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(54) Title: MARKING DEVICE

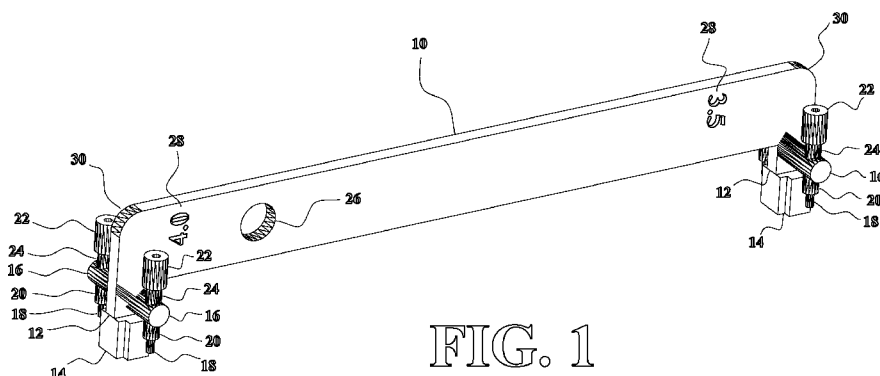


FIG. 1

(57) Abstract: A marking device, designed to mark teeth, to position orthodontic brackets at an optimum level (though it can also be used to mark other things). The invention also relates to a method of marking teeth using the device. The device comprises one or more elongated rectangular metal plates. At each end of each plate is a "leg" that extends downward, with a "foot" covered by plastic. Cylindrical "arms" extend from both sides of each leg at right angles to the plate. Pencil lead holders pass through the arms on each side of the plate, so that the pencil leads extend vertically downward and parallel to the plate. Knobs above the holders can be rotated to move the pencil lead up or down. Near each end of each plate, the distance of the pencil lead from the foot is marked in millimeters. Pencil marks aid in placing the orthodontic brackets.

MARKING DEVICE**BACKGROUND OF THE INVENTION****1. FIELD OF THE INVENTION**

The present invention relates to marking devices and
5 methods, especially for teeth.

2. DESCRIPTION OF THE PRIOR ART

There are numerous prior inventions of marking devices and
methods, but none that are equivalent to the present
invention.

10 U.S. Patent No. 2,583,679, issued on January 29, 1952, to
Benjamin P. Boston, discloses a measuring instrument and
marker combined, including a pencil holder attached to the end
of a flat rectangular leg. The instant invention is
distinguishable, in that it has pencil lead holders on
15 opposite sides and ends of the rectangular plate.

U.S. Patent No. 2,588,658, issued on March 11, 1952, to
Louis Plotnik, discloses a metal scribing gauge, with a needle
in a sleeve on the front end of a ruler. The instant
invention is distinguishable, in that it has writing
20 implements on sides of an elongated plate.

U.S. Patent No. 2,659,980, issued on November 24, 1953, to
Joseph W. Dunn, discloses an adjustable marking rule, with
flat "tongues" that extend downward and a sliding marker. The
instant invention is distinguishable, in that it has pencil
25 lead holders that extend downward in fixed positions at ends
of the rectangular plate.

U.S. Patent No. 2,675,617, issued on April 20, 1954, to
David Goldman and John Geiger, discloses a ruler with a slide
and a chalk or crayon holder on one end of the ruler. The
30 instant invention is distinguishable, in that it has writing
implements on sides of an elongated plate.

U.S. Patent No. 2,867,042, issued on January 6, 1959, to
Dozier A. Sutton, discloses geometrical instruments, having
flat rectangular portions from which extend downwards a

pointed member and a ball point marker, rather than the pencil lead holders of the instant invention.

U.S. Patent No. 3,164,906, issued on January 12, 1965, to Russ S. Andaloro, discloses a multiple pen combination, with
5 the pens all in a single row. The instant invention is distinguishable, in that it has writing implements on opposite sides of an elongated plate.

U.S. Patent No. 3,191,295, issued on June 29, 1965, to Lawrence L. Falk, discloses a device for scoring cartons and
10 the like. The instant invention is distinguishable, in that it is designed for marking teeth.

U.S. Patent No. 3,421,223, issued on January 14, 1969, to Marvin M. Stark, discloses a tooth marking method and means, in which spots on areas of the teeth are marked by the patient
15 biting down on a pad, rather than lines being drawn on sides of the teeth, as in the instant invention.

U.S. Patent No. 4,590,677, issued on May 27, 1986, to Paul J. Kopp, discloses an alignment gauge for a scribe tool, with a scribing needle extending from one end of a rectangular
20 portion, rather than a pencil lead holder, as in the instant invention.

U.S. Patent No. 4,725,228, issued on February 16, 1988, to Lawrence F. Andrews, discloses a tooth crown center locating device. The instant invention is distinguishable, in that it
25 deigned for measuring the placement of braces on teeth.

U.S. Patent No. 4,850,864, issued on July 25, 1989, to Michael K. Diamond, discloses a bracket placing instrument. The instant invention is distinguishable, in that it holds
30 for writing implements on opposite sides of an elongated plate.

U.S. Patent No. 5,197,195, issued on March 30, 1993, to John S. Aikens, discloses a cutting guide apparatus. The instant invention is distinguishable, in that it holds plural writing
implements on opposite side of an elongated plate.

35 U.S. Patent No. 5,312,248, issued on May 17, 1994, to Farnaz

Zandkarimi, discloses a bracket marking gauge. The instant invention is distinguishable, in that it holds plural writing implements on opposite side of an elongated plate.

5 U.S. Patent No. 6,418,631, issued on July 16, 2002, to John Ramsthaler, discloses an adjustable measuring and marking device, with markers on one side of a telescoping ruler. The instant invention is distinguishable, in that it has writing implements on opposite side of an elongated plate.

10 U.S. Patent No. 6,726,472, issued on April 27, 2004, to Robert J. Kuhn, discloses an orthodontic measuring gauge, with pivotally connected first and second arms, with a single marker on the second arm. The instant invention is distinguishable, in that it has a single elongated plate, with plural markers on opposite sides of the plate.

15 U.S. Patent No. 6,736,637, issued on May 18, 2004, to James A. Bond, discloses a pre-marked orthodontic arch wire, in which the marks are on the wire, rather than on the teeth, as in the instant invention.

20 U.S. Patent No. 7,837,464, issued on November 23, 2010, to Michael Craig Marshall, discloses a method for determining bracket locations on electronic models of teeth, using virtual marking, rather than physical marking, as in the instant invention.

25 U.S. Patent No. 8,021,150, issued on September 20, 2011, to Roberto Carrillo Fuenteville, discloses a method for dental implant placement, using a grid, rather than marking the teeth, as in the instant invention.

30 U.S. Reissued Patent No. RE43,364, reissued on May 8, 2012, to Michael Craig Marshall, discloses a method and apparatus using a scanned image for marking bracket locations, in which a model of teeth is physically marked, rather than the actual teeth themselves, as in the instant invention.

35 U.S. Design Patent No. D584,353, issued on January 6, 2009, to David J. Schreff and Donna J. Lindsay, discloses a design for a holder for writing or drawing instruments, in which the

instruments are held between two rectangular plates, rather than along the sides of a plate, as in the instant invention.

U.S. Design Patent No. D639,854, issued on January 14, 2011, to Patrick A. Canizio, Sr., discloses a design for a scribe,
5 in which a writing instrument extends through one leg that is movably attached to a rectangular ruler, rather than alongside the leg as in the instant invention.

U.S. Patent Application Publication No. 2005/0130095, published on January 16, 2005, to Richard A. Raby, Oliver L.
10 Puttler and Nicholas A. Stark, discloses a method of orienting an orthodontic appliance to a tooth, involving hypothetical reference lines or rays, rather than physical graphite marks on the teeth, as in the instant invention.

U.S. Patent Application Publication No. 2006/0242849,
15 published on November 2, 2006, to Robert D. Fogal, Sr. and Robert D. Fogal, Jr., discloses a tool for marking weight attachment location on a wheel of a motor vehicle, with a single marker near the end of a bar. The instant invention is distinguishable, in that it has plural markers on opposite
20 sides of an elongated plate.

U.S. Patent Application Publication No. 2007/0031774, published on February 8, 2007, to David K. Cinader, Jr. et al., discloses registering physical and virtual tooth structures with markers, in which markers are placed on teeth,
25 but the markers are not pencil lines, as in the instant invention.

U.S. Patent Application Publication No. 2008/0145811, published on June 19, 2008, to Nelson R. Diers, discloses a device, method and kit for determining orthodontic dimensions,
30 in which the marks are on a transparent ruler, rather than on the teeth themselves, as in the instant invention.

U.S. Patent Application Publication No. 2009/0155739, published on June 18, 2009, to Neil Stewart McLeod, discloses a dental contact adjustment tool, which makes graphite marks
35 on teeth, but is not designed for making straight lines on

teeth, as in the instant invention.

U.S. Patent Application Publication No. 2012/0311877,
published on December 13, 2012, to Raghunath Manohar,
discloses a marking gauge, in which marking pins extend
5 through, rather than alongside a scribing bar, as in the
instant invention.

British Patent No. 2 380 164, published on April 2, 2003,
to William Hale and Mark Clarke, discloses a circle scribing
and marking tool, in which pencils pass through a scribing
10 plate, rather than alongside, as in the instant invention.

None of the above inventions and patents, taken either
singly or in combination, is seen to describe the instant
invention as claimed.

SUMMARY OF THE INVENTION

15 The present invention is a marking device, designed to mark
teeth, to position orthodontic brackets at an optimum level
(though it may also be used to mark other things). The
invention also relates to a method of marking teeth using the
device. The device comprises one or more elongated
20 rectangular metal plates. At each end of each plate is a
"leg" that extends downward, with a rest or "foot" covered by
plastic. Cylindrical bars or "arms" extend from both sides of
each leg at right angles to the plate. Pencil lead (graphite)
holders pass through the bars on each side of the plate, so
25 that the pencil leads extend vertically downward and parallel
to the plate. Knobs above the holders can be rotated to move
the pencil lead up or down. Near each end of each plate, the
distance of the pencil lead from the foot is marked in
millimeters. Thus, if the distance marked is 4.5 millimeters,
30 when the foot is placed against an incisal portion of the
teeth, the pencil lead will mark a line on the teeth 4.5
millimeters from the incisal portion, to aid in placing the
orthodontic brackets at that distance on the teeth. Different
distances may be marked with different ends of one or more
35 plates.

Accordingly, it is a principal object of the invention to provide an apparatus for marking teeth for placement of orthodontic brackets.

It is another object of the invention to provide a method
5 of marking teeth for placement of orthodontic brackets.

It is a further object of the invention to provide an apparatus for marking objects.

Still another object of the invention is to provide a method of marking objects.

10 It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become
15 readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the first preferred embodiment of the invention.

20 FIG. 2 is a front elevational view of the first preferred embodiment of the invention.

FIG. 3 is a rear elevational view of the first preferred embodiment of the invention.

FIG. 4 is a top plan view of the first preferred embodiment
25 of the invention.

FIG. 5 is a bottom plan view of the first preferred embodiment of the invention.

FIG. 6 is a side elevational view of the first preferred embodiment of the invention, with the left and right side
30 views being identical.

FIG. 7 is a perspective view of the second preferred embodiment of the invention.

FIG. 8 is a front elevational view of the second preferred embodiment of the invention.

35 FIG. 9 is a rear elevational view of the second preferred

embodiment of the invention.

FIG. 10 is a top plan view of the second preferred embodiment of the invention.

FIG. 11 is a bottom plan view of the second preferred
5 embodiment of the invention.

FIG. 12 is a right side elevational view of the second preferred embodiment of the invention.

FIG. 13 is an environmental view of either preferred
embodiment of the invention, showing it being used to mark
10 teeth.

FIG. 14 shows the mark made on teeth using the invention, and the brackets of orthodontic braces placed along the line.

FIG. 15 shows a pair of the plates in the first preferred embodiment of the invention.

15 Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention a marking device, designed primarily to mark teeth for the proper placement of orthodontic
20 brackets, but which may also be used for other things. The invention also comprises a method of using the device.

FIG. 1 is a perspective view of the first preferred embodiment of the invention, showing the elongated plate 10, which is preferably made of metal. Legs 12 extend downward
25 from each end of the plate. The legs are at right angles to the plate, and coplanar with the plate. At the end of each leg there is a rest or foot 14, which is preferably made of plastic or other material softer than the plate, that can rest comfortably against teeth. Arms 16 extend in opposite
30 directions from each end of the plate, at right angles to the plate and the legs. Pencil "leads" 18 can be retained in pencil lead holders 20 passing through each arm. Knobs 22 can rotate on screw threads 24 on the portions of the pencil lead holders above the arms to adjust the position of the pencil
35 leads. (Alternatively, pens or other writing implements may

be substituted for the pencil leads.) A hole 26 at one end of the plate enables it to be retained on a hook.

FIG. 2 is a front elevational view of the first preferred embodiment of the invention, showing the indicia 28 marked on the plate adjacent to each pencil lead holder, giving the distance of the axis of each pencil lead holder from the closest side of the foot adjacent to the pencil lead holder, preferably in millimeters. The upper corners 30 of the plates are preferably rounded. FIG. 3 is a rear elevational view of the first preferred embodiment of the invention, which is the same as the front view, except the position of the indicia 28 and hole 26 are reversed. There may be two or more plates, with different distances marked by the indicia. When there are a plurality of the plates, they may be made of metals with different colors to avoid confusion, e.g., a first plate may be made of stainless steel, and a second plate may be made of brass.

FIG. 4 is a top plan view of the first preferred embodiment of the invention. FIG. 5 is a bottom plan view of the first preferred embodiment of the invention. FIG. 6 is a side elevational view of the first preferred embodiment of the invention, with the left and right side views being identical. Each leg passes between two of the writing implements.

FIG. 7 is a perspective view of the second preferred embodiment of the invention. In the second preferred embodiment of the invention, there are only two pencil lead holders 20 or writing implements, at one end of the plate 10, on opposite sides of the plate. In the second preferred embodiment, there is only one leg 12 extending from the same end of the plate as the writing implements, said leg being at right angles to the plate and coplanar with the plate, with the leg passing between the writing implements. There is a single foot 14 at the end of the leg away from the plate, said foot being made of a softer material than the plate. FIG. 8 is a front elevational view of the second preferred embodiment

of the invention, showing the lower rounded corner 32 on the side of the plate opposite the writing implements. FIG. 9 is a rear elevational view of the second preferred embodiment of the invention. FIG. 10 is a top plan view of the second preferred embodiment of the invention. FIG. 11 is a bottom plan view of the second preferred embodiment of the invention. FIG. 12 is a right side elevational view of the second preferred embodiment of the invention, with the left side elevational view being identical the that in FIG. 6.

The invention also comprises a method including the steps of:

(a) grasping a flat plate with a plurality of writing implements parallel to the plate; (b) placing an extension from the flat plate against an object; and (c) pulling one of the writing implements across the object using the flat plate, marking the object. FIG. 13 is an environmental view of either preferred embodiment of the invention, wherein the object is a tooth T, showing it being used to mark teeth with a line L.

FIG. 14 shows the lines L marked on teeth T using the invention, and the brackets B of orthodontic braces placed along the line. Shown are the teeth of the Maxillary Arch or Upper Arch UA, and the teeth of the Mandibular Arch or Lower Arch LA. The permanent human teeth on each jaw are classified as follows:

Anterior Teeth

Incisors

Central

Left Central LC / Right Central RC

Lateral

Left Lateral LL / Right Lateral RL

Cuspid (or Canine or Eye) Teeth

Left Cuspid LE / Right Cuspid RE

Posterior Teeth

Bicuspid Teeth

First Bicuspid

Left First Bicuspid L1B

Right First Bicuspid R1B

Second Bicuspid

5 Left Second Bicuspid L2B

Right Second Bicuspid R2B

Molars

First Molars

Left First Molar L1M / Right First Molar L2M

10 Second Molars (not shown)

Third Molars (Wisdom Teeth) (not shown)

The optimum placement of the line on each tooth is measured from the incisal or biting edge of each tooth, which is at the bottom on the upper jaw, and at the top on the lower jaw. For the teeth of the upper jaw, the optimum placement of the line is generally four millimeters from the incisal edge of each tooth, except on the lateral incisors (LL and RL), where it is 3.5 millimeters, and on the cuspids (LE and RE), where it is 4.5 millimeters. For the upper arch, the lower edges of the brackets B should be placed on the line. For the teeth of the lower jaw, the optimum placement of the line is generally four millimeters from the incisal edge of each tooth, except on the cuspids (LE and RE), where it is 4.5 millimeters. For the lower arch, the upper edges of the brackets B should be placed on the line.

The invention will normally be sold as a pair of plates, as shown in FIG. 15, with the upper plate having ends marking teeth 3.5 and 4.0 millimeters from the incisal edge of the teeth, and the lower plate having ends marking teeth 4.5 and 5.0 millimeters from the incisal edge of the teeth, as indicated by indicia 26.

It is to be understood that the present invention is not limited to the preferred embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

CLAIMS

I claim:

- 5 1. A marking device, comprising:
an elongated flat plate;
four writing implements parallel to the plate, on opposite
sides and opposite ends of the plate, with two writing
implements on each side of the plate, and two writing
10 implements on each end of the plate; and
two legs, each extending in the same direction from one of
the two ends of the plate, said legs being at right angles to
the plate and coplanar with the plate, with each leg passing
between two of the writing implements.
- 15 2. The marking device according to claim 1, further
comprising:
feet at the end of each leg away from the plate, said feet
being made of a softer material than the plate.
- 20 3. The marking device according to claim 2, further
comprising:
arms that retain the writing implements, said arms extending
in opposite directions from each leg at right angles to the
plate and the legs.
- 25 4. The marking device according to claim 3, wherein:
the writing implements are pencil lead holders.
5. The marking device according to claim 4, further
comprising:
knobs on each pencil lead holder, that can be rotated to
adjust the position of pencil leads in the pencil lead
30 holders.

6. The marking device according to claim 5, wherein:
the distance of the axis of each pencil lead holder from the closest side of the foot adjacent to the pencil lead holder is marked on the plate adjacent to the pencil lead holder.

5 7. A marking device, comprising:

an elongated flat plate;

two writing implements parallel to the plate, on an end of the plate, with one of the writing implements on each opposite side of the plate; and

10 a leg extending from the same end of the plate as the writing implements, said leg being at right angles to the plate and coplanar with the plate, with the leg passing between the writing implements.

8. The marking device according to claim 7, further
15 comprising:

a foot at the end of the leg away from the plate, said foot being made of a softer material than the plate.

9. The marking device according to claim 8, further comprising:

20 arms that retain the writing implements, said arms extending in opposite directions from the leg at right angles to the plate and the leg.

10. The marking device according to claim 9, wherein:
the writing implements are pencil lead holders.

25 11. The marking device according to claim 10, further comprising:

knobs on each pencil lead holder, that can be rotated to adjust the position of pencil leads in the pencil lead holders.

12. The marking device according to claim 11, wherein:
the distance of the axis of each pencil lead holder from the
closest side of the foot adjacent to the pencil lead holder is
marked on the plate adjacent to the pencil lead holder.

5 13. A method of marking teeth, comprising the steps of:
grasping an elongated flat plate with a plurality of writing
implements parallel to the plate, said writing implements
being on one or more ends of the plate, with one or more of
said writing implements on each opposite side of the plate;
10 placing a leg extending from the same end of the plate as
one or more of the writing implements against one or more
teeth, said leg being selected from one or more legs, with
each of the legs at right angles to the plate and coplanar
with the plate, with the legs passing between the writing
15 implements;
pulling one of the writing implements across the object
using the flat plate, marking the teeth with a line; and
using the line to position a bracket of an orthodontic
brace.

20 14. The method of marking teeth according to claim 13,
wherein:
there are four of the writing implements on opposite sides
and opposite ends of the plate, with two writing implements on
each side of the plate, and two writing implements on each end
25 of the plate; and
there are two of the legs, each extending in the same
direction from one of the two ends of the plate

15. The method of marking teeth according to claim 13, wherein:

there are two of the writing implements on one end of the plate, with one writing implement on each side of the plate;
5 and
there is only one of the legs.

16. The method of marking teeth according to claim 13, wherein:

there is a foot for each of the one or more legs, with the
10 foot at the end of the leg away from the plate, said foot being made of a softer material than the plate.

17. The method of marking teeth according to claim 16, wherein:

there are arms that retain the writing implements, said arms
15 extending in opposite directions from each of the legs at right angles to the plate and the leg.

18. The method of marking teeth according to claim 17, wherein:

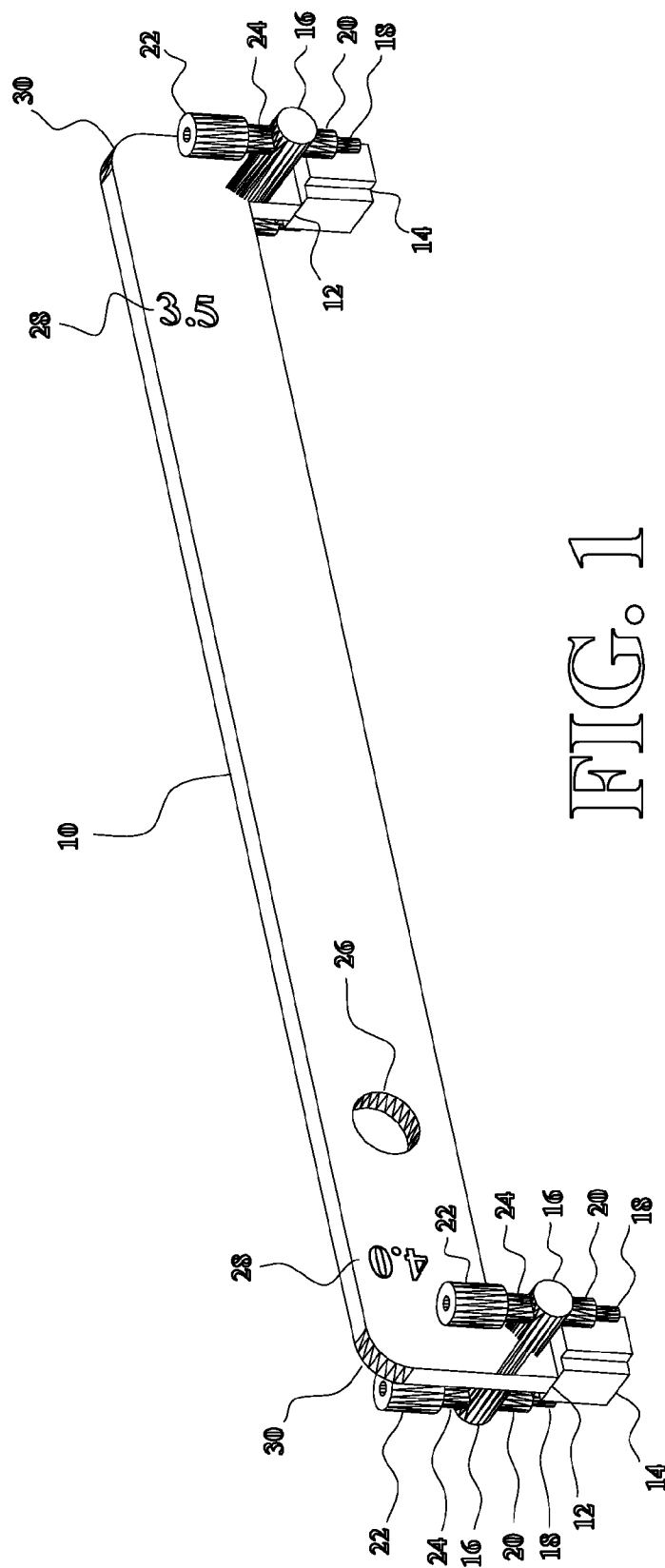
the writing implements are pencil lead holders.

20 19. The method of marking teeth according to claim 18, wherein:

there are knobs on each pencil lead holder, that can be rotated to adjust the position of pencil leads in the pencil lead holders.

25 20. The method of marking teeth according to claim 19, wherein:

the distance of the axis of each pencil lead holder from the closest side of the foot adjacent to the pencil lead holder is marked on the plate adjacent to the pencil lead holder.



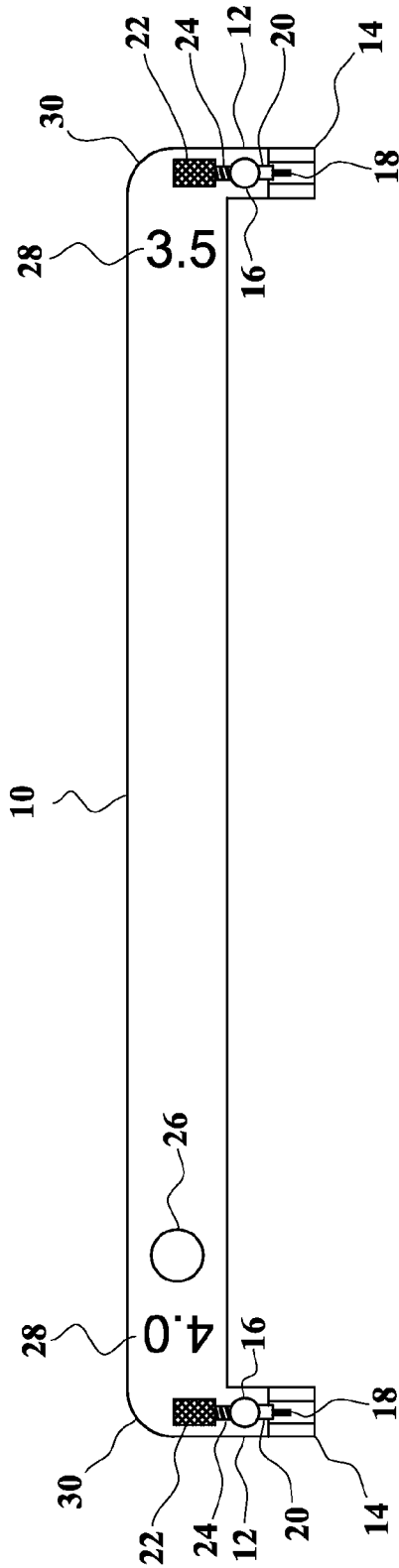


FIG. 2



FIG. 3

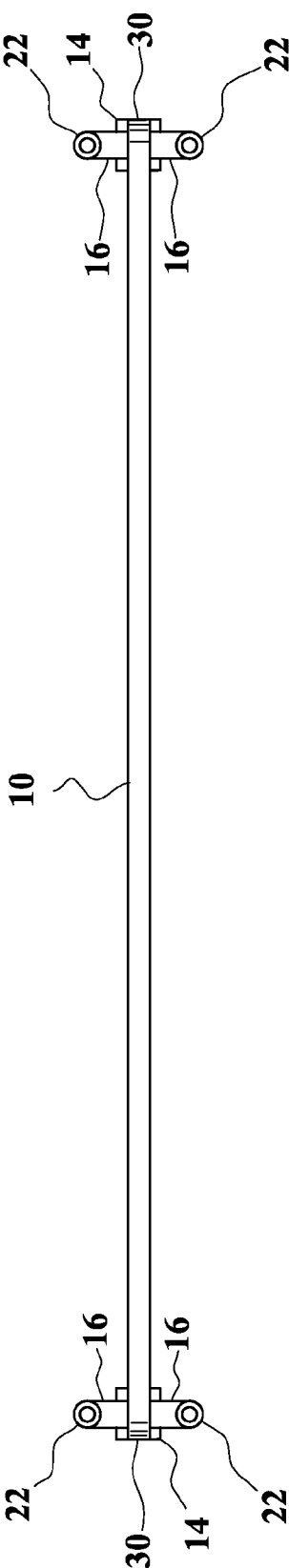


FIG. 4

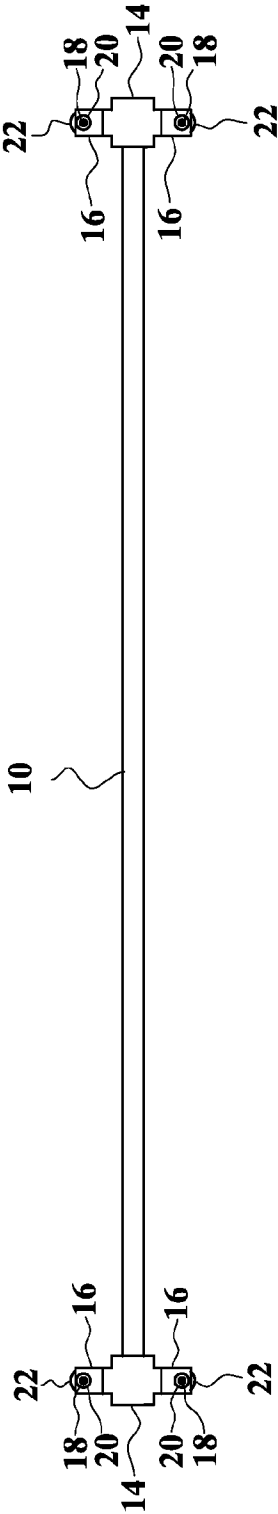


FIG. 5

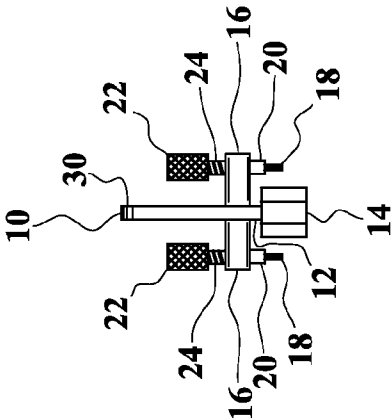


FIG. 6

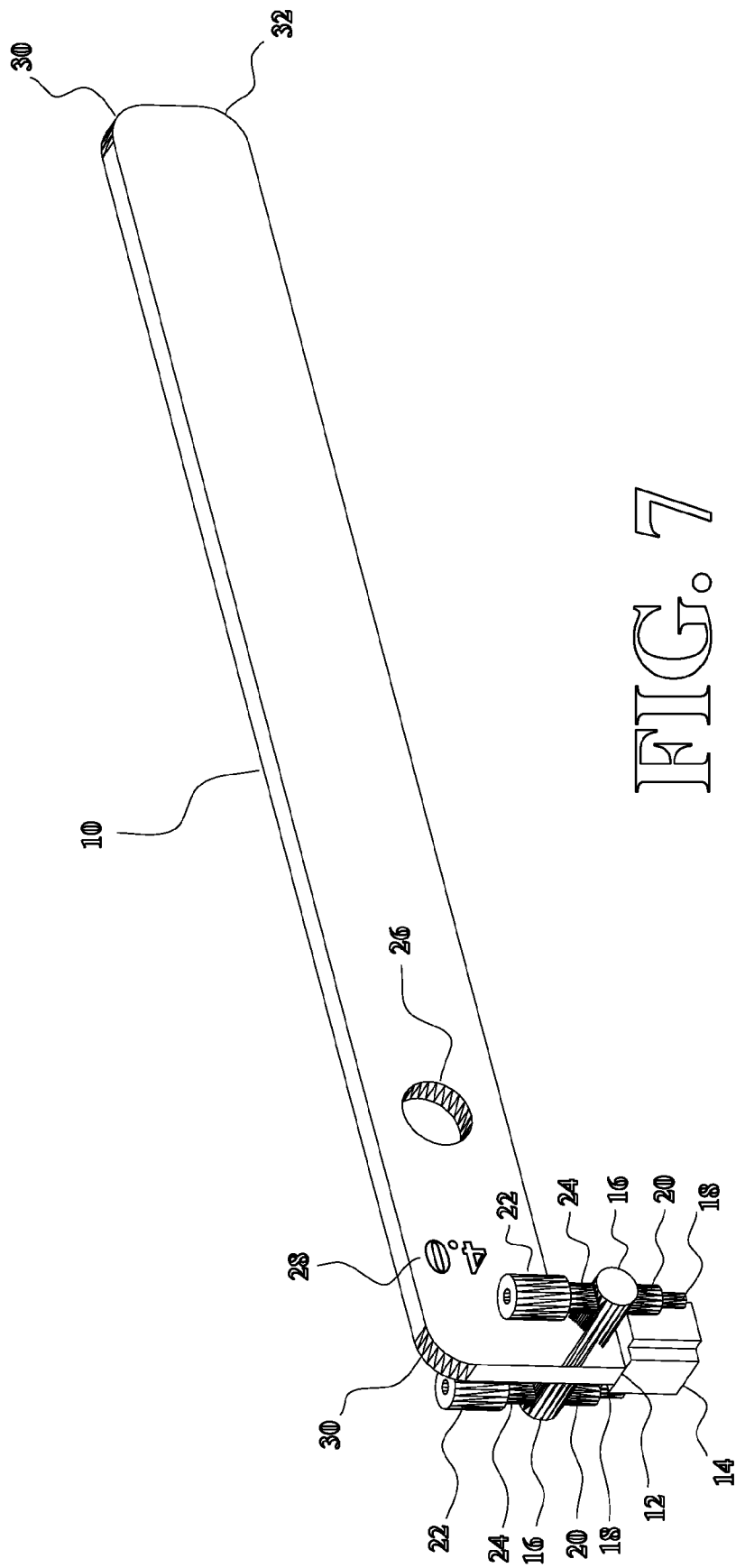


FIG. 7

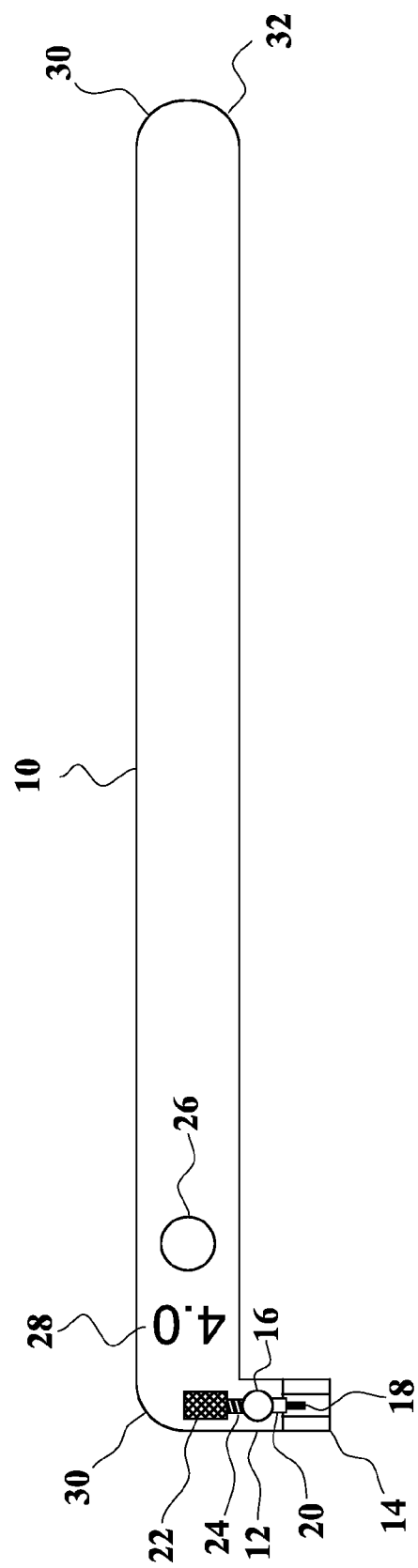
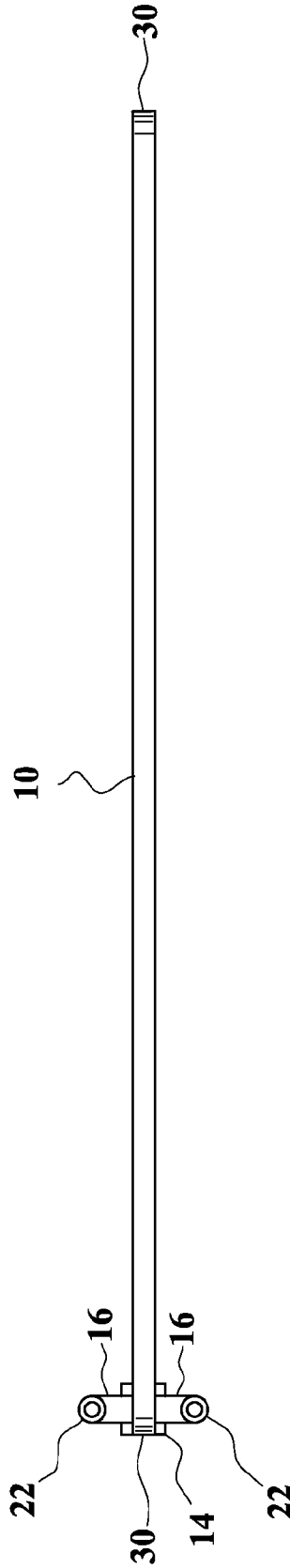
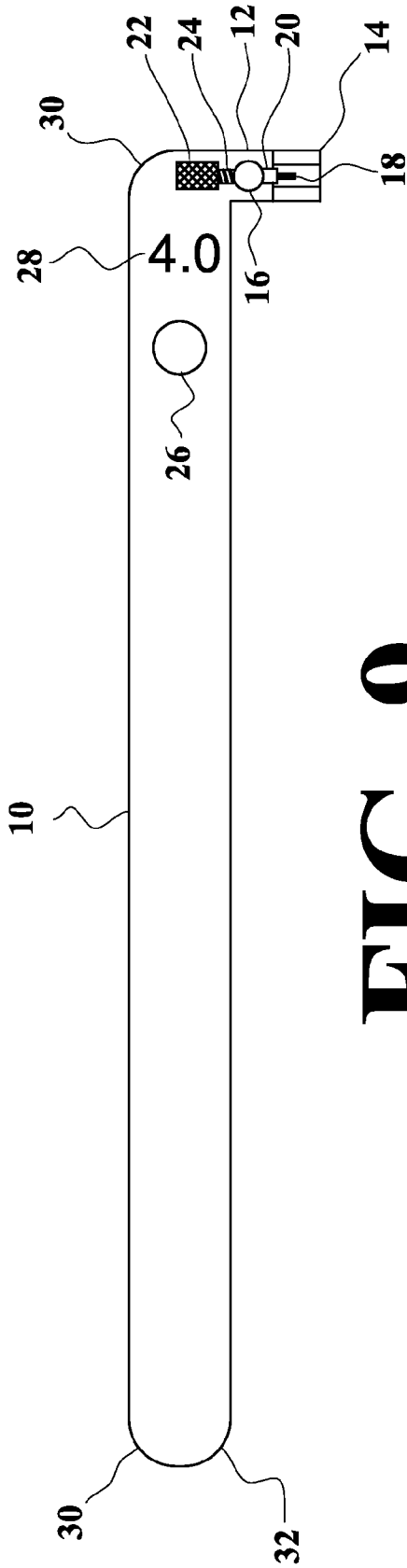


FIG. 8



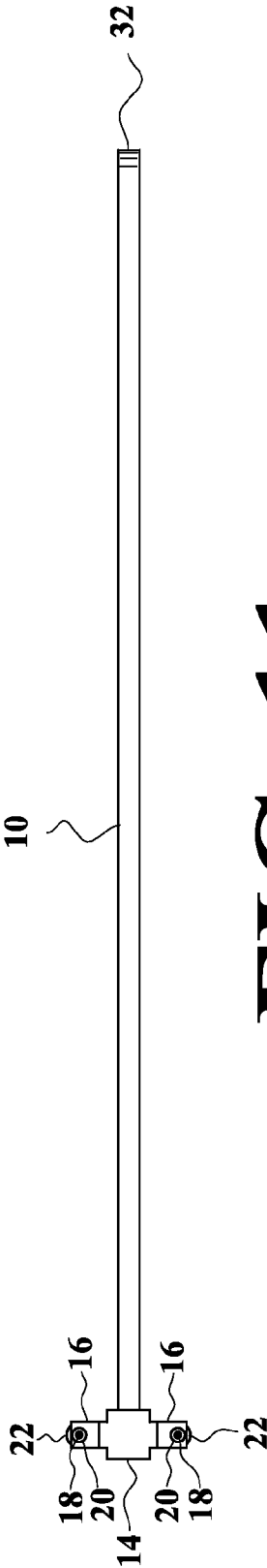


FIG. 11

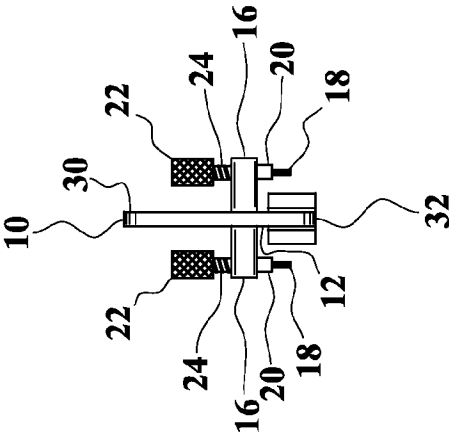


FIG. 12

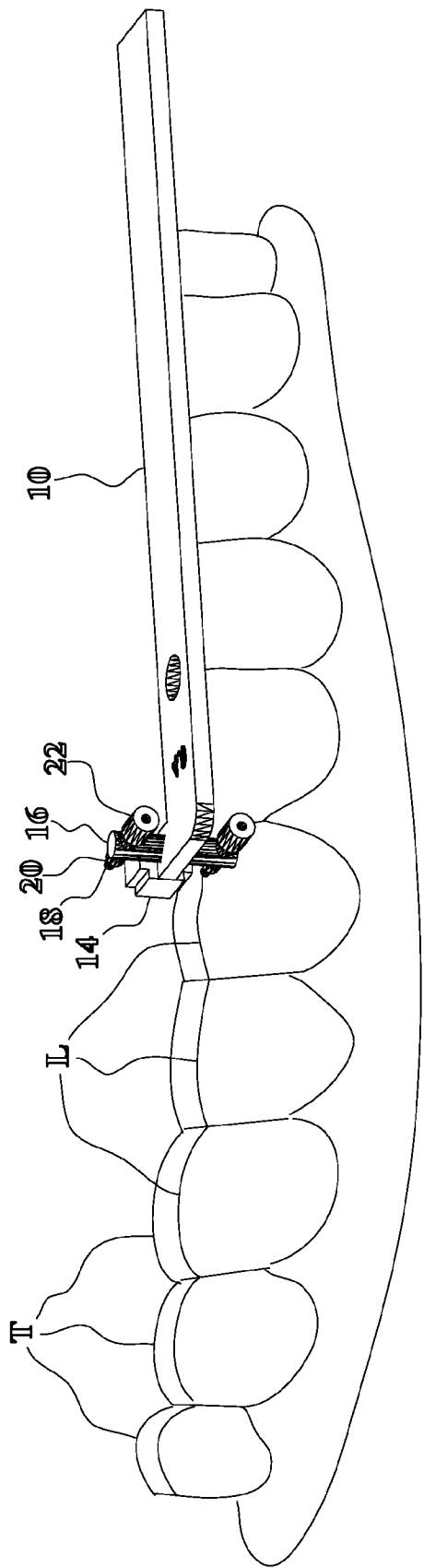


FIG. 13

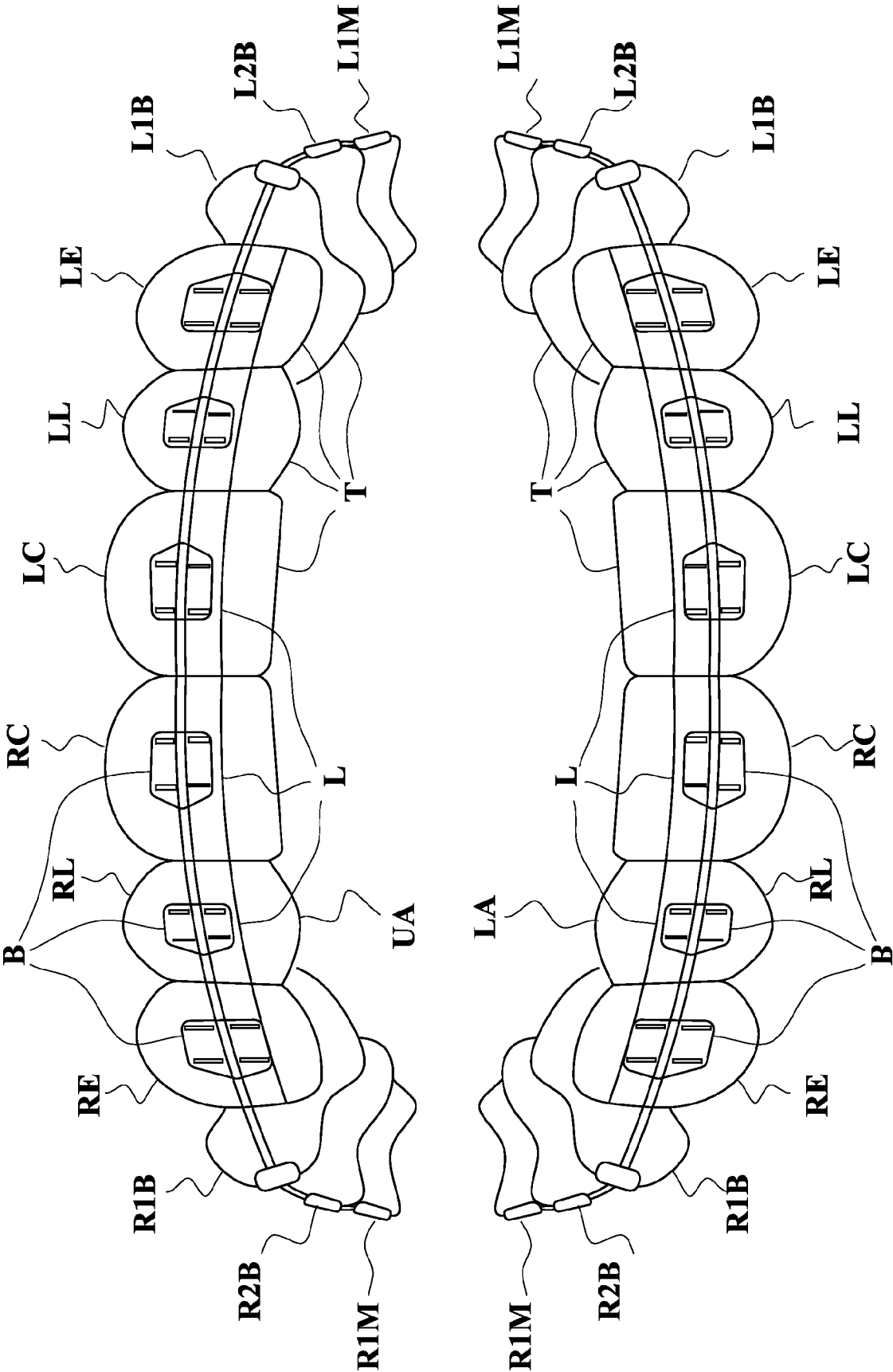
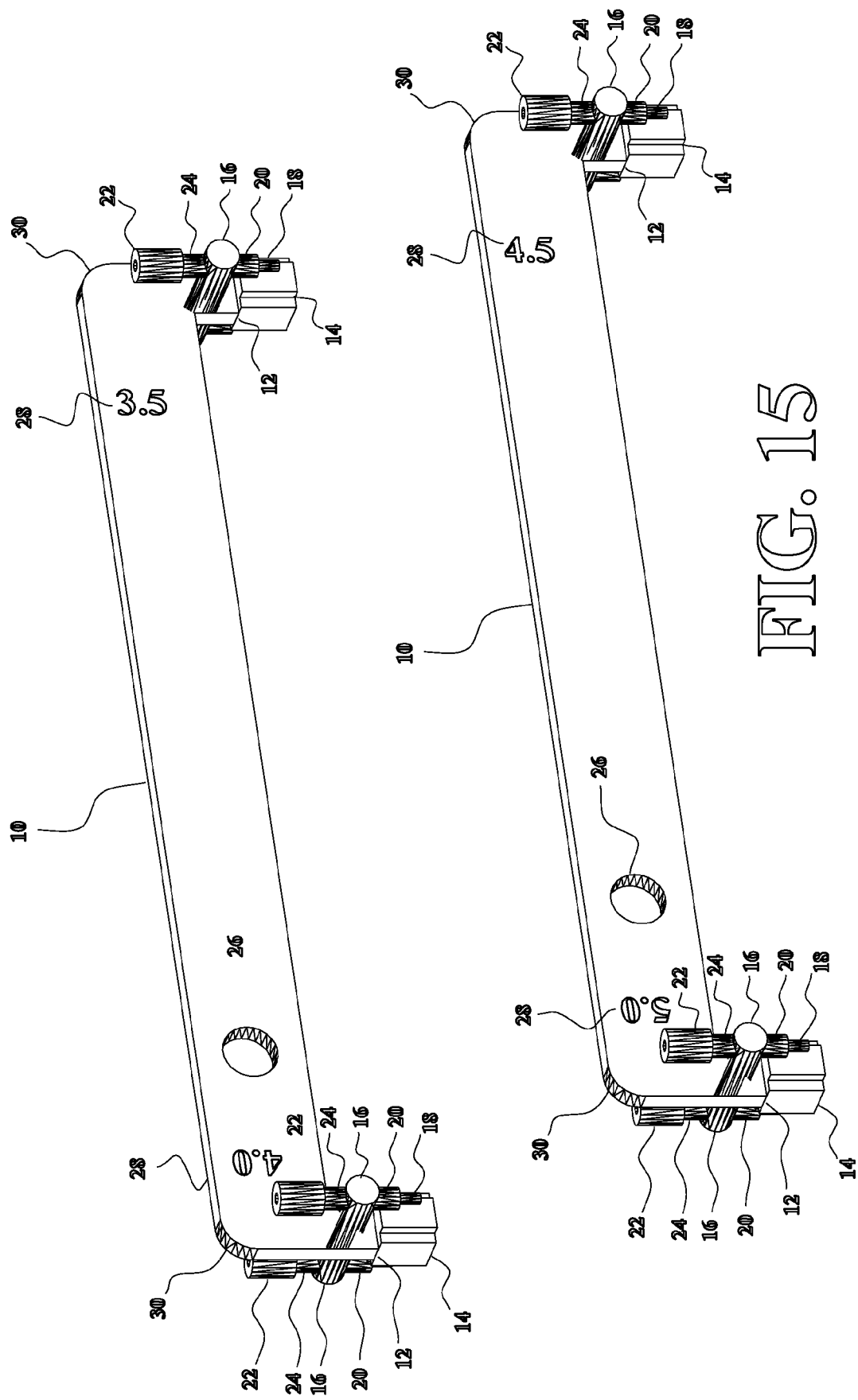


FIG. 14



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US14/72822

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A61C 19/04, 7/14, B25H 7/04; (2015.01) CPC - A61C 19/04, 7/14, B25H 7/04; According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC(8) Classification(s): A61C 19/04, 19/055, 7/14, B25H 7/04; (2015.01) CPC Classification(s): A61C 19/04, 19/055, 7/14, B25H 7/04; USPC Classification(s): 33/41.4, 42, 514 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); Proquest; Google; Google Scholar; Search Terms Used: marking, pencil, parallel, lines, opposite, sides, feet, orthodontics, bracket, placement, multiple, four, scribe, graphite, lead.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005/0283986 A1 (NICHOLSON, M.); December 29, 2005; figures 1 and 3; abstract paragraphs [0016]-[0019], [0023] and [0024].	1-20
A	US 5,197,195 A (AIKENS, J); March 30, 1993; figures 1, and 7; column 3, lines 23-50.	1-20
A	US 5,312,248 A (ZANDKARIMI, F.); May 17, 1994; figures 1, 2, and 6-8; abstract; column 2, line 67 to column 3, lines 10; column 3, lines 11-26, and column 3, lines 49-61.	1-20
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 28 February 2015 (28.02.2015)		Date of mailing of the international search report 25 MAR 2015
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774