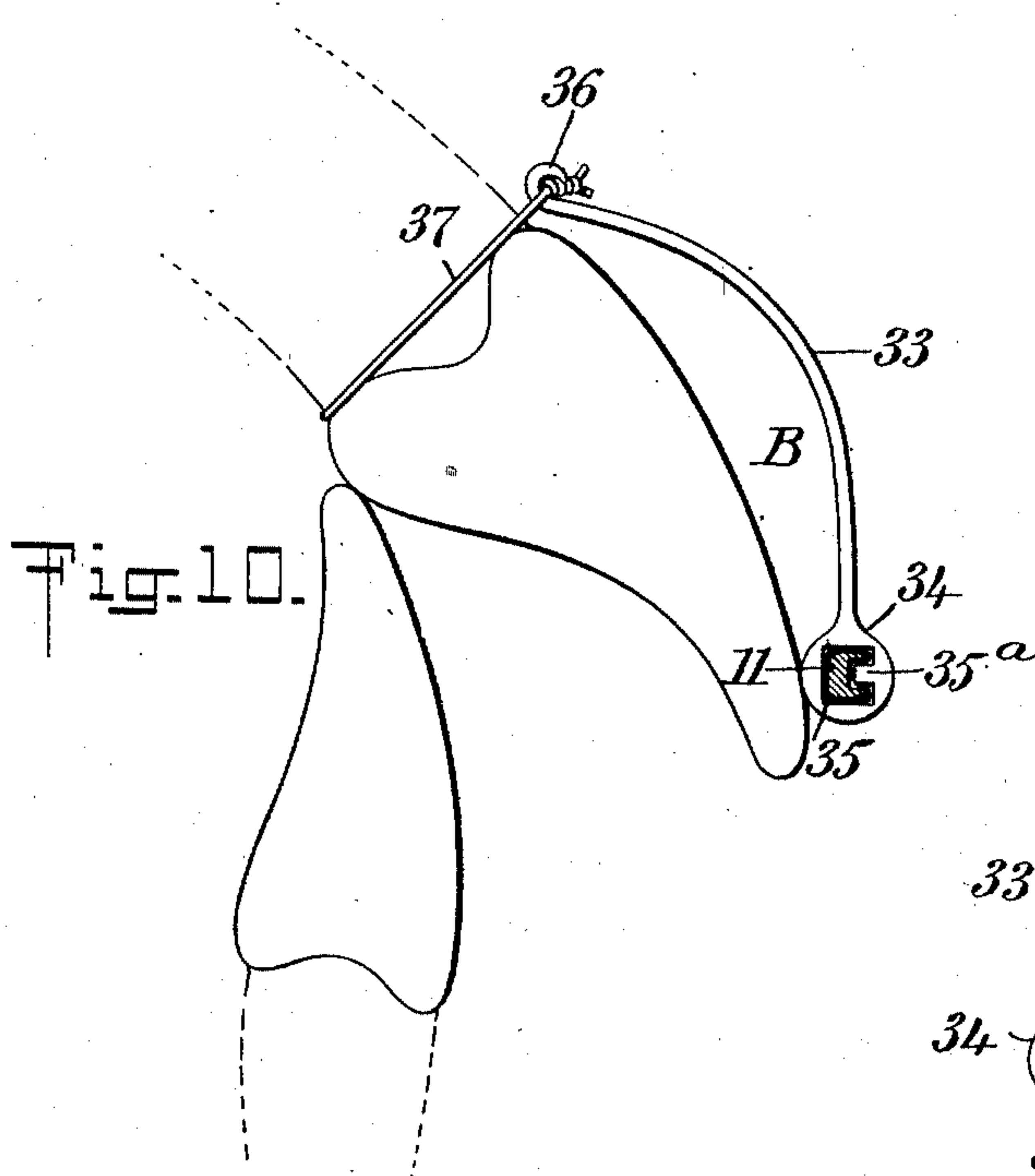
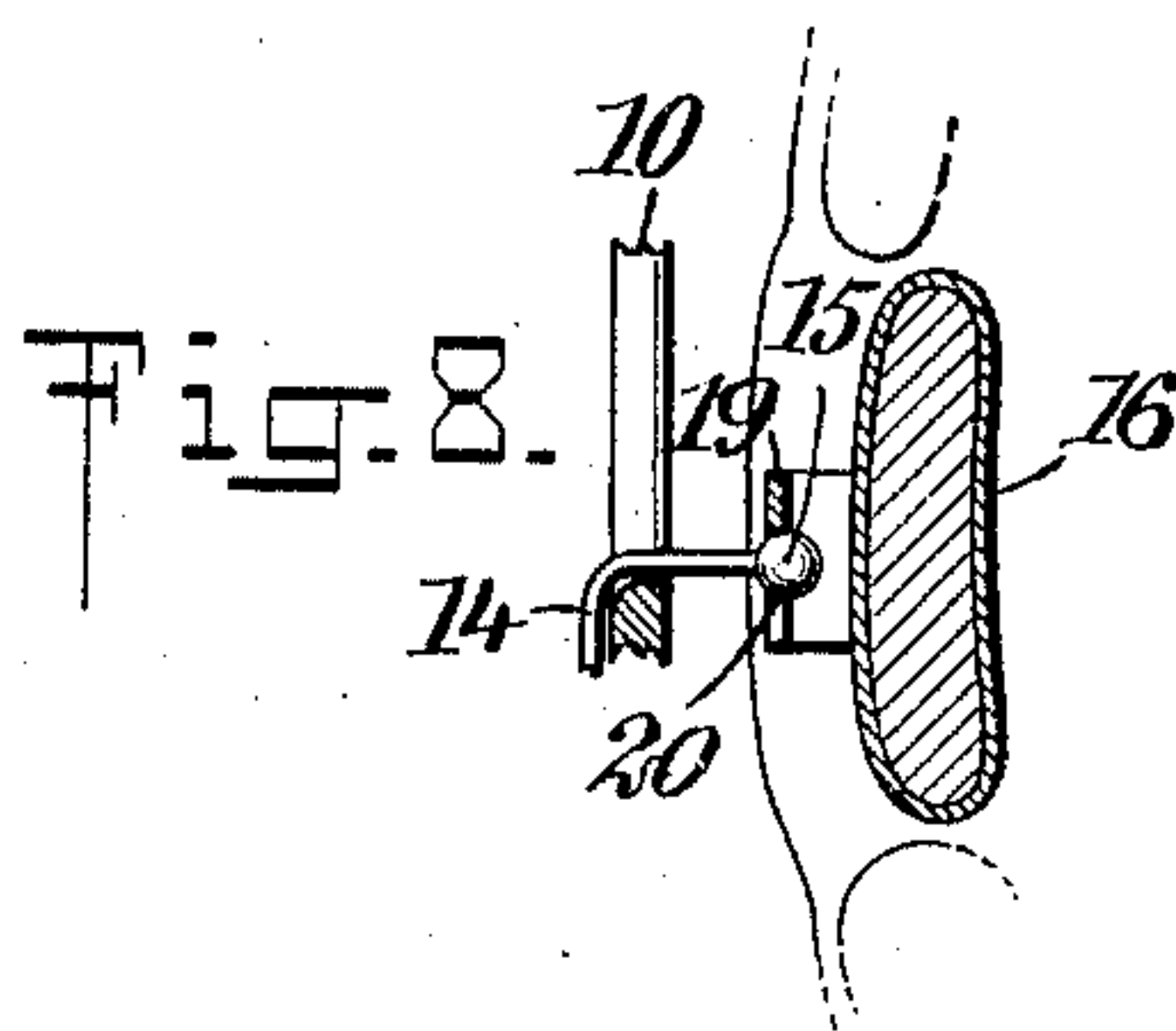
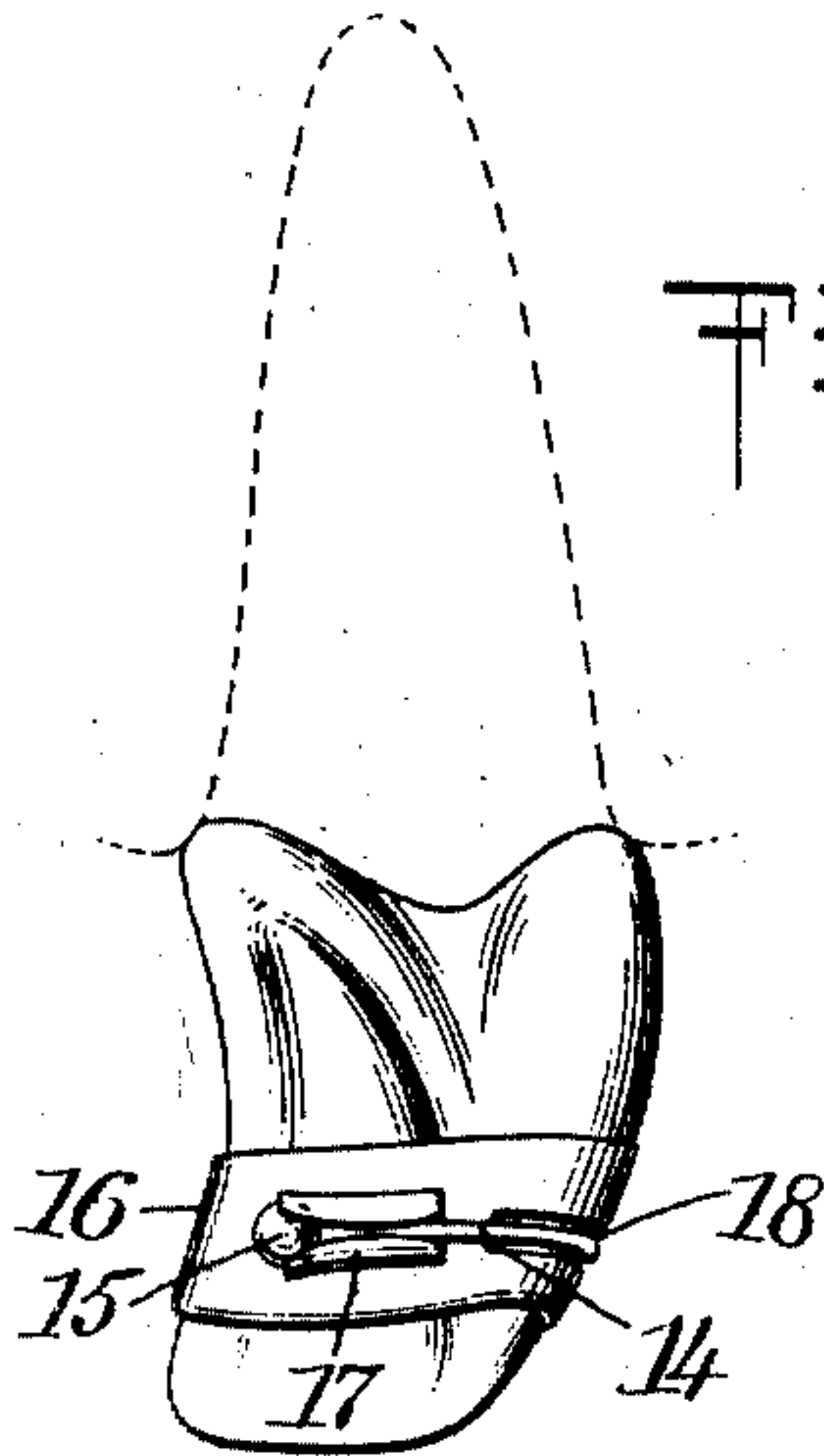
INVENTOR  
*Eben Moore Flagg*  
BY *Munn & Co*  
ATTORNEYS

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2 SHEETS—SHEET 2.



WITNESSES  
*E. M. Cheney*  
*J. H. Ketcher*

INVENTOR  
*Eben Moore Flagg*  
BY *Munn & Co*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

EBEN MOORE FLAGG, OF NEW YORK, N. Y.

## DENTAL REGULATOR AND SPACER.

No. 868,628.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed October 5, 1906. Serial No. 337,636.

*To all whom it may concern:*

Be it known that I, EBEN MOORE FLAGG, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Dental Regulator and Spacer, of which the following is a full, clear, and exact description.

My invention relates to certain improvements in apparatus for orthodontia, or correction of oral deformities.

Instead of using rubber bands, jack screws, wooden wedges or ligatures of thread or twisted wire for the purpose of moving the teeth, I employ devices whereby they are moved by pressure being brought to bear upon a delicate wire furnished with a ball or protuberance at each end, and since this wire can be practically concealed within grooves cut in the framing of the structure, there is no chance for it to fret or chafe the lips or cheeks of the patient.

By means of my improved device, which is cleanly, diminutive and positive in action, teeth may be rotated in their sockets, shortened or lengthened therein, or moved forward or backward, and can be carried inward or outward toward their normal positions in the dental arch, or the entire arch may be expanded.

A further purpose of the invention is to provide a structure capable of producing the above-named results, which will be simple and economic for a device of its character, and one that can be readily adapted to any mouth and to all conditions, and which can be worn without serious discomfort.

It is also a purpose of the invention to so construct the device that all of the foregoing movements are accomplished without that disagreeable nauseating alternative of being compelled to place apparatus across the palate of the patient, thereby interfering seriously with the functions of speech and mastication and insalivation.

Another purpose of the invention is to provide a device wherein torsional force can be combined with the action of a spring lever to accomplish one of the most difficult movements with which the orthodontist has to deal, namely, to depress the cutting edge of a protruding tooth and at the same time carry the apex of its root forward so that the tooth shall assume the perpendicular, which is the required position of the tooth for proper service.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a view of the roof of a mouth illustrating the device applied to correct the position of the central

incisors; Fig. 2 is a side elevation of the device and the tooth with which such portion engages; Fig. 3 is a longitudinal section through the device drawn upon a larger scale, the section being taken practically on the line 3—3 of Fig. 2; Fig. 4 is a transverse section also drawn upon an enlarged scale, the section being substantially on the line 4—4 of Fig. 2; Fig. 5 is an enlarged outer side elevation of a molar to which the device is shown anchored in Fig. 1, and a sectional side elevation of that portion of the device located at the anchorage; Fig. 6 is a transverse section through the band and socket and arched bar at the point of anchorage, said section being taken practically on the line 6—6 of Fig. 5; Fig. 7 is an inner face view of one of the incisors and that portion of the device applied thereto; Fig. 8 is a horizontal section through a tooth and a section through a portion of the body of the device, illustrating the adaptation of the device for drawing a tooth outward; Fig. 9 is a front elevation of a part of the band usually cemented to the tooth to be operated on; Fig. 10 is a side elevation of opposing teeth of the upper and the lower set, illustrating the adaptation of the device to restore a protruding tooth to its natural or perpendicular position; and Fig. 11 is a detail perspective view of the spring lever employed in connection with the body bar shown in Fig. 10.

The body A of the device, which may be termed an arch expander, is made as light as possible consistent with strength, and in shape corresponds practically to the formation of the dental arch. The body A comprises a link member 10, or its equivalent, and a bar member 11 at each end of the link member the link member and the bar members being screwed together or otherwise removably connected. The link member 10 is shown as occupying a central position relatively to the dental arch, but it may have other positions according to the nature of the work, as for example a side or lateral position. The bar members 11 are of like formation, and said bar members are preferably made rectangular or polygonal in cross section, and each of said members is provided with a longitudinal groove 12 in its outer or in its inner face, which groove extends usually the full length of the member. Each bar member 11 is externally threaded, the threads being designated as 13 in the drawings, and in connection with the groove 12 of each bar member 11 what I term a bola wire 14 is employed, which wire while strong is comparatively thin, being of small gage. The name bola is given to said wire because the wire is provided at its ends with balls or enlargements designated respectively as 15 and 15<sup>a</sup>. These bola wires are adapted for use in connection with the body A and the tooth to be rectified, particularly where the tooth is to be rotated in its socket, or is to be drawn forward as is indicated in Figs. 1 and 8.

The tooth to be operated upon is surrounded by a band 16, and said band is usually cemented to the



tooth; and as is illustrated in Figs. 1 and 7, at the inner face of a band 16 a longitudinal socket member 17 is provided, through which the wire 14 is passed, the ball 15 being held at the end of the said socket against the tension to which the wire may be subjected during the process of rectification. Each band 16 is also provided with a slot 18 where a wire 14 engages with a band, so as to prevent the wire from moving from its set position relatively to the band and so that less space may be occupied between the teeth.

When a wire 14 is connected with the rear of a band 16, as is shown in Figs. 1 and 7, said wire is passed forward through the link member 10 of the frame A, and is then carried along the groove 12 in one or the other of the bar members 11, as is particularly shown in Figs. 2 and 3, and what may be termed the rear ball or projection 15<sup>a</sup> of the wire 14 in action is made to enter a recess 22 in a slide 21, which has free movement on a bar member 11, and said slide 21 is permitted to move forward or is carried toward the end of the bar member to which it is applied, by means of a nut 23, having threaded engagement with the thread of the said bar member, being located in front of the slide 21. Thus as the nut 23 is turned to force the slide 21 to the rear or toward the end of the bar member 11, the wire 14 connected with the slide is placed under tension, and as the tooth is rectified, or the wire connected with the said tooth slackens, renewed and stronger tension is applied to the wire, or the tension is relaxed as occasion may require, by the adjustment of the nut 23, either to or from the slide 21. In fact, the slide 21 and the nut 23 on each of the bar members 11 of the body A, constitute anchorage members for the inner or rear ends of the wires in action.

In the further construction of the band 16, the said band is provided with a boxing 19 made integral with its front surface; and in this boxing a key-hole slot 20 is produced for the reception of the forward ball or enlargement 15 of a wire 14 when a tooth is to be drawn outward. At such time the wire is passed from the boxing 19 through the link member 10 of the body A and to its anchoring device in the manner which has been described relative to the rectification shown in Fig. 1. The circular section of the key-hole slot 20 is of less diameter than the diameter of the ball 15, so that said ball can turn in that portion of the slot as in a socket.

The anchoring device for the arched body A consists of an open or a closed band 24 as desired, adapted to surround a back tooth when the front teeth are being rectified, a molar for example as is illustrated. Each band 24 is provided with a fixed sleeve 25 at one end, the opposite end being made round in cross section and threaded, forming a tongue 26 that loosely passes through said sleeve 25. A nut 27 is screwed upon the outer end of the tongue to hold the band 24 in fixed yet removable engagement with a tooth as is shown in Fig. 1. The separated portion of the band 24 will always be at the inner face of the tooth to which it is applied, and in one construction of the device shown in Fig. 1, the arched body A is made to conform more or less accurately to the dental arch, and to more or less assist the wires 14 in their action, by passing the ends of the rod or bar members 11 of the body A through sleeves 28, located upon the bands 24 between their ends, and

screwing nuts 29 on the said members 10, adapted to engage with the forward ends of the sleeves 28. These sleeves 28 are at the front or outer faces of the bands when the latter are secured upon a tooth, as is also shown in Fig. 1.

Another form of clamp may be provided for the body A, as is shown in Fig. 5, wherein an open socket member 30 is employed at the outer face of a band 24 instead of the sleeve 28 mentioned, as is also illustrated in Fig. 6. The end portions of the frame A pass into the said socket members, but in this instance two nuts 31 and 32 are used upon the bar members 11 of the body A, one at each side of each socket member 30. In order that these three elements 30, 31 and 32 may fit smoothly and snugly, the ends of the socket members 30 are conically formed and enter conical countersinks at the opposite ends of the nuts as is especially shown in Fig. 5.

I desire it to be particularly understood that I do not confine myself to any particular shape of the bar members 11 of the arched body A, since for example they may be circular instead of polygonal, and when circular the wires in the grooves prevent the slides from turning. I desire it to be understood further that various details of the construction may be modified without departing from the spirit of the invention.

In Figs. 10 and 11 I have illustrated the means employed to depress the cutting edge of a protruding tooth and at the same time carry the apex of its root forward, so that the tooth shall assume the perpendicular. Such means consist of what I term a spring lever B, which as is shown in Fig. 11 comprises an initial straight body section 33 of suitable length; having an enlargement 34 at its lower end, in which an opening 35 is made, adapted to conform to the contour of the bar member 11 that it is to receive; and when a slot is produced in said bar member a tongue 35<sup>a</sup> extends into said opening and enters said slot; but when the slot is dispensed with other well-known means may be employed to accomplish the same result.

The spring lever B is longer than the surface of the tooth to which it is to be applied, so that it may be outwardly arched in application as shown in Fig. 10; and its body 33 terminates at the top in a hook 36 or its equivalent, adapted to receive a wire 37 that is tied around the neck of the tooth; and when the lever is connected with the body A its lower end is held against the tooth adjacent to its cutting edge and its body is outwardly bowed; thus the lever B exerts outward tension on the tooth at its neck and inward tension on the tooth at its cutting edge, the degree of tension being determined by the adjustment of the nuts at the ends of the arch body A, and in this manner a projecting or protruding tooth is speedily brought into normal position with comparatively little inconvenience to the patient. In the arched body employed in connection with the spring lever B, the front loop section 10 may be omitted and said body may be of bar construction throughout its length.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent,—

1. In dentistry, a grooved or channeled body bar for application to the dental arch, a tensioning member carried by the bar and received by its groove for application to a tooth, and means for attaching said member to the tooth to be rectified.

2. In dentistry, a grooved body bar adapted for applica-



tion to a dental arch, a tensioning member carried by the bar and adjustable in its groove, device for attaching the tensioning member to a tooth, and means for adjusting said tensioning member.

- 5 3. In dentistry, a grooved body bar adapted to a dental arch and a rectifying medium for a tooth adjustable upon said bar, an anchoring device for the bar, and means for adjusting said bar in said anchoring position.
- 10 4. In dentistry, a grooved body bar adapted to the dental arch, a rectifying medium for a tooth adjustable on said bar, which medium is in the form of a bola wire, locking devices for the wire, and means for adjusting said bar relatively to the dental arch.
- 15 5. In dentistry, a body bar adapted to the dental arch, a band having a socket and adapted to a tooth, a wire having an enlargement at each end, one end of said wire being passed into the socket of said band, the other end of said wire being led along said body bar, a slide mounted on the bar, which receives that end of the wire located at the
- 20 bar, and a nut adjustable on the bar, in engagement with the said slide to move the slide to or from the end of the body bar, or the center thereof.
- 25 6. In dentistry, a body bar adapted to a dental arch, a band having a socket and adapted to a tooth, a wire having an enlargement at each end, one end of said wire being passed into the socket of said band and the other end of the wire being laid along the said body bar, a slide mounted on the said body bar, which receives that end of the wire

located at said body, a nut adjustable on the body bar in engagement with said slide to move the slide to and from 30 an end of the body bar, or the center thereof, an anchoring band, a clamp sleeve carried by said band, through which an end of the said body bar is passed, and a nut mounted on said body bar for engagement with the forward end portion of the said clamp sleeve. 35

7. In dentistry, the combination with a body bar adapted to a dental arch, which bar comprises a central substantially loop-shaped member and a threaded bar member at each side of the loop-shaped member, anchoring bands each adapted for attachment to a tooth, and a rectifying band adapted for attachment to a tooth to be operated upon, of a flexible rectifier in the form of a wire having an enlargement at each end, means for attaching one end of the rectifier to said rectifying band, a slide mounted upon one of the bar members of the body bar, having means for 45 retaining the opposite end of the rectifier, an adjusting nut also carried by the said bar member and adapted for engagement with the said slide, and an adjustable connection between the bar members of said body bar and the said anchoring bands. 50

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EBEN MOORE FLAGG.

Witnesses:

J. FRED. ACKER,  
JNO. M. RITTER.