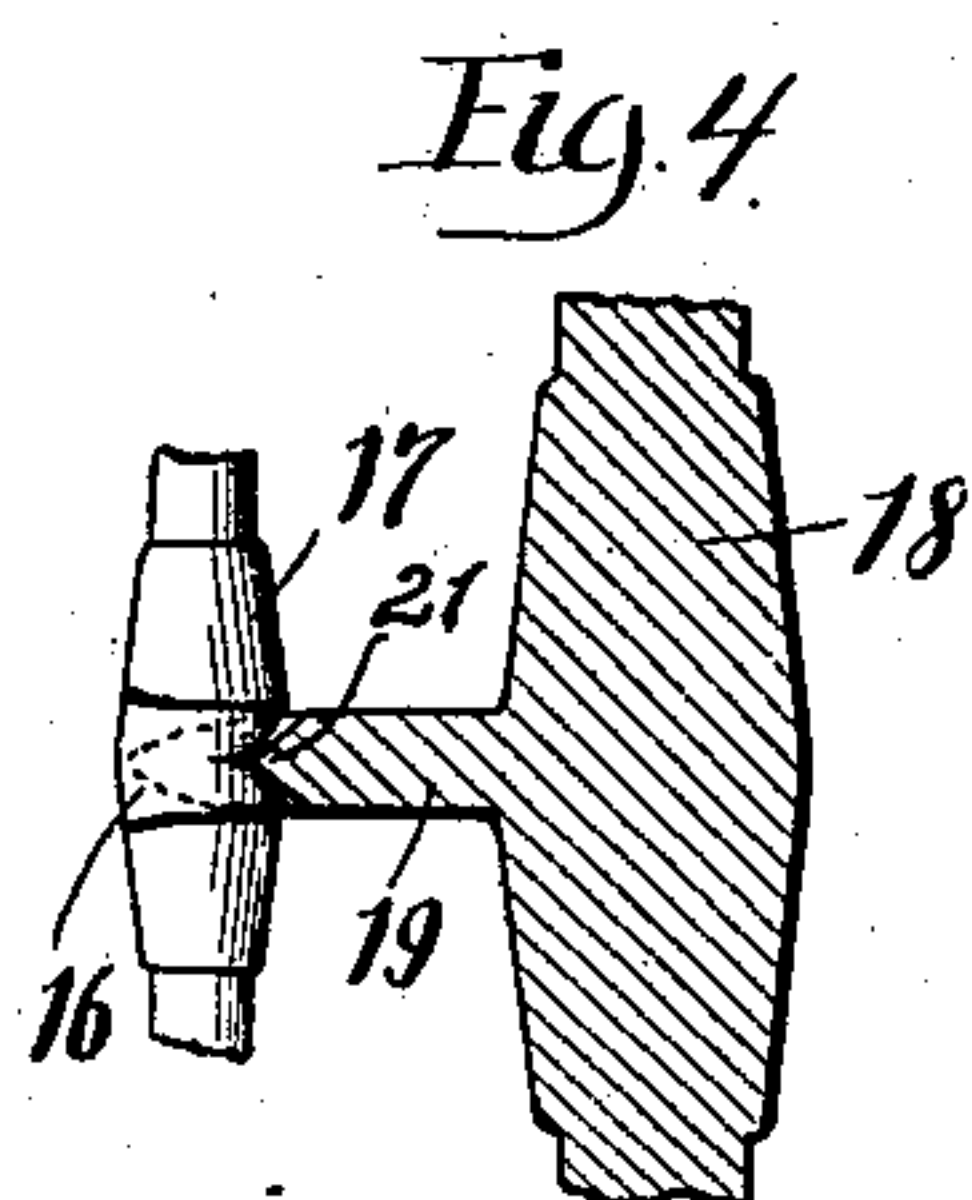
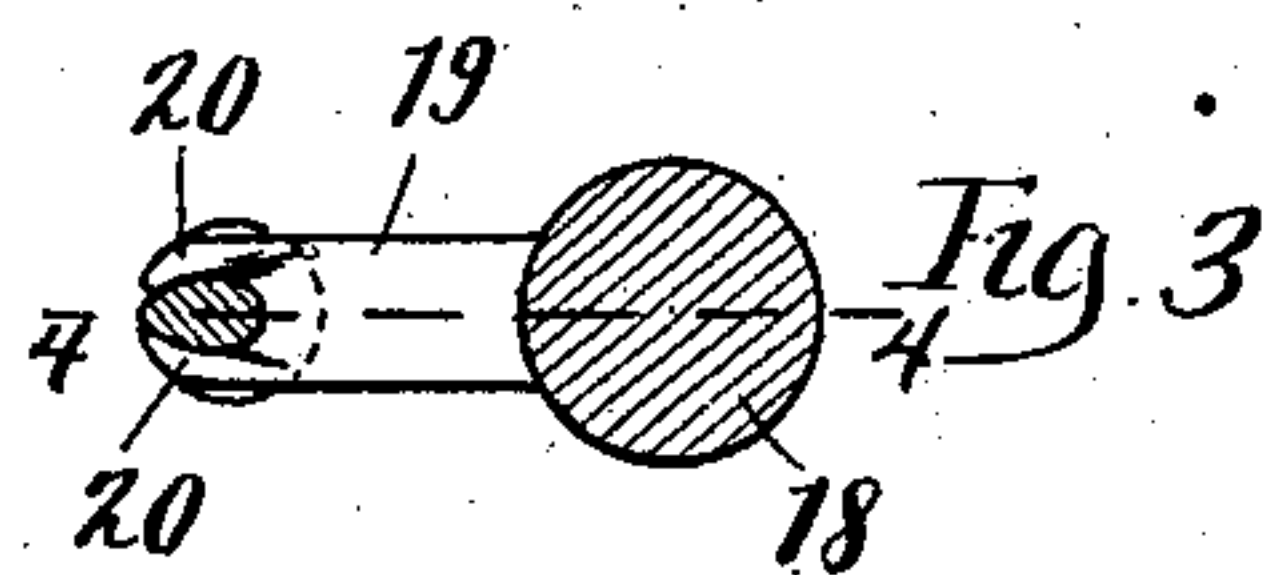
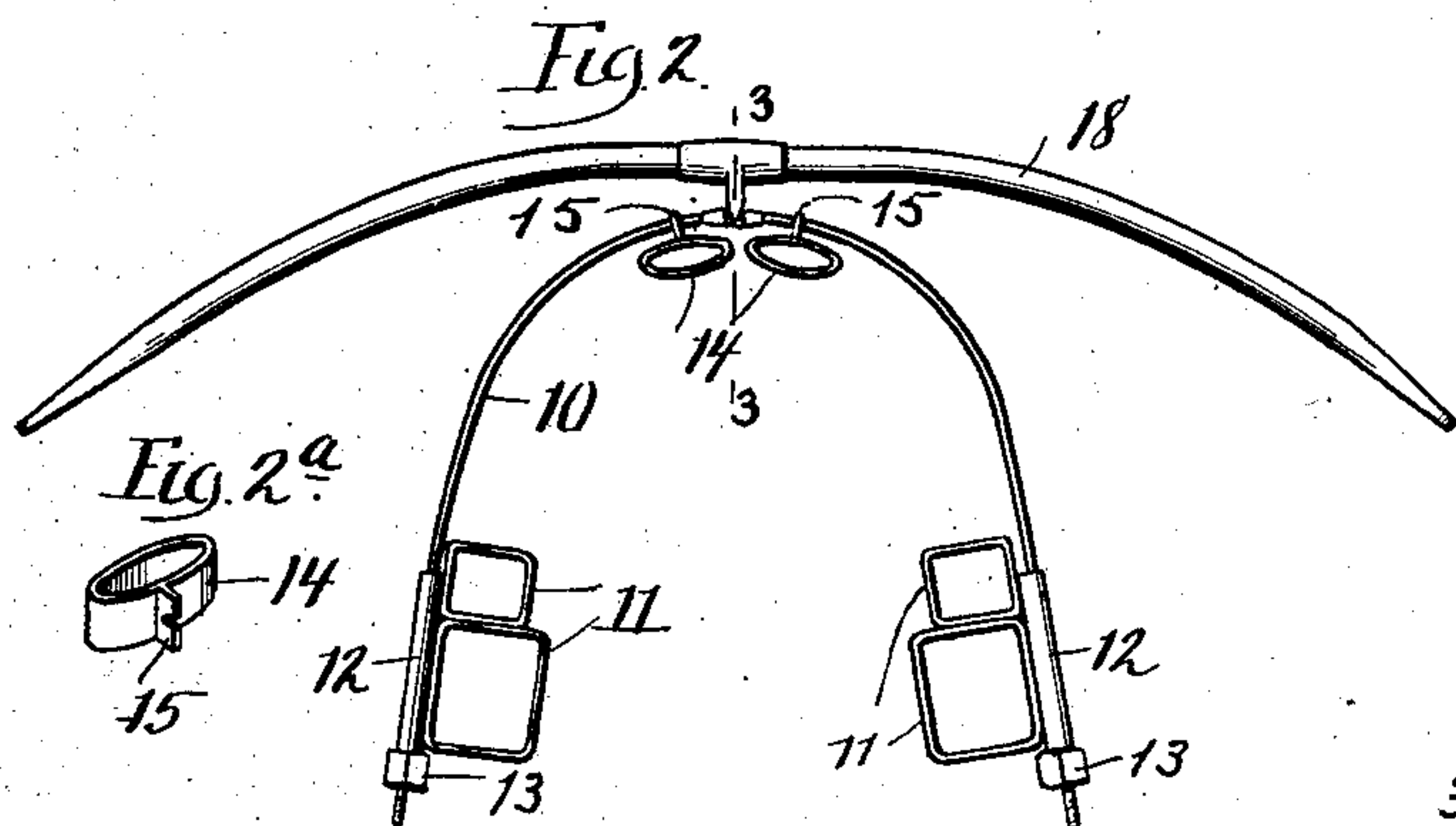
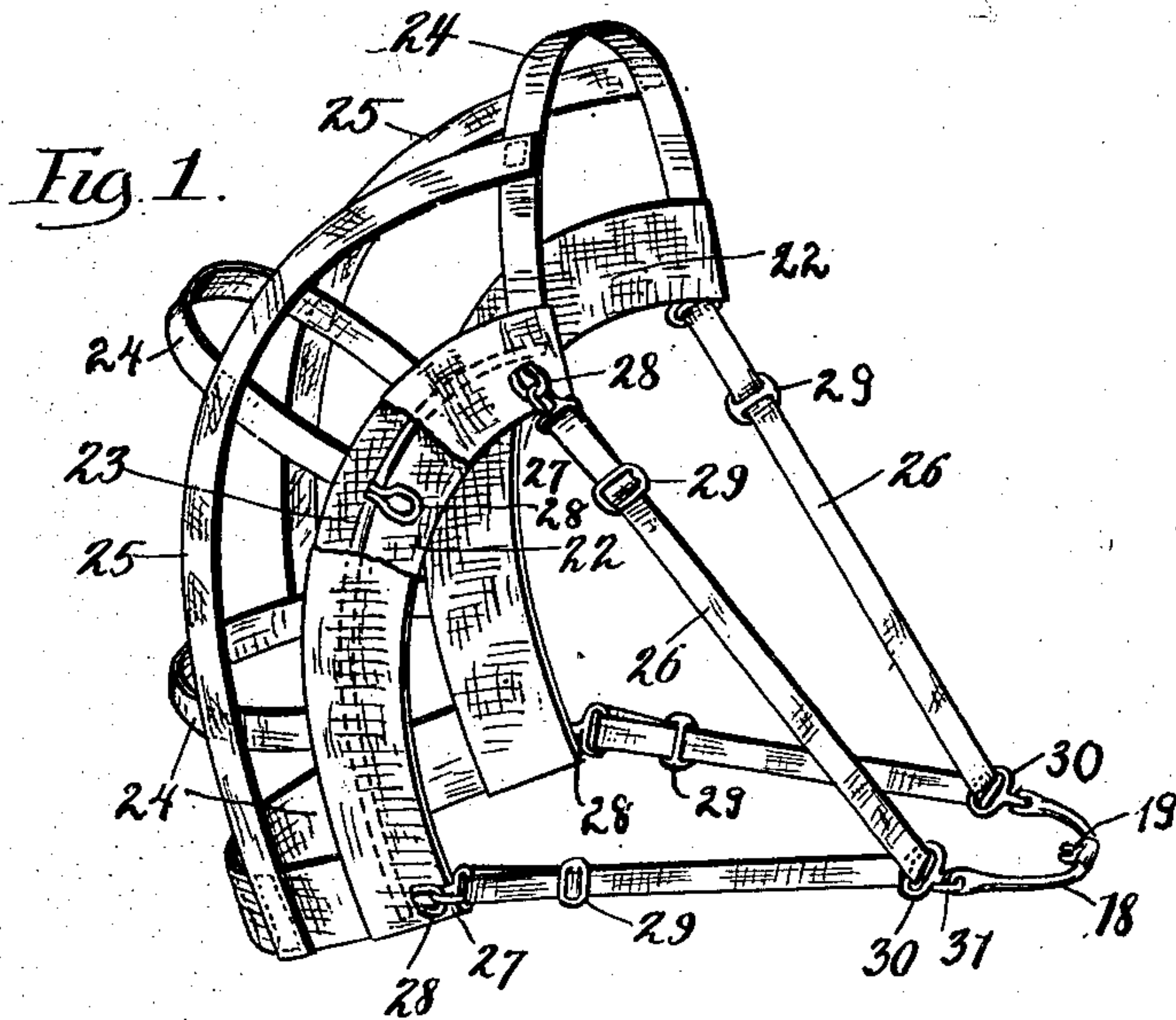
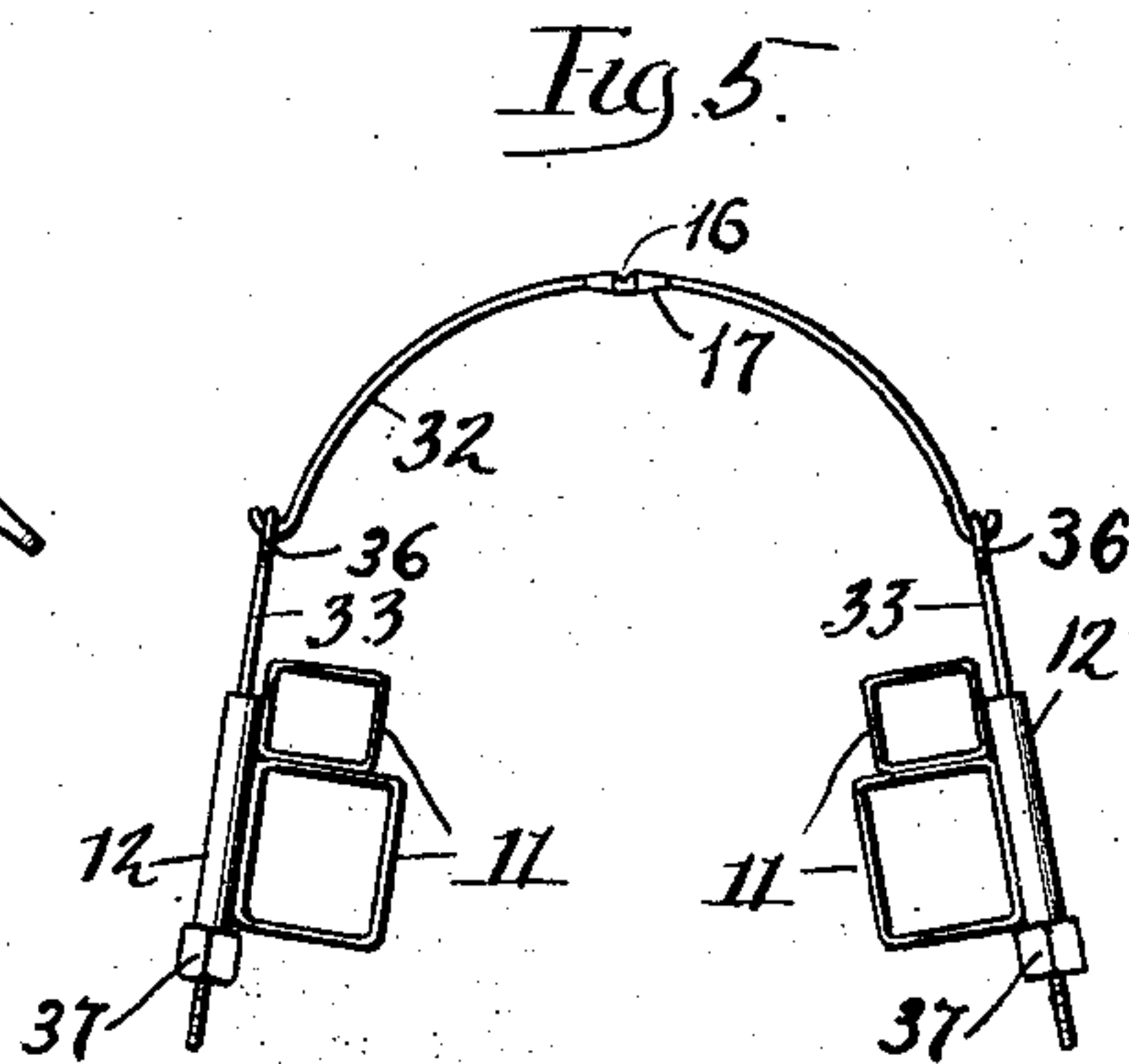
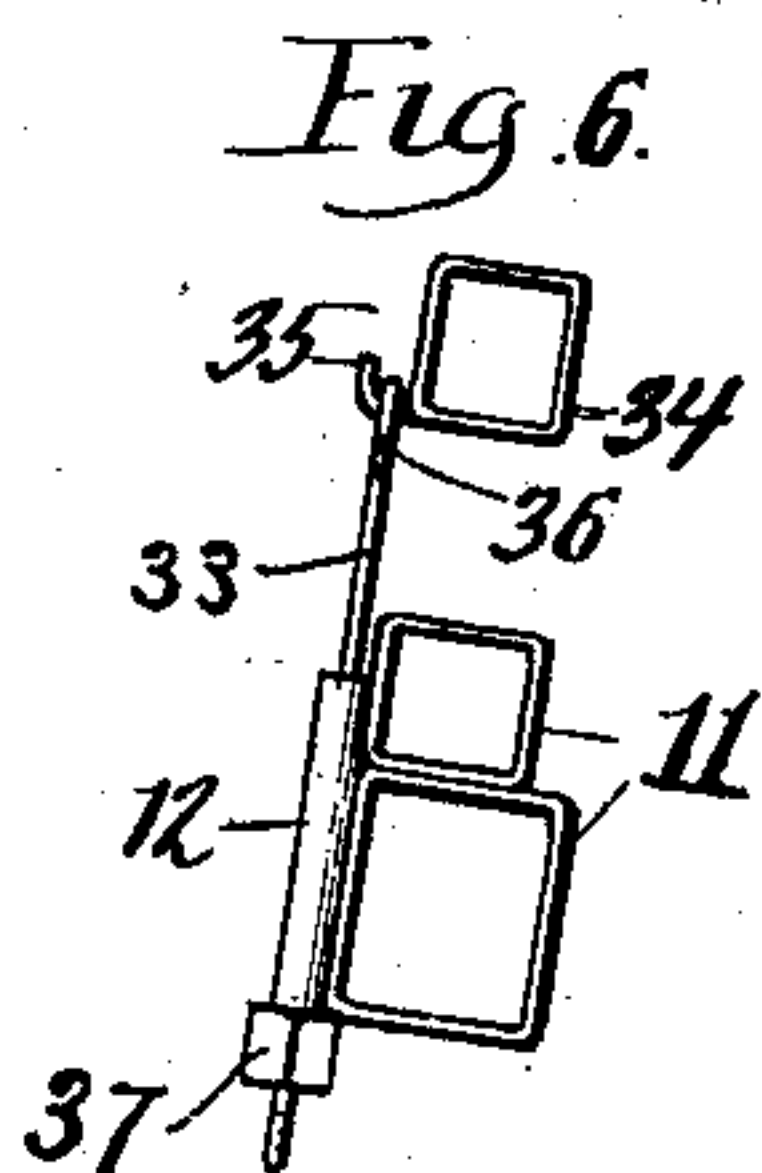


J. N. MACDOWELL.  
TOOTH REGULATING APPARATUS.  
APPLICATION FILED MAR. 14, 1903.

NO MODEL.



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# UNITED STATES PATENT OFFICE.

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## TOOTH-REGULATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 741,687, dated October 20, 1903.

Application filed March 14, 1903. Serial No. 147,782. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES N. MACDOWELL, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Tooth-Regulating Apparatus, of which the following is declared to be a full, clear, and exact description.

The invention relates to teeth-regulating devices used for correcting excessive protrusion of the front teeth and cuspids. Such devices usually comprise a head-gear and traction-bar connected thereto by suitable traction-straps.

One object of the present invention is to provide a head-gear of open-work construction which will not unduly heat the scalp, as do the tightly-fitting skull-caps previously employed.

As these devices are usually worn at night, a further object of the present invention is to provide a construction which will snugly fit about the patient's head and may be comfortably worn by the patient when in bed and to avoid the use of projecting metal parts upon the head-gear or traction-bar which press into the patient's face and head and prevent restful sleep.

A further object of the invention is to provide a construction of head-gear which will uniformly distribute the strain over the upper part of the patient's neck and the back and top of his head without pulling upon the wearer's hair, thus avoiding defects found in the prior constructions, in which the strain is localized, so that they tend to pull the wearer's hair, adding to his discomfort, and, indeed, if worn for any length of time tend to produce bald spots.

A further object of the invention is to provide means by which traction-straps may be easily and quickly adjusted without requiring that they should be tied or changed.

A further object of the invention is to provide improved connections between the traction-bar and head-gear and between the traction-bar and arch-bar, so that the parts will be yieldingly locked together, but will be self-adjusting and prevent shocks upon the teeth and discomfort to the wearer.

A still further object of the invention is to provide an improved form of short arch-bar

which may be used in special instances with traction-screws.

With these objects in view the invention consists in the features of construction and arrangements and combinations of parts set forth in the following description, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of the improved head-gear and traction-bar. Fig. 2 is a plan view of the traction-bar, arch-bar, and connections. Fig. 3 is a detail section, on an enlarged scale, on line 3 3 of Fig. 4. Fig. 4 is a detail section on line 4 4 of Fig. 3. Fig. 5 is a plan view of the traction-bar, the special short arch-bar, and the traction-screws. Fig. 6 is a plan view of the traction-screw and connections as used before the head-gear and traction-bar are applied.

The apparatus is usually employed for correcting a dental arch which is too narrow and in which the front teeth unduly protrude.

The wire arch-bar 10, of which several different sizes are usually provided, is adapted to press upon one or more of the teeth, in accordance with the irregularity to be corrected. Metal bands 11 are adapted to be clamped or cemented to the back teeth and preferably to the first molar and to the second bicuspid. Tubular members 12, through which the rear ends of the arch-bar 10 extend, are soldered or otherwise suitably secured to the clamp-bands 11, and traction-nuts 13 are adjustably threaded upon the ends of the arch-bar into engagement with the tubular members 12. Bands 14, adapted to be clamped, cemented, or otherwise secured to the front or other teeth to be regulated, are provided with notched projections 15, adapted to engage the arch-bar 10. Other means may be provided for connecting the bands 14 and the arch-bar 10 without departure from the essentials of the invention.

The arch-bar 10 is provided midway between its ends with a groove 16, approximately V-shaped in section and preferably formed in an enlarged central portion 17. The curved or bent traction-bar 18, which extends outside of the patient's mouth, is provided midway between its ends with a laterally-extending lug 19, having forked-like ex-



tensions 20, adapted to engage the groove 16 of the arch-bar 10. The ends of the forked-like extensions 20 extend inwardly to a slight extent toward each other (see Fig. 3) and are spaced apart a distance somewhat less than the smallest diameter of the groove 16. By this means as the forked-like extensions are pressed over the arch-bar 10 and into the groove 16 the traction-bar and arch-bar are yieldingly locked together and are not easily displaced. The lug 19 is provided between the forked-like extensions 20 with a V-shaped bearing edge 21, the angle of which is somewhat less than that of the V-shaped groove 16, within which the bearing edge 21 rests. By this arrangement the traction-bar is free to rock or oscillate on the arch-bar when the patient's head is pressed upon a pillow or when the bar is otherwise displaced without transmitting a shock to the teeth to which the arch-bar is secured. The sides of the groove 16 at the rear are cut away, as shown in Fig. 4, so that the engagement of the forked-like extensions 20 with the sides of the groove may not interfere with this rocking movement of the traction-bar.

The head-gear comprises curved stiff side pieces 22, which are preferably formed of flat layers of felt or other soft material stitched together with the stiffening metal insert 23. The bent side strips are adapted to fit against the sides of the patient's head and extend from the neck upwardly behind the ears and thence forwardly toward the forehead. The metal stiffening-strip is preferably formed of a flattened annealed brass wire, so that the side strips 22 may be bent or adjusted to closely fit the sides of the patient's head. The side strips, while sufficiently stiff to hold the flexible portions of the head-gear in place, are thus adjustable to snugly conform to the contour of the patient's head. The side strips 22 are connected by flat flexible, preferably elastic, cross-bands 24, which extend between and intermediate the ends of such strips, and the cross-bands are connected and held in place by flexible, preferably elastic, longitudinal bands 25. A traction-strap 26, preferably formed of flat elastic webbing, is connected at its opposite ends to one of the side strips 22 of the head-gear, preferably by means of hooks 27, which engage eyes 28, attached to the side strips 22 near its ends. A similar traction-strap is connected to the other side strip of the head-gear. The eyes 28 are preferably secured, as indicated, to the metal stiffening-strip 23 and project outside of the felt covering. The ends of the traction-straps 26 preferably extend through loops formed in the hooks 27 and are attached to adjusting-clasps 29, which engage the body of the straps. Loops 30 slide freely upon each of the traction-straps 26 and are provided with hooks 31, adapted to engage openings in the flattened ends of the traction-bar 18. The head-gear thus constructed fits the head snugly, may be worn without dis-

comfort, will not heat the scalp, and evenly distributes the strain. When the apparatus is in position for use, the hooks 27 extend in line with the loops 28 and the hooks 31 extend in line with the traction-bar 18, and the backwardly-bent ends of these hooks are of such length that in normal operative position the parts connected thereby are in effect locked together and cannot be accidentally displaced. The loops 30 freely slide upon the traction-straps 26, so that the connection between the latter and the traction-bar 18 is self-adjusting. By adjusting the position of the clasps 29 the tension of the traction-straps may be conveniently regulated. One or more additional eyes 28 may be provided, as shown, upon the side pieces 22 of the head-gear, so that the direction of the pull of the straps upon the bar 18 may be changed, if desired. The flat stiff side strips formed of layers of felt having a stiffening metal insert of annealed wire and the flat cross connections fit snugly against the sides, back, and top of the patient's head and may be worn with comfort and without danger of displacement when the patient is in bed. The curved side strips extend from the patient's head upwardly behind the ears and then forwardly toward the forehead, so the flexible cross connections between the side strips uniformly distribute the strain and will not pull the hair. The open construction of the head-gear will not unduly heat the scalp or prevent the circulation of the blood therethrough. The traction-bar is curved to conform closely with the features and is provided with flattened ends connected by small hooks to the traction-straps, so that the use of large projecting curved hooks upon the traction-bar which press into the patient's face when he is in bed and disturb his sleep are avoided. Moreover, the traction-straps themselves are formed of broad felt strips of elastic webbing, so that they will not press into the wearer's face.

As well understood in the art, in many older cases where the dental arch is too narrow it is necessary to provide room in the arch before applying pressure to the front protruding teeth. For this purpose traction-screws are employed, and in connection therewith is provided a special arch-bar 32 of a construction similar to the bar 10, except that it is considerably shorter and except that instead of having threaded ends its ends are hook-shaped to engage eyes in the ends of the traction-screws. In operation the traction-screws 33 are passed through the tubular members 12, which, as previously described, are anchored to the back teeth by the clamp-bands 11. A band 34 is cemented, clamped, or otherwise fixed, usually to one of the cuspids, and is provided with a hooked extension 35, engaging the eye 36 upon the forward end of the traction-screw. (See Fig. 6.) A nut 37 is threaded upon the rear end of the traction-screw 33 and against the tubular member 12, and by periodically adjusting this nut the



tooth to which the band 34 is attached may be drawn backwardly to provide room for the contraction of the interior part of the dental arch. Usually before the operation the first bicuspid intermediate the bands 34 and 11 is extracted. After this preliminary adjustment has been effected it is not necessary with the present improved short arch-bar 32 to remove the traction-screws; but the hooked ends of this special arch-bar are engaged with the eyes 36 upon the forward ends of the traction-screws and the pressure is applied to the front teeth by means of the traction-bar and head-gear. During the operation of the apparatus, as well understood, the continued pressure exerted by the head-gear and traction-straps to the traction-bar and transmitted thereby to the arch-bar and to the front unduly-projecting teeth will serve to expand the mid-portion of an abnormally-narrow dental arch and push back the front teeth.

It is obvious that numerous changes may be made in the details of the construction without departure from the essentials of the invention.

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

1. A head-gear for the purpose described comprising separate, stiff strips adapted to fit against the sides of the head, flexible cross connections between said side strips, a traction member and traction-straps connected to said traction member and said side strips.

2. A head-gear for the purpose described comprising separate, curved, stiff strips adapted to fit against the sides of the head, elastic cross-bands between said side strips, a traction member and elastic traction-straps connected to said traction member and said side strips.

3. A head-gear for the purpose described comprising separate strips adapted to fit against the sides of the head, said strips being formed of pieces of cloth or the like and a stiffening metal insert, flexible cross connections between said side strips and traction-straps connected to said side strips.

4. A head-gear for the purpose described comprising separate, curved side strips adapted to fit against the sides of the head, said side strips being formed of cloth having a stiffening insert of suitable metal, elastic cross-bands connecting said side strips, elastic lengthwise bands connecting said cross-bands and traction-straps connected to said side strips.

5. The combination with a head-gear comprising separate, adjustable stiff strips adapted to fit against the sides of the head and flexible cross connections between said side strips, of a traction member and traction-straps extending between the ends of said member and said side strips.

6. The combination with a head-gear, of a traction member, traction-straps extending

between said head-gear and said traction member, locking hook-and-eye connections between said traction member and said straps and locking hook-and-eye connections between said straps and said head-gear.

7. The combination with a head-gear, of separate traction-straps, each of said traction-straps being connected at each end to one side of said head-gear, a supporting-loop sliding freely on each of said traction-straps and a traction member supported by and between said loops.

8. The combination with a head-gear, of separate traction-straps, each of said traction-straps being connected at each end to one side of said head-gear, a supporting-loop sliding freely on each of said traction-straps, a traction member and hook-and-eye connections between the ends of said traction member and said loops.

9. The combination with a head-gear, of a traction member, traction-straps extending between the ends of said traction member and the sides of said head-gear and adjusting-clasps connected to said traction-straps whereby the tension of said straps may be varied.

10. The combination with a head-gear, of separate traction-straps, each of said straps being connected at each end to one side of said head-gear, a loop freely sliding on each of said traction-straps, a traction member supported between said loops and means for adjusting the length of said traction-straps.

11. The combination with a head-gear, of separate traction-straps for each side of said head-gear, hook-and-eye connections between each end of said traction-straps and said head-gear, a loop freely sliding on each of said traction-straps, a traction member, hook-and-eye connections between the ends of said traction member and said loops and means for adjusting the length of said traction-straps.

12. The combination with a head-gear comprising separate, stiff strips adapted to fit against the sides of the head and flexible cross connections between said side strips, of separate traction-straps, each of said straps being connected at each end to one of said side strips, a loop freely sliding on each of said traction-straps and a traction member supported between said loops.

13. The combination with a head-gear comprising separate, curved, stiff strips adapted to fit against the sides of the head and elastic cross connections between said strips, of separate flexible traction-straps, each of said straps having hook-and-eye connections with one of said side strips, a loop freely sliding on each of said traction-straps, a traction member and hook-and-eye connections between the ends of said traction member and said loops.

14. The combination with a head-gear, traction-bar and arch-bar, of a lug rigidly secured to one of said bars having fork-like exten-



sions, the ends of said extensions extending inwardly toward each other and a groove in the other of said bars within which said fork-like extensions are fitted to yieldingly lock  
5 said bars together.

15. The combination with a head-gear, traction-bar and arch-bar, of a lug on one of said bars having fork-like extensions and a V-shaped bearing extending between the base  
10 portions of said fork-like extensions and in the same plane therewith, and a transverse V-shaped groove in the other of said bars arranged to be engaged by said fork-like extensions and said V-shaped bearing, said V-  
15 shaped bearing and groove and said fork-like extensions forming a pivotal joint between said bars whereon said traction-bar may rock relatively to said arch-bar.

16. The combination with the head-gear  
20 and traction-bar, of tooth-bands, traction-screws adjustably connected at their rear ends to said tooth-bands, a short arch-bar separate from said traction-screws and detachably engaging the forward ends thereof

and means on said traction-bar for engaging  
25 said short arch-bar.

17. The combination with the head-gear and traction-bar, of tooth-bands, tubular members secured to said bands, traction-  
30 screws extending through said tubular members, nuts adjustably threaded upon the rear ends of said traction-screws engaging said tubular members, a short arch-bar, hook-and-eye connections between the forward ends of said traction-screws and said arch-bar and  
35 means on said traction-bar for engaging said arch-bar.

18. The combination with the head-gear, traction-bar and arch-bar, of traction-straps connected to the sides of said head-gear and  
40 hooks upon the end of said traction-straps engaging openings in the end of said traction-bar.

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Witnesses:

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