

Nov. 11, 1941.

J. A. LINDE

2,262,108

ORTHODONTIC APPLIANCE LOCK

Filed Sept. 20, 1938

2 Sheets-Sheet 1

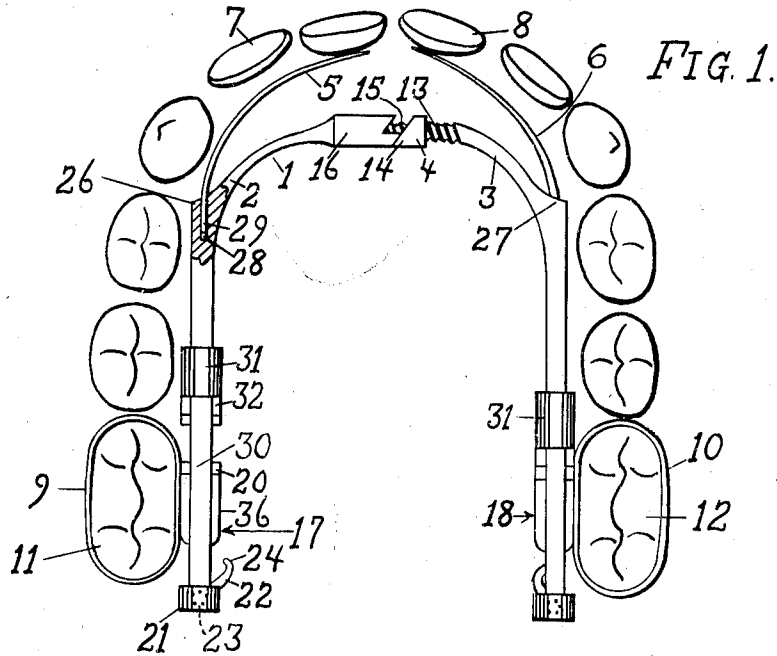


FIG. 6

FIG. 2.

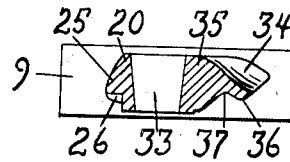
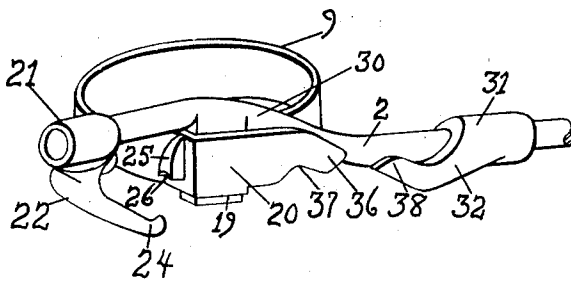


FIG. 4

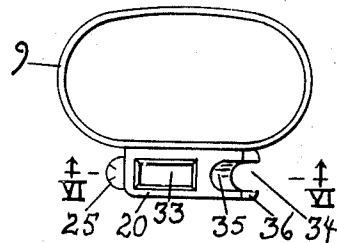
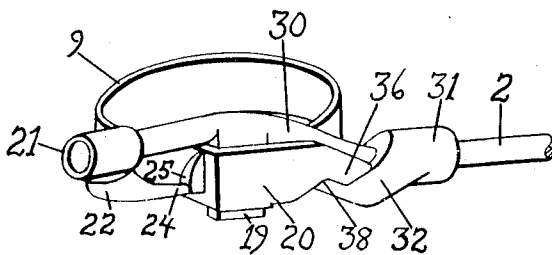


FIG. 3

INVENTOR:
BY *John A. Linde*
C. F. Wm. Fousberg
ATTORNEY

Nov. 11, 1941.

J. A. LINDE

2,262,108

ORTHODONTIC APPLIANCE LOCK

Filed Sept. 20, 1938

2 Sheets-Sheet 2

FIG. 7.

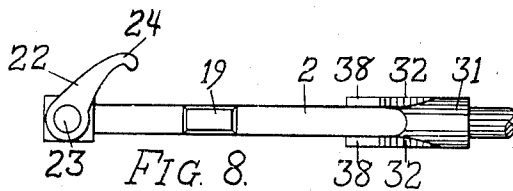
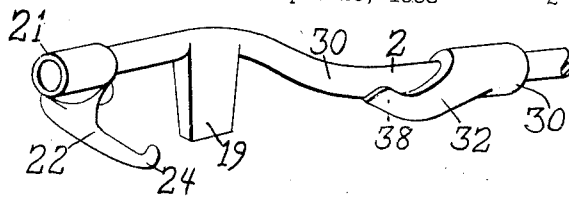


FIG. 8.

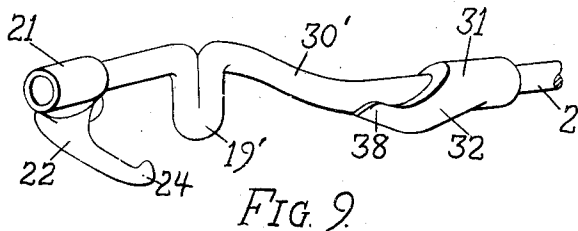


FIG. 9.

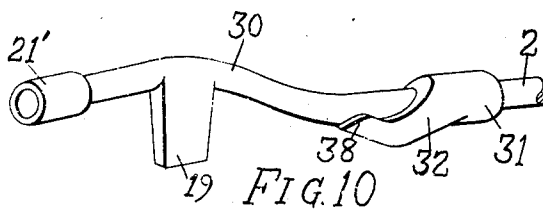


FIG. 10.

FIG. 5

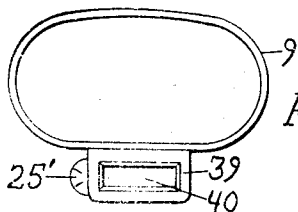
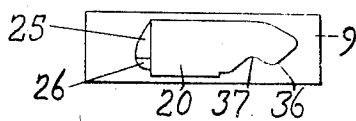


FIG. 15

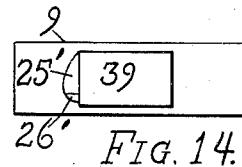


FIG. 14.

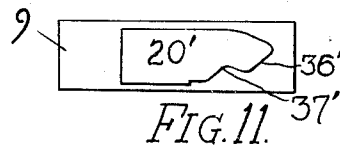


FIG. 11.

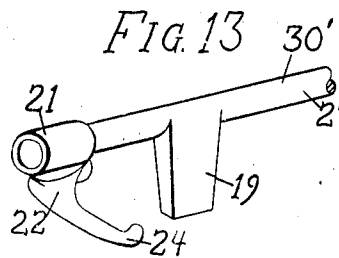
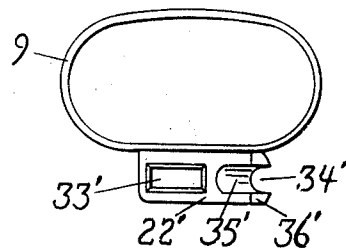


FIG. 13

FIG. 12.



INVENTOR:
John A. Linde
BY
C. F. Wm. Forssberg
ATTORNEY.

UNITED STATES PATENT OFFICE

2,262,108

ORTHODONTIC APPLIANCE LOCK

John A. Linde, New York, N. Y.

Application September 20, 1938, Serial No. 230,755

5 Claims. (Cl. 32-14)

This invention relates to an orthodontic locking device for securely locking an arch wire to an anchoring band when the latter is fixed upon a tooth, and particularly to that type wherein a portion or projection upon the arch wire or a member mounted upon or attached thereto is adapted to cooperate with portions of a hollow projection or pocket upon the anchoring band.

The main object of my invention is to provide a locking device of the character indicated which is capable of being easily placed in position or released an indefinite number of times without danger of breakage of any part used for locking or loss of accuracy in adjustment.

Another object is to produce a locking device which includes a group of combined locking means of the indicated type, wherein a reinforced locking is obtained.

Yet another object is to produce such a locking device which does not require special tools or difficult manipulations for locking or releasing the same.

A further object is to produce locking means of the indicated type wherein novel means are included and utilized for securing the lock rigidly in assembled relation with the anchoring band which is, nevertheless, released quite readily despite the rigidity of the assemblage when in locked relation.

It is also an object to have an orthodontic locking device which is moderate in cost yet durable and convenient and certain in operation.

Other objects and the various advantages accruing from the nature and construction of my invention will appear more fully in detail as this specification proceeds.

In the accompanying drawings forming part hereof:

Fig. 1 is a plan view of an orthodontic appliance or arch wire connected to a pair of anchor bands by means of locking devices made according to the present invention and embodying the salient features of the same in practical form.

Fig. 2 is a perspective view of one of the combined locking devices with associated portions of the arch wire and anchoring band, wherein a slidable latch and locking hook of the locking device are withdrawn and shifted to released positions preparatory to disassembling the locking device.

Fig. 3 is a similar view with the latch and hook of the locking device locked in assembled positions upon the device.

Fig. 4 illustrates one part of the locking device which is attached to the anchor band.

Fig. 5 is another view or side elevation of the same.

Fig. 6 is a longitudinal section of the same portion of the locking device on line VI—VI in Fig. 4, with the near side removed to reveal the interior shape.

Fig. 7 is a perspective view of the complementary portions of the combined locking device mounted on a portion of the arch wire and corresponding to and cooperating with the portions shown in Figs. 4, 5 and 6.

Fig. 8 is another view of the same as seen from below.

Fig. 9 illustrates a modification of the same.

Fig. 10 is another modification in which the locking hook is omitted.

Fig. 11 is a side elevation of the complementary portion of the locking device mounted on an anchor band and corresponding to and cooperating with the locking portions shown in Fig. 10.

Fig. 12 is a top plan view of the parts shown in Fig. 11.

Fig. 13 is another modification of the arch wire and locking device portions shown in Figs. 7 and 8, in which the arch wire is practically straight and the slidable latch is omitted.

Fig. 14 is a side elevation of the complementary portion of the locking device secured to an anchor band and corresponding to and cooperating with the locking portions shown in Fig. 13.

Finally, Fig. 15 is a top plan view of the parts shown in Fig. 14.

Throughout the views the same reference numerals indicate the same or corresponding parts.

In the practice of orthodontia it has always been a problem to properly secure in reliable manner, an arch wire or a portion attached, thereby connecting the same to an anchor band which is secured to an anchoring tooth such as a molar, because it has frequently broken loose when an attempt has been made to remove the arch wire for adjustment, renewal, or repairs. Part of the problem has been to make locking means entirely secure each time the arch wire has been assembled with the anchoring band because of several factors. One of the difficulties arising is that usually a part upon the locking device has necessarily been bent into locking position when the device has been assembled and when the whole should be released the same part was bent out of its locking relationship with respect to the assemblage. It is thus evident that if the appliance as a whole were inserted in the mouth of a patient and set in place, and also removed a number of times in order to take up by adjust-

ment the changes which had occurred in the position of the teeth, such part which was frequently bent back and forth would obviously break off and immediately put the entire appliance out of commission.

In order therefore to avoid breakage of any latching means used upon a locking device for the present purpose, and with the foregoing objects in view, it is now proposed by the present invention to introduce a combined locking device having a hooked portion and a slidable latch portion as well as a hinged latch which make it readily possible to fix the device and remove the same an indefinite number of times without serious wear or any danger of breakage due to bending of any part.

Hence, in the practice of my invention, an orthodontic arch wire generally indicated at 1, and consisting of a pair of wire members 2 and 3, adjustable, for example, by means of a nut 4 so as to spread the members apart, may be provided with a pair of springs 5 and 6 adapted to maintain a predetermined amount of pressure against the lingual sides of the front teeth 7 and 8, while being anchored by means of a pair of anchor bands 9 and 10 secured upon molars 11 and 12 respectively. Obviously if the two arch members 2 and 3 are caused to expand or be adjusted apart by turning the nut 4 upon thread 13 the beveled corner 14 of the same will readily engage in any one of several notches 15 in the sleeve 16 secured on member 2 and prevent return of the nut and will cause the springs 5 and 6 to exert an increased pressure against the front teeth which were intended to be shifted.

However, the foregoing features are well known in the art and form no effective part of the invention at bar which rather involves the combination of the securing and locking means for effectively connecting the arch members 2 and 3 to the anchoring bands 9 and 10 in a detachable manner. The locking means of arch member 2 generally indicated at 17 are shown partly open, while the locking means generally indicated at 18 pertaining to arch member 3 are shown closed or locked and fully secured. Arch member 2 is primarily provided with a rigid pendent portion or tongue 19 which is adapted to extend into a hollow socket member or pocket 20, soldered, welded or brazed to anchor band 9 or actually integral therewith, the tongue 19 being disposed within the extremity of the arch wire member. Upon the extreme end of the mentioned arch wire is preferably mounted a terminal member 21 to which a locking hook 22 is pivoted by means of a rivet 23 or the like, so as to be capable of swinging with its rear hooked portion 24 toward detent 25; having a concave seat 26 into which the hooked portion 24 is adapted to seat. The detent 25 may be integral with the socket 20 of the anchor band 9 or may be soldered or brazed to said anchor band.

The main portions of the wire members 2 and 3 are provided at 26 and 27 respectively, with recesses or sockets 28 for receiving the inner ends 29 of the mentioned tapering springs 5 and 6 which resiliently engage against the teeth 7 and 8. Near the rear end of these wire members, which primarily make up the appliance, each arch wire is bent as at 30, while a slidable lock member 31 is mounted further in upon each wire and provided with a pair of lower latch portions 32 having a purpose which will immediately be disclosed.

If we again particularly note the socket mem-

ber 20, it is evident in Figs. 4 and 6, for example, that this member is formed with a substantially vertical hole or opening 33 which merges with an open inclined channel 34, while an upward projection in the highest portion of the bottom of this channel at 35 serves as a threshold between the channel and the hole proper.

When it is desired to assemble the arch wire 2, for example, with lock 17 it is but necessary to insert the lower end of the depending tongue 19 of said wire down through the aperture 33 in the socket member 20, until portion 30 of the wire 2 strikes the bottom of the slot or channel 34, when projection 35 will extend up into the curve of the bent portion 30 and assist in locating the arch wire rigidly in the socket member. The lower portion of the socket member is provided at the end opposite to that bearing detent 25 with a rounded or shaped locking portion 36, and within this portion with a cutout seat 37. If the slidable latch member 31 is slid toward the socket member 20 the latch portions 32 will engage against the shaped portion 36 of the locked member, and if sufficient force is applied the latch portions 32 will tend resiliently to bend slightly downward and the wire 2 also to slightly bend if it is sufficiently light, so as to allow the extreme end 38 on the latch portion to snap into place in the seat 37 within shaped portion 36.

Preferably, the hole or aperture 33 in the socket member is tapered, although this is not essential. However, simultaneously with the locking operation just described, the hook 22 is swung into locking engagement with detent 25, so that the hooked end 24 is seated in the concavity 26 by forcing the hook slightly with the fingers so that said hooked end passes the lower near edge of the detent, whereupon the hook will snap past the same into locked position.

Naturally, the end portion of the arch wire extending from tongue 19 as well as the hook 22 are slightly resilient so that the hook end portion of the said arch wire are temporarily bent apart very slightly in order to allow said hooked end 24 to become engaged in the seat 24 according to the procedure just described. The arch wire as well as the tongue and the hooked end, also the socket 20 and the detent may be made of any practical metal or alloy which will prove durable and strong and is preferably some noble metal such as platinum, irridium or iron alloys such as stainless steel or even some alloy of silver or gold which will not rust or be subject to corrosion in the mouth. Of course, any metal or alloy which can be used or is at present used in dental and orthodontic appliances etc., may be used. Especially the rivet 21 requires to be made of good material which is quite rigid and durable, preferably stainless steel or an alloy of iron with vanadium, magnesium, tungsten or any other metal which will serve to fortify the alloy against corrosion and may even be a stainless steel.

In the assembled locked condition of the parts, the arch wire is hooked fore and aft securely in the socket member 20, and by this means to the anchor band 9, and cannot be removed from the anchor band without releasing the hook 22 and latch 31 from the socket member. When it is desired to release the parts it is but necessary to force the slidable latch member 31 away from socket lock member 20 by means of a simple wedge tool, when the end 38 of the latch will be forced over the shaped end 36 of said socket member out of seat 37 and also pull open the hook 22, when it will be possible to lift the

tongue 19 of the arch wire up out of engagement with the aperture 33 and part 30 of the wire out of the channel 34 in said socket member. The mentioned socket member may have a closed bottom so as to form a limited pocket or it may simply form a tubular member as shown without any bottom whatsoever. This feature forms no essential part of the invention per se, and may be variable to suit different conditions.

In the modification shown in Fig. 9, the bent portion 30' of arch wire 2 is not continued to the end directly but is bent down and doubled upon itself at 19' to form the depending portion or tongue. The other parts may be the same as described.

In Fig. 10, the end member 21' is free from any hook, and even this member 21' may be omitted, if desired. This form of the arch lock has a corresponding socket member 20' free from any detent, but provided with locking portion 36' and seat 37' as shown in Fig. 11, with which the parts of slidable latch 31 may cooperate when bent part 30 lies in channel 34' and extends up over threshold 35' while tongue 19 extends down into aperture 33' shown in Fig. 12. Assembling or locking and also releasing occur as already described without reference to a hook or its corresponding detent.

Conversely, in Fig. 13, the arch wire 2' is straight at 30' and has the depending tongue 19 as before, as well as end member 21 and the locking hook 22 pivoted thereto, but no slidable latch is included. This form of the arch lock is adapted to cooperate with the socket member 39 illustrated in Figs. 14 and 15. The tongue 19 fits in aperture 40 in the socket, while the hook 22 cooperates with the concave locking seat 26' in the detent 25', but no channel or locking portions are included upon the other end of the socket member. Assembling and locking, as well as releasing of the parts occur also as described with reference to the locking hook and detent.

Obviously, variations in the structure, relative sizes and forms of the parts may be resorted to, such as pivoting hook 22 directly to a portion of the arch wire 2 rather than to the member 21 by means of rivet 23, and the socket member and latch may be altered in form without departing from the principles herein disclosed.

Other variations may be resorted to within the scope of the invention, and parts and features may be altered or used without others as occasion may require.

Having now fully described my invention, I claim:

1. Combined means for detachably locking an orthodontic appliance arch member to an anchor band adapted to be anchored upon a tooth, including the combination, with a fixed tongue pendent upon said arch member, a corresponding hollow locking member for receiving said tongue secured to said anchor band, of a swingable locking member pivoted upon one portion of said arch member and provided with an end portion adapted to swing into locked engagement with the exterior portion of said hollow locking member, a grooved portion formed with an upwardly open groove upon the hollow locking member, said groove having one end directed toward one portion of the opening in said hollow locking member and being adapted to receive a portion of the arch wire when the tongue thereof is inserted into the hollow locking member, and a slidable latch member mounted upon said arch member and adapted in one extreme position to engage

with a portion of said hollow locking member in order to retain said arch member doubly locked in assembled relation with said hollow locking member.

2. Combined means for detachably locking an orthodontic appliance arch member to an anchor band adapted to be anchored upon a tooth, including the combination, with a fixed tongue pendent upon said arch member, a corresponding hollow locking member for receiving said tongue secured to said anchor band, of a swingable locking member pivoted upon one portion of said arch member and provided with an end portion adapted to swing into locked engagement with the exterior portion of said hollow locking member, a grooved portion formed with an upwardly open groove upon the hollow locking member, said groove having one end directed toward the upper portion of the opening in said hollow locking member and being adapted to receive a portion of the arch wire when the tongue thereof is inserted into the hollow locking member, a second detent upon the hollow locking member, and a slidable latch member mounted upon said arch member and adapted in one extreme position to engage with said second detent in order to retain said arch member doubly locked in assembled relation with said hollow locking member.

3. Combined means for detachably locking an orthodontic appliance arch member to an anchor band adapted to be anchored upon a tooth, including the combination, with a fixed tongue pendent upon said arch member, a corresponding hollow locking member for receiving said tongue secured to said anchor band, of a swingable locking member pivoted upon one portion of said arch member and provided with an end portion adapted to swing into locked engagement with the exterior portion of said hollow locking member, a second detent upon the lower portion of the hollow locking member, and a slidable latch member mounted upon said arch member and adapted in one extreme position to engage beneath said hollow locking member with said second detent in order to retain said arch member doubly locked in assembled relation with said hollow locking member.

4. Means for detachably locking an orthodontic appliance arch member to an anchor band adapted to be anchored upon a tooth, including the combination, of a depending tongue secured near one end of said arch member, a locking member having a forwardly extending portion formed with an upwardly open groove along the same connecting with a downwardly extending opening or pocket portion in said locking member, said forwardly extending portion having a cam shaped entrance portion beneath one end thereof and a seat located within said cam shaped entrance portion, said locking member being attached to the anchor band and adapted to receive a portion of said arch member in the grooved forwardly extending portion and the depending tongue in said opening or pocket portion, and a slidable latch member mounted upon said arch member having a rearwardly extending portion with upwardly facing locking means adapted in one extreme position to engage beneath said forwardly extending portion of said locking member in order to retain said arch member in assembled relation with said locking member, the slidable latch member constituting a projection directed toward the depending tongue of the arch member, and the upwardly facing

locking means including a hooked locking end adapted to pass beneath said cam shaped entrance portion to a locked position in said seat.

5. Means for detachably locking an orthodontic appliance arch member to an anchor band adapted to be anchored upon a tooth, including the combination, of a depending tongue secured near one end of said arch member, a bent portion upon said arch member adjacent to said tongue, a locking member having a forwardly extending portion formed with an upwardly open groove along the same connecting with a downwardly extending opening or pocket portion in said locking member, an upwardly directed projection in the groove upon the forwardly extending portion of said locking member forming a threshold adjacent to the opening or pocket portion upon the latter member, said threshold

serving in the assembled condition of the appliance to extend up into the interior of the bent portion of said arch member in order to assist in locating the arch member and the locking member in mutually fixed positions with respect to each other, said locking member being attached to the anchor band and adapted to receive a portion of said arch member in the grooved forwardly extending portion and the depending tongue in said opening or pocket portion, and a slidable latch member mounted upon said arch member having a rearwardly extending portion with upwardly facing locking means adapted in one extreme position to engage beneath said forwardly extending portion of said locking member in order to retain said arch member in assembled relation with said locking member.

JOHN A. LINDE.