

THE LOOP REGULATING APPLIANCE.*

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IN presenting this paper on what I have termed the *Loop Regulating Appliance*, I am not claiming anything new, but simply giving the description of a regulating appliance which I have been using for several months with a great deal of satisfaction and which I think I will continue to use more and more in my practice in the future. I have used the term *Loop Regulating Appliance* because one of the principal features of this device is the employment of a loop which exerts force by being opened. The appliance is made of some spring material and the loop acts as a spring. By opening or closing the loop one is able to increase or decrease the size of the arch, for the appliance is used in the nature of an arch or alignment wire, thereby eliminating entirely the use of the screw used on standard forms of expansion arches or alignment wires.

The question of the superiority of the screw force over the spring force has long been a question of dispute, and we find some of our leading practitioners advocating the use of the screw force in preference to everything else, and still others who are equally positive in the use of the spring force only. It is my belief that there are indications for both the screw force and the spring force and there are certain conditions in which the screw force is much better than the spring force, and *vice versa*.

Fig. 1 shows a very simple case of malocclusion, which is characterized by the arches being in normal mesio-distal relation—the only malocclusion present at this time is the left upper central which is in lingual occlusion. In treating this case, plain bands were put on the second deciduous molar with the seam made on the mesio-buccal angle of the molar; a perpendicular tube was soldered on the molar band about the region of the buccal groove. These tubes are made from 18-gauge tubes soldered perpendicular with the tooth, which makes stationary anchorage on the molars as far as antero-posterior or bucco-lingual movements are concerned. A piece of 18-gauge non-corrosive wire was selected and a short spur was soldered on the end of the wire to engage the tube on the molar band. The distal end of the horizontal wire was bent around to form the loop shown in Fig. 2, which shows the appliance laying on the model. A locking device similar to this has been described at various times by Young and is known as the *Young Locking Device*, designed for use with the pin and tube appliance. The ease with which this locking device can be made recommends it to me over any other similar form. Fig. 2 shows a side view of the model before treatment, the appliance laying on top of the model. You will observe that there are two loops in the alignment wire which were made with the loop-forming pliers designed by Federspiel. The loops are put in the arch for the purpose of increasing the spring or increasing the length of the lateral half of the alignment wire,

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so as to carry the incisors forward. The incisor now occupies its proper position, and I will show you the finished result of this case at some future time.

Fig. 3 shows another case of malocclusion which we would classify as neutroclusion or Class I, as there is a normal mesio-distal (or antero-posterior) relation of the arches. The left side of the case, illustrated in Fig. 3, shows that there is an impacted lower second premolar which was erupting far to the lingual, as there was not sufficient room between the first premolar

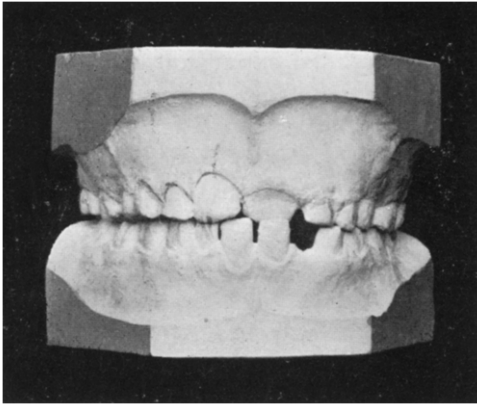


Fig. 1.

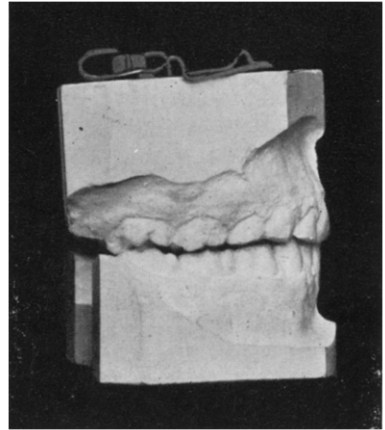


Fig. 2.

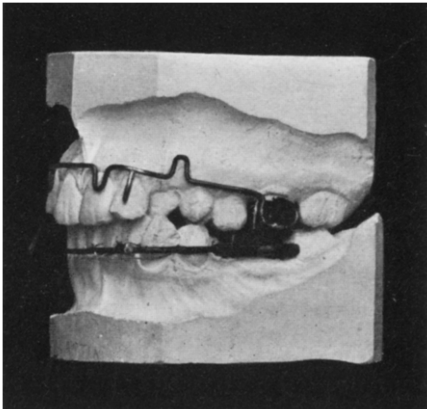


Fig. 3.

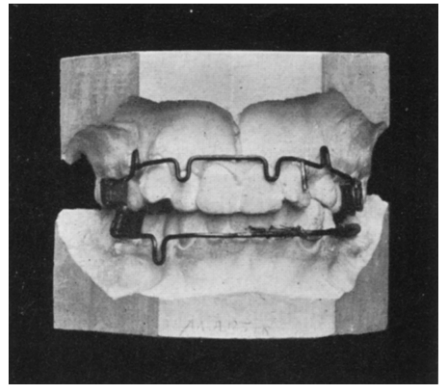


Fig. 4.

and first molar for it to erupt in its proper position. The upper left canine is in lingual occlusion, while the upper left lateral is protruding with the crown to the labial and the apex of the root lingually, which necessitates the moving of the cutting edge of the tooth lingually and the apex of the crown forward. You will observe that on the upper first molars we have plain bands, which show the position of the perpendicular tube and the ends of the alignment wire bent around to form the locking device. By springing the gingival portion of the distal end of the wire away from the band, we

are able to move the arch down, thereby disengaging the spur from the tube and removing the appliance. There are two loops on the upper arch, one of which is made in the region of the canine and premolar and the other in the region of the central incisor. These loops can be turned either gingivally or occlusally according to the indication. In this case you will notice the loop in the region of the canine and premolar has been turned gingivally so as to get it out of the way as much as possible. The one in the incisor region, which should be made between the region of the central and lateral, has been turned gingivally so as to exert a force parallel with the incisors, or, in other words, to act the same as a spur which you see in the region of the lateral incisor. By opening the loop in the premolar and canine region, we increase the length of the arch from the incisors to the molars the same as if we turned the nut on a threaded expansion arch. By opening the loop in the incisor region, we increase the expansion of the arch in the region of the canine and serve the same purpose as the double arch which was designed with a screw in the incisor region for widening the two lateral halves; and do it more easily. The purpose of the spur which

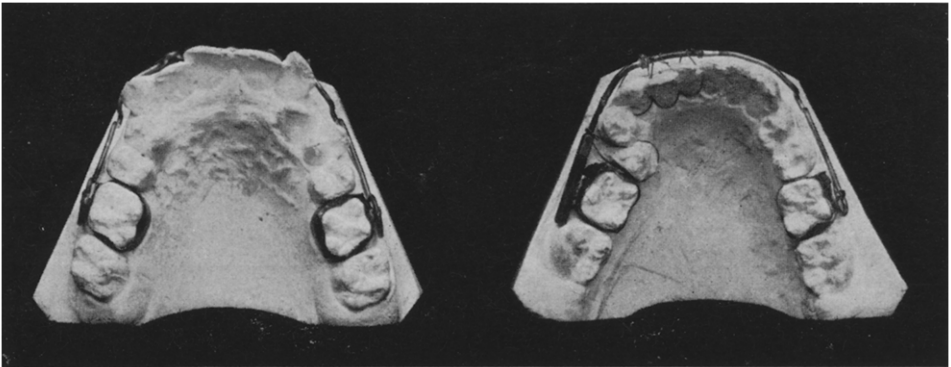


Fig. 5.

is seen in the region of the lateral incisor, is to move the apex of the root forward and the cutting edge distally, which is accomplished by placing a ligature around the alignment arch at the gingival portion of the tooth and bending the tip of the spur on the incisal edge of the spur lingually. This exerts a lingual force on the incisal edge and a forward force on the apex. The lower appliance, which you see in Fig. 3, is one-half of the expansion arch, which is used in the usual manner. A horizontal tube is soldered to a plain band on the lower molar and a spur is soldered on the expansion arch in front of the canine, and a long loop ligature is used to carry the premolar and canine forward, as shown in Fig. 4. The ligatures which you see on this case are smaller than should be used but were employed for descriptive purposes only, so as to avoid mutilating the model by putting on large wire ligatures. The lower appliance consists of a combination of the regular expansion arch and the loop appliance. The band on the lower left first molar carries a parallel tube while the one on the lower right molar carries a perpendicular tube.

You will also notice that the loop on the lower appliance on the right side is turned gingivally, which is the best manner of turning the loop in the lower arch, because if the cusps are long, the upper teeth very often strike the lower loop. Care must also be taken in soldering the perpendicular tube on the lower molar band (as shown on the right side) in such a position that the occlusion of the upper molar will not strike the occlusal portion of the locking device. That means that the tube on the lower molar must be made shorter than the tube on the upper molar so they will not interfere with the occlusion of the teeth. It is needless to say that in using these perpendicular tubes on the molars, when moving the molars buccally, they will move in an upright position if the alignment wire does not twist upon itself, which often occurs when too much expansion force is put on these teeth. One nice feature about this appliance is the use of the plain molar bands which you see in the accompanying illustrations—they are much more kindly to the tongue than the use of clamp bands. However it must be remembered when using the plain bands, that the bands stay in position only because of the adhesive property of the cement and will not stand as

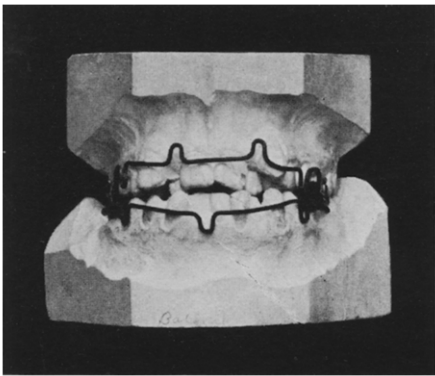


Fig. 6.

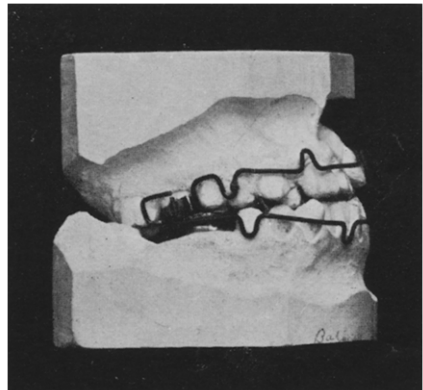


Fig. 7.

much force, without loosening, as the clamp band. One of the strong features in favor of the loop appliance is that it is almost impossible with an 18-gauge wire to exert too much force, especially in a patient as old as the one the models of whose teeth are shown in Figs. 3, 4 and 5. By looking at the occlusal view of the upper model you will see that the right upper lateral occupies a very peculiar position and the canine is in lingual occlusion. When I put this loop appliance on this case, I very much doubted whether small gauge wire would exert enough force to move the upper canine over the lower teeth. At the present time, (February, 1915), the canine is over the lower teeth, and the case is very nearly completed. The premolar region is expanded nicely, the right canine was depressed as it should have been and the laterals and centrals were moved to their proper positions. The left side of the lower arch which had to be lengthened was lengthened by using a half of a regular expansion arch as described elsewhere in this paper; the occlusal view shows a soft soldered spur on the expansion arch with the ligature in place to carry the canine and premolar forward. The cut does

not show any ligature around the premolar, but the ligature should extend around both the left first premolar and canine, and space made so that the second premolar can be moved into position.

Fig. 7 shows a front view of another case. The patient is about 22 years old, the teeth are very badly bunched, and a general expansion is required in both the upper and lower arch. The occlusal view shows that one lower second molar and one lower first molar are missing, and these missing teeth will have to be taken care of later. In regard to the treatment of conditions such as you see in the lower case, I believe sometimes it is preferable to attempt to move the second and third molars anterior and close the space rather than to put in an artificial substitute. I have treated cases both ways but at the present time do not believe that either plan would be suitable for all cases and that by using judgment we can decide which plan is the most desirable to use. However, this paper is not intended as a discussion upon the treatment of mutilated cases but on the use of the Loop Appliance, which in the author's practice has proven extremely satisfactory. In examining Figs. 6 and 7, you will see that plain bands were placed on the upper molars,

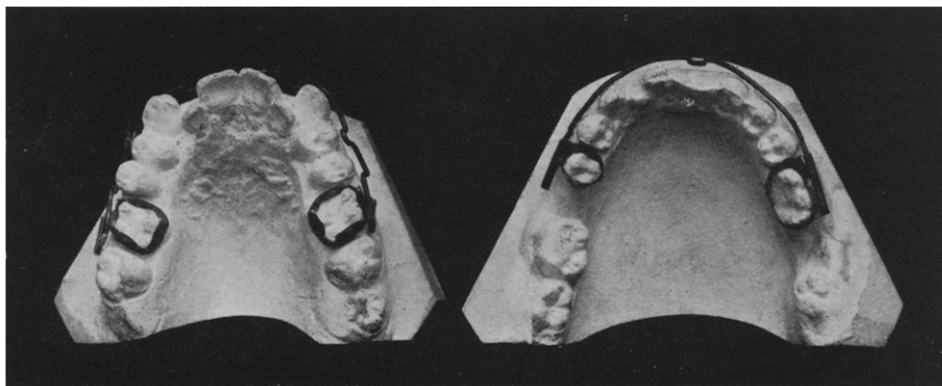


Fig. 8.

on the lower right molar and left second premolar. The bands on the upper molars carry perpendicular tubes, while the lower bands carry parallel tubes. The parallel tubes are used on the lower molars because the teeth are short; by using perpendicular tubes the occlusion would interfere with the locking device.

By looking at the right side of the upper model, you will see that the spur has been soldered on the wire, then the wire bent gingivally to bring it in the region of the gingival portion of the second premolar, then a loop bent occlusally to occupy the position between the two premolars. This loop in this position serves a purpose of two spurs and moves the premolars bodily, for resting against these teeth as it does, it prevents them from tipping. By using the wide portion of the loop-forming pliers, which forms a wide loop, a loop can be made of sufficient width so the perpendicular portion of the loop will occupy the greatest convexity of both the first and second premolar, thereby moving them bodily and overcoming any tendency they might have to rotate. Very often we find that the ligatures

on the premolars have a tendency to slip gingivally. This can be avoided by a soft soldered spur placed on the perpendicular portion of the loop as you see on that part of the loop which occupies the first premolar region in Fig. 7. The loop in the premolar region, by being open, will again perform the function which is performed by the screw, while the loop in the incisor region will carry the canines apart and expand the arches. You will notice that the loops in the incisor region have both bands turned gingivally, for appearance's sake, as the patient possesses a short lip, and objected to the appliances showing any more than absolutely necessary. The construction of the lower device differs from the upper in that we have the parallel tube, therefore the loop in the premolar region is made directly in front of the tube so the posterior portion of the loop will rest against the end of the tube, performing the same function that the nut performs in the regular expansion arch. One loop has been placed in the central region in the lower appliance, because the expansion of the lower arch is not as great as that required in the upper. In opening these loops it requires considerable experience in order to open the loop and not misplace the arch. In bending or opening the loop in the posterior portion, we must make an equal opening on the anterior portion to keep the arch straight. The ease with which these appliances can be constructed has been very satisfactory to me, for I can make an entire loop appliance out of a plain piece of wire and put it in the mouth in the same length of time that it takes to adjust a manufactured expansion arch. These loops are very comfortable to the patient and this form of appliance is less annoying, and less conspicuous than the old large size expansion arch with a nut, which irritates the lip. At the present time I have confined this appliance to the treatment of Class I (neutroclusion) cases and cannot say that it would be superior to the regular expansion arch in anterior or posterior occlusions of the lower arch. It is my intention to report later in the columns of this journal as to the finished results of the cases herein presented and at the same time give descriptions of other cases which are being treated at the present time in my clinic. But my present belief is that the loop appliance will greatly supplant any other form of appliance in my practice.