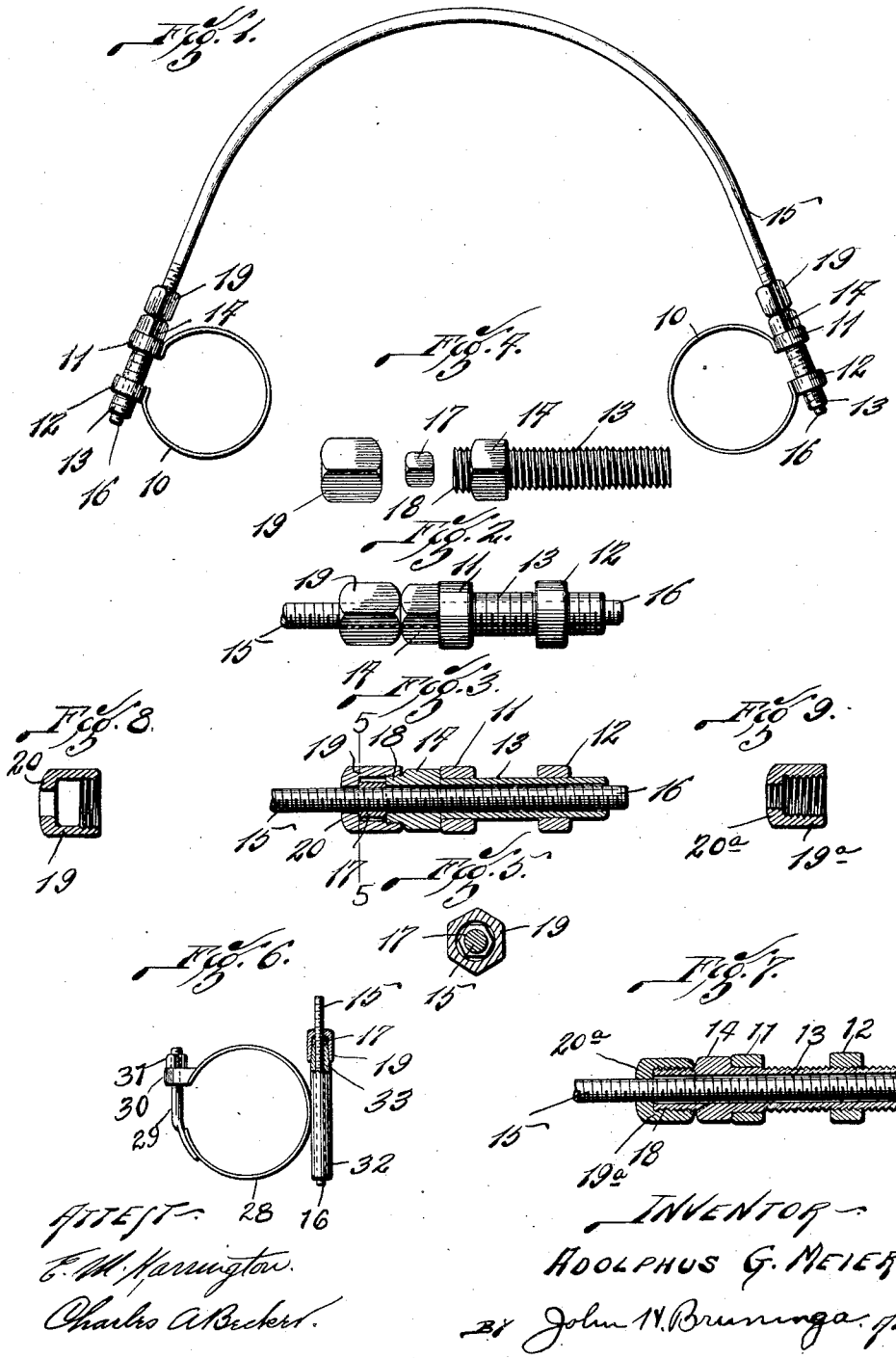
A. G. MEIER.

TOOTH STRAIGHTENING APPLIANCE.

APPLICATION FILED JULY 1, 1914.

1,114,624. Patented Oct. 20, 1914.



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UNITED STATES PATENT OFFICE.

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TOOTH-STRAIGHTENING APPLIANCE.

1,114,624. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed July 1, 1914. Serial No. 848,367.

To all whom it may concern:

Be it known that I, ADOLPHUS G. MEIER, a citizen of the United States, and residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Tooth-Straightening Appliances, of which the following is a specification.

This invention relates to tooth straightening or regulating appliances.

A tooth straightening appliance comprises one or more anchor bands, and, in the present practice, an arch having the ends thereof resting in anchor tubes on the anchor bands, and provided with nuts arranged to abut against the anchor tubes, these nuts being placed in front of or in back of the anchor tubes when it is desired to use the arch as an expansion arch or a retracting arch respectively. There is necessarily a small amount of play between the arch and the anchor tube, and it is, therefore, difficult to obtain an accurate direct outward pull, as the arch will be unsteady. Where the arch is used as an expansion arch, which is generally the case, it often happens that the patient will cut or remove the ligatures and then remove the arch. Now, in view of the fact that teeth will rapidly return to original positions when the appliance is removed, such removal of the appliance may affect and prolong the operation.

The objects of this invention, therefore, are, to construct a regulating appliance which will obviate the objectionable features of appliances as now constructed, which will firmly support the arch or other appliance element with great rigidity, and which will permit a universal operation and adjustment of the appliance.

Further objects will appear from the detail description taken in connection with the accompanying drawing, in which:

Figure 1 is a view of an appliance embodying this invention, Fig. 2 is an enlarged detail side elevation, Fig. 3 is an enlarged detail longitudinal section, Fig. 4 is a view showing the anchor tube, the arch nut, and the clamping nut, Fig. 5 is a section on the line 5—5, Fig. 3, Fig. 6 is a detail showing another form of appliance, embodying this invention, Fig. 7 is a section similar to Fig. 3, but showing still another embodiment of this invention, Fig. 8 is a section of the clamping nut of Fig. 1, and, Fig. 9 is a section of the clamping nut of Fig. 7.

Referring to the accompanying drawing, and more particularly, to Figs. 1 to 5 inclusive, which illustrate the invention applied to a Lukens appliance, 10 designates an anchor band provided with a smooth eyelet 11 and a threaded eyelet 12, through which extends a hollow clamping bolt 13 having an angular head 14. In the Lukens anchor band, the clamping bolt is formed hollow to provide an anchor tube for the arch 15, the threaded ends 16 of which extend into the clamping bolt and are provided with nuts 17. This Lukens appliance is fully described in United States Patent Serial No. 660,194.

In accordance with this invention, the forward or mesial end of the anchor tube, which forms, in this particular embodiment, the clamping bolt, is provided with a short threaded projection 18 which may be of the same diameter as the threaded part of the anchor tube. The arch nut 17 is made hexagonal in form and so that its largest diameter will be substantially the diameter at the base of the threads on the mesial projection 18. A clamping nut 19 threaded on the inside is arranged to slip over the arch nut 17, and is provided with an inwardly projecting flange 20 adapted to bear against the arch nut 17 and having a smooth bore so as to slip over the arch. The nut 19 is angular, in this case hexagonal, so as to present an angular outside surface adapted to be engaged by a wrench. It will be noted that the largest diameter of this clamping nut is about the same as the head 14 on the clamping bolt 13. When the clamping nut 19 is screwed on the mesial projection 18 so as to firmly clamp the arch nut 17 against the end of the clamping bolt and anchor tube 13, this clamping nut 19 will firmly hold the arch in position in the anchor tube.

Fig. 6 shows the invention applied to an Angle anchor band. This band 28 is provided with a bolt 29 attached to one end of the band and passing loosely through a sleeve 30 on the other end of the band, this bolt being threaded to receive a nut 31. The anchor tube 32 has its forward or mesial end

33 threaded to receive the clamping nut 19, which is of the same form as shown in Figs. 1 to 5 inclusive. In this construction, also, the angular clamping nut clamps the arch nut 17 to the mesial end of the anchor tube and firmly clamps the arch in position in the anchor tube.

After the arch or like appliance element is placed in the anchor tubes of the anchor bands (the clamping nuts 19, being at this time slipped back over the arch) and after the arch is adjusted to the desired position by the arch nut 17 bearing against the mesial ends of the anchor tubes, these clamping nuts are screwed on the mesial projections 18, so as to firmly clamp the nuts 17 threaded on the arch and, therefore, making a firm connection therewith, to the anchor tubes. This will firmly hold the arch in position on the anchor bands so that this arch is held from movement in either direction axially, as well as against lateral movement. The arch is, therefore, held rigidly in a predetermined position so that all play is eliminated and there is no lost motion up or down. The teeth can, therefore, be ligatured to a firm arch so that the pull will be direct, as well as positive, and in a predetermined direction or directions. Where, therefore, the ligatures must engage teeth at different distances from the gum line, the different inclinations of the ligatures will not cause a displacement of the arch in view of its firm support. It will be noted that the arch is held firmly against axial movement in either direction. It is, therefore, possible to utilize this arch either as an expansion or as a retracting arch without changing the positions of the arch nuts from one side of the anchor tube to the other side thereof. It is, therefore, possible to retract protruding incisors, or forwardly or distally projecting cuspids and bicuspids, without placing the arch nuts at the rear ends of the anchor tubes. It will be understood that this is accomplished by rubber wedges, in case of the incisors, and by ligaturing, in the case of the cuspids and bicuspids. It will, therefore, be seen that, in this construction, the arch is firmly gripped and held against all movement, so that any stress can be placed on the arch. The arch can, therefore, be used to greater advantage in all places where the arch was formerly used, and can also displace traction and jack screws in practically all operations. By clamping the arch at the mesial end of the anchor tube, not only is a better and firmer grip obtained on the arch at a point nearest the point or points of application of the force on the teeth to be moved, but, by placing the clamping nut mesially, its adjustment can be made with greater facility when the appliance is in the patient's mouth. Moreover, it will be noted that the clamping nut can be removed or replaced and the arch clamped or unclamped without disturbing the adjustment of the arch with respect to the clamp bands, for it will be noted that adjustment or removal of the clamping nut does not in any way disturb the arch nut which abuts against the anchor tube and, therefore, positions and locates the arch with respect to the anchor tube. Since the clamping bolt entirely incloses the arch nut and, since there are no open spaces formed in the interior liable to collect solid or liquid food, the appliance is entirely sanitary. In view of the fact that the arch is firmly held in position, the removal of the ligatures will not release the arch, so that the arch cannot be removed by the patient by simply cutting the ligatures. A young patient will not, of course, ordinarily be able to loosen the clamping nuts 20.

Referring now to Fig. 7, which shows another embodiment of this invention, the flange 20^a of the clamping nut 19^a is, in this case, threaded internally to engage the threads in the arch. The arch may, therefore, be locked to the anchor tube without the use of the arch nut 17. This appliance can be used in certain cases where frequent adjustment of the arch with respect to the anchor bands is not necessary. The construction utilizing the arch nuts is, however, preferable, in view of the greater facility of adjustment. It will be understood that the construction shown in Fig. 7 may be applied to anchor bands of other types, such as the Angle type.

While the receptacles 13 and 32 have been described as anchor tubes, and while the arch has been described and shown as the appliance element adapted to exert pressure on the tooth to be moved, it is obvious that the anchor band may be used with other appliance elements, such as, traction screws, etc., which are adapted to be placed in and received by the anchor tube. It is to be understood, therefore, that the terms "arch" and "anchor tube" are to be construed accordingly. It is further obvious that various changes may be made in details of construction without departing from the spirit of this invention, and it is, therefore, to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention, what is claimed is:

1. A tooth straightening appliance comprising an anchor band having an anchor tube, an arch in said anchor tube, a nut on said arch, and means engaging said nut and said anchor tube adapted to lock the arch to said anchor tube.

2. A tooth straightening appliance comprising an anchor band having an anchor tube, an arch in said anchor tube, an arch

nut on said arch, and a clamping nut threaded on the mesial end of said anchor tube and adapted to clamp said arch nut thereto.

3. A tooth straightening appliance comprising an anchor band having an anchor tube, an arch in said anchor tube, an arch nut on said arch adapted to bear against the end of said anchor tube, and a clamping nut passing over said arch nut and threaded on the end of said anchor tube adapted to clamp said arch nut thereto.

4. An anchor band for tooth straightening appliances having an anchor tube, and a nut threaded on said anchor tube adapted to lock an arch nut thereto.

5. An anchor band for tooth straightening appliances having a hollow clamping bolt constructed to form an anchor tube, and means on said bolt adapted to lock an arch nut thereto.

6. An anchor band for tooth straightening appliances having a hollow clamping bolt constructed to form an anchor tube, and a nut threaded on the mesial end of said bolt adapted to clamp an arch nut thereto.

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

ADOLPHUS G. MEIER.

Witnesses:
J. H. BRUNNINGA,
A. B. CREMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."