

Teeth regulation : with finely made original devices ready for immediate operative application without soldering / by Miland A. Knapp.

Contributors

Knapp, Miland Austin, 1868-
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Publication/Creation

Philadelphia, Pa. : The S.S. White Dental Manufacturing Co., 1900.

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RECAP

TEETH REGULATION

WITH FINELY MADE ORIGINAL DEVICES

READY FOR IMMEDIATE OPERATIVE APPLICATION

WITHOUT SOLDERING.

NUMEROUS SPECIFIC ILLUSTRATIONS.

BY

MILAND A. KNAPP, D.D.S.

SECOND EDITION, REVISED AND ENLARGED.

1900 :

THE S. S. WHITE DENTAL MANUFACTURING CO.,

PUBLISHER and Sole Agent,

PHILADELPHIA, PA., U. S. A.

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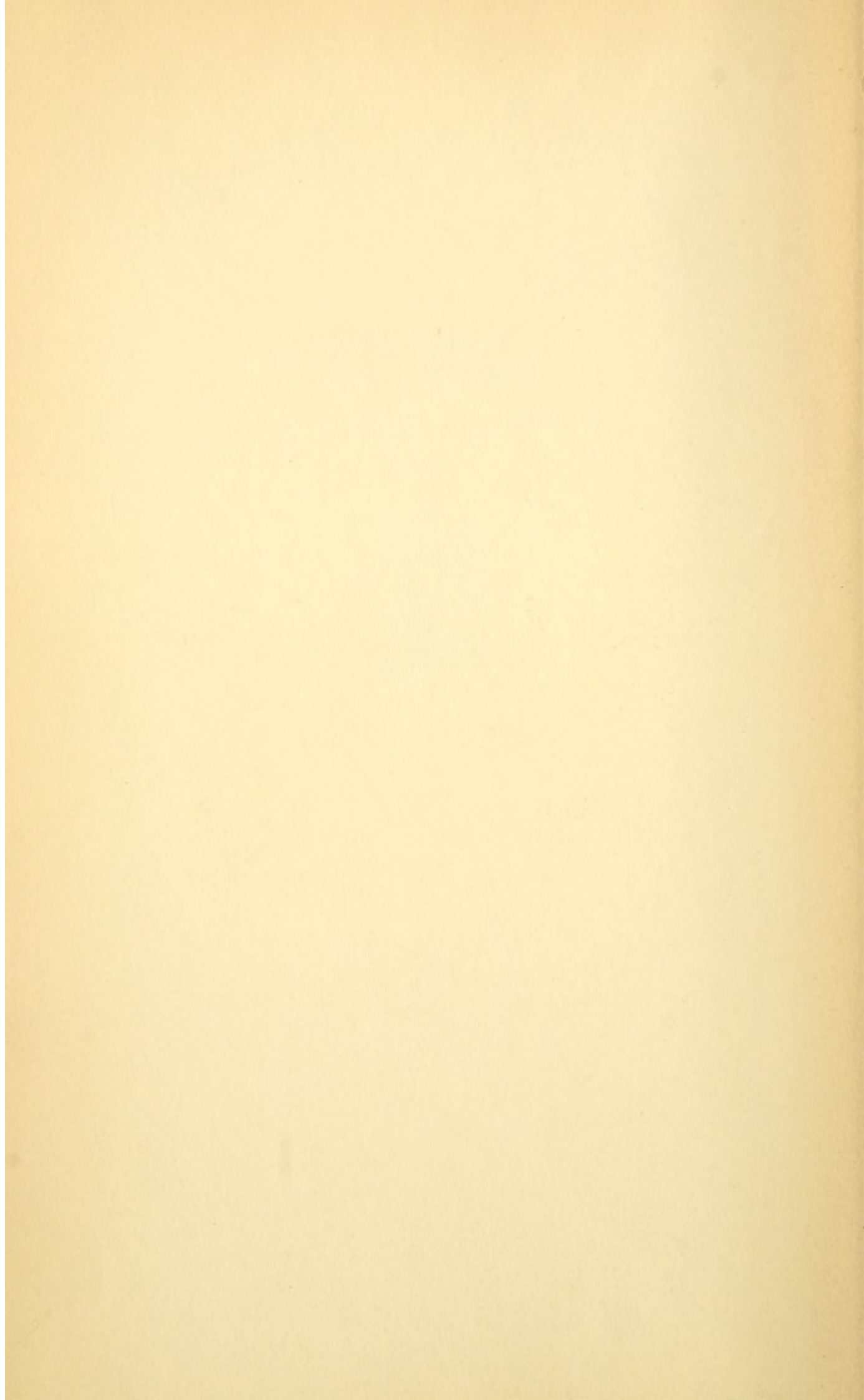
1900

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INTRODUCTION.

IN the treatment and correction of the typical cases of irregularity of the teeth described and illustrated in the following pages, the author has attempted simply and plainly to give a description of the peculiar regulating devices, the manner of at once applying or removing them, and the method of their positive operation with safety, with restful intervals, and with secure retention. The exemplifying cases were chosen principally to show the uses of the different parts of the devices, each combination shown being immediately applicable to any case wherein similar conditions exist.

For a number of years the author experienced the difficulties attending this branch of corrective dental art, and spent much time in constructing appliances to accomplish the desired results, frequently making and using, or attempting to use, most of the seemingly practical appliances described in dental literature, and all of those offered for sale at dental depots; some of the last of which are very good, yet require a great amount of time to be spent in soldering them together, and after the soldering require repolishing or replating for the presentation of a respectable appearance in the mouth. The author therefore determined to work out, by a series of practical experiments, some forms of devices that could be immediately applied to the teeth without the very tedious and annoying operation of taking impressions, making appliances, fitting them to plaster models, and making soldered bands to

suit the several teeth. Often one would find when the case was about half completed, that some change was necessary which would require a new form of appliance, necessitating the loss of the first one made and nearly all the material used in its construction. The regulating of a case under such circumstances proved to be a very tedious and expensive operation.

If operators were now compelled to make from blanks bought at dental depots burs, excavators, pluggers, clamps, etc., and had to make a new one or lot for every operation they were called upon to perform, the filling of teeth would be a much more tedious and expensive operation than it now is, yet this is what has hitherto been done in nearly every case of dental irregularity dentists have been called upon to correct.

After a long series of experiments in practical work, the author has succeeded in performing with the regulating devices described in the following pages, all the operations usually met with in practice, and he claims for these devices the following advantages:

First: They are ready to take out of the box and apply to the teeth. No heating or soldering is required. They are therefore as neat in appearance in the mouth as when removed from the box.

Second: The several members are as small as is consistent with strength, they are well plated to resist tarnishment, are accessible in all situations, and are not liable to displacement or loss by the patient.

Third: All the parts are interchangeable, and when an extra member is ordered for a special case, it will work with all the parts on hand as well as those afterward obtained.

Fourth: The directions of force can be changed in a few moments at any time to overcome unlooked-for requirements, or an entirely different device may be put on without the

usual trouble of removing bands and soldering on new attachments.

Fifth: The threaded bars having nuts screwed on ready for action can be readily placed in, or be taken from the socket clutch bands while these are fixed on the teeth; whereas, in other organizations, the nuts must first be unscrewed, the bar ends be pushed through the band tubes, beyond which the nuts must be again screwed onto the bar ends. This is a very tedious and troublesome operation when those bar ends extend beyond the band tubes on second molars.

Sixth: The several devices can be used over and over again, and will last as long as some instruments commonly used in dental practice.

Seventh: They are time-savers for the practitioner, and are attractive to the patient.

Eighth: The members of each organization are readily separable for sterilization in hot water before replacement in the box.

Ninth: Every member has its indicative number by which it may be identified in description and illustration, and be specified in purchasing orders, to be sure of obtaining the desired part or parts so numbered.

Tenth: The prices of the parts are moderate in view of their convenience, accuracy, uniformity, sightliness, ready usefulness, and durability.

For perspicuity in depicting the several appliances in positions upon and relative to the anchor teeth and the teeth to be moved, the portions of the subject not necessary to be graphically denoted are omitted from the illustrations. The chief object of these is to enable the operator to correct irregularities typified, or specified in the depictions, by means of the promptly applicable devices which are much more clearly shown in some situations when appearing on a white, rather than on a dark or shaded background.

Some of the parts are too small for clear delineation, and therefore associated and magnified or sectional views are given, to make obvious the constructive details or assemblages of the several devices.

To those who have hitherto employed thicker and heavier appliances, these thin and small devices may seem inadequate; but the author has in practice proved their sufficiency, and has a firm confidence in their general efficiency when employed with due regard to the correct principles involved in their construction and uses. A fundamental feature of the system and means is the production of a from time to time progressive movement of the tooth or teeth in the desired direction *without retrogression*. A comparatively weak initial and successive push or pull action will in every suitable case be effective if the *gain be unflinchingly maintained*; and this is the function of the clutch nut and lock nut members. A moderate moving force, the locking of the moving mechanism, and a timely repetition of that process results in a new tooth-position and a new restoration to sustain it: these are the sources of success in teeth regulation.

In this revised second edition, the illustrations are followed by the indicating numbers of the several appliances employed in each figure. By this means, with reference to the description, the particular parts desired for a given case may be ordered *by number* in every instance. In several instances, however, No. 30 (the coil of wire) is omitted as probably already in hand by the dentist and not needed in the case illustrated.

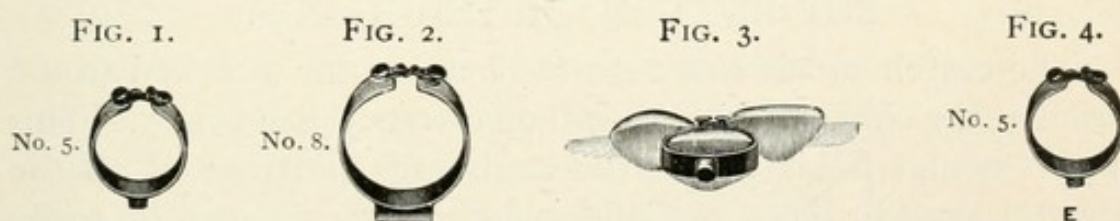
The author duly and thankfully recognizes the editorial aid afforded by W. Storer How, D.D.S., in the preparation of this work for the press.

He also appreciates the liberal expenditures of The S. S. White Dental Mfg. Co. for the publication of the volume in new, readily readable type, with profuse illustrations, and in an excellent style of bibliogony.

TEETH REGULATION.

GENERAL DESCRIPTION OF THE BUTTON BANDS.

The bands used to attach these appliances to the teeth are open or separated at the side opposite to that from which the attachments are to be made. Each end of the band has a button, around which is to be wound a wire thread, holding the two ends of the bands firmly at any required distance from each other. These bands are made in ten sizes, ranging from the size of the smallest incisor to that of the largest molar.



Sizes 1 to 6, inclusive, are studded bands, and are used on all teeth except molars. One of these bands is shown as wired for use in Fig. 1. Sizes 7 to 10, inclusive, are clutch bands, and are to be used on molar teeth for anchorage. One of these is shown as wired for use in Fig. 2.

The bands most used are Nos. 3, 4, 5, 8. These are the sizes supplied in the sets, and will be found to be sufficient for many cases. Nos. 3, 4, and 5 are studded bands, and are used on the teeth which are to be moved; they are designed to fit

bicuspid, cuspids, centrals, and laterals, both upper and lower. No. 8 is one of the double socket clutch bands like Fig. 2, a clutch band used for anchorage to the molars, and that size will be found almost universal in its adjustable application.

Each band is adaptable to fit a variety of sizes of teeth, as the ends of the bands may be separated until the buttons touch the teeth on each side, or may be brought so near that the buttons touch each other. The buttons also serve for rotating wire, or other attachments.

The full range of the band is sometimes limited by the position of the teeth, and a band that will allow the buttons to nearly touch becomes necessary, as in Fig. 3, which is an illustration of a studded band No. 4. For this reason the ten sizes of bands are made to meet all these peculiarities.

THE BUTTON STUDED BANDS.

Fig. 4 shows the studded band with the threaded stud E at the opposite side of the band from the buttons. To this stud is to be attached the ball cap of the jack-screw, the square T socket, or the retaining devices. The square T socket, No. 27, may be screwed onto the stud before cementing the band.

THE BUTTON CLUTCH BANDS.

The clutch consists of a slotted bar or tube attached to the band at the side opposite from the buttons. See Fig. 5. This receives and holds firmly the anchorage portions of all the devices used in these appliances, and allows them to be easily and quickly removed and replaced without removing the bands or the clutch nuts from the bars. This last advantage will be duly appreciated by every dentist who has had to place a nut on a bar or wire after passing it through a tube or pipe fixed on a tooth-band in the mouth. He will well remember his efforts to put nuts on traction bars or wire arch bars protruding from the distal ends of tubes on molar teeth.

An enlarged drawing of the clutch tube of the double socket clutch bands Nos. 7 to 10 is shown at Fig. 6. A is the band to which the partial tube B is attached. D is the slot which

receives the threaded bar. C C are enlarged portions or sockets which receive the cylindrical portions of the clutch nuts.

When the nuts are in position the threaded bar is held firmly in the tube; see Fig. 17.

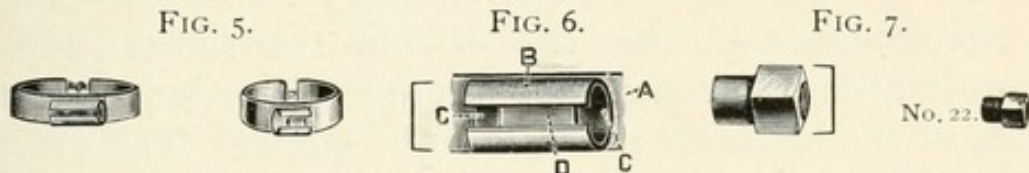
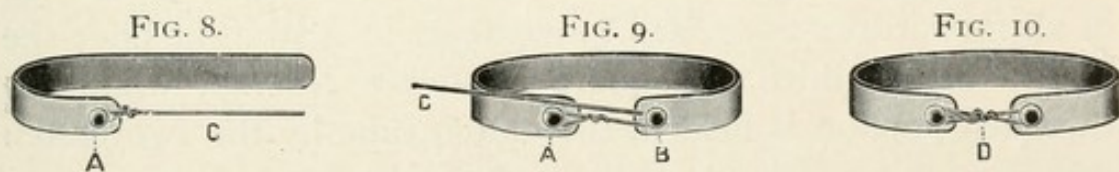


Fig. 7 shows the (magnified cut in brackets) clutch nut, the rounded portion of which fits into the socket C or C of the clutch tube B, Fig. 6.

TO APPLY THE BANDS.

First select a band of the proper size, and carefully work it on around the tooth to be banded. Do not use a mallet or pound on the band. If the teeth are very tight together, press a thin spatula or spreader between them on each side, let it remain a few minutes, and when removed the band will go between the teeth easily.

Burnish the band to fit the irregularities of the tooth surface, and then fasten the wire C to the button A on one end of the band, as shown magnified in Fig. 8. Draw the wire C tight around the other button B, Fig. 9. Then remove the wire from button B, being careful to leave the kink in the wire



at button B, which will be a gauge to the size of tooth after the band is removed from the tooth. Next remove the band from the tooth and replace the wire around button B, giving the wire two or three cross turns in the form of a figure eight around both buttons, ending in one or two turns of the wire

around the center of the coil, as shown at D, Fig. 10. The band is then ready to be cemented to the tooth.

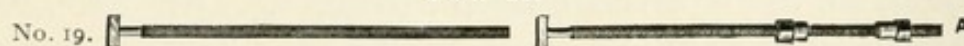
The teeth should be thoroughly dried with alcohol, the cement mixed to a sticky consistence and applied to the entire inner surface of the band, and the band pressed over the tooth well up to the gum. At the same time put a T bar—No. 19 or No. 20, or an arch bar No. 38—into the slot (D, Fig. 6) in order to fix the clutch tube in proper line relations to the teeth, or the bands on the teeth to be moved. This precaution may render it unnecessary to bend the bar for accommodation to the clutch tube, as may be requisite if the band shall have been fixed without regard to a due alignment of the clutch tube. It is better to let the cement harden before attaching the appliances to the bands.

To remove the bands, unwind or cut the wire, and the band may then be easily removed from the most sensitive or loose tooth without injury to the tooth or band.

When bands are taken off they should be immediately cleaned and sterilized in boiling water, after which they may be put away for future use. Each band may be used for a great many cases.

THE T BARS.

FIG. 11.



The long T bar, Fig. 11, or the short T bar No. 20, is used in all forward or backward movements in a straight line; the T end fitting into the square T socket No. 27, while the threaded portion is held in the clutch tube by the two clutch nuts No. 22 (see Fig. 7) of the companion cut A, Fig. 11.

It will be readily seen that by turning these nuts in the proper directions the bar may be used to either push or pull, and by tightening both nuts the bar is locked and cannot become loosened by the action of the tongue. When only one nut is used, the close fit and friction of the cylindrical portion

of the clutch nut (Fig. 7) also keeps the bar from becoming loose by tongue action. The square T socket, Fig. 12, is a bifurcated head (see magnified cut), slotted to receive the T head of the T bar, and screws onto any studded band. When screwing 27 onto a stud, do not let the stud-end *go quite through* the socket; else the T of 19, 20, or 40 will not enter the socket. As the T head fits accurately in the slots of this socket head, it, so seated, when pushing or pulling, prevents rotation, but allows the tooth to tip in either line of movement; see Fig. 17. To insert the T bar, hold the bar at about a right angle to the socket screwed onto the stud, and let the T enter the vertical slot until the bar may be swung to the right or left and be locked in the socket No. 27 for pushing or pulling, as the case may be. The T bar may be removed from the square T socket and clutch tube at any time without removing the bands.

FIG. 12.

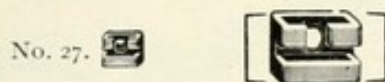
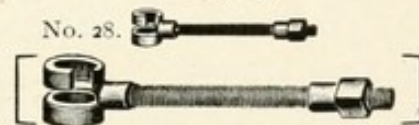


FIG. 13.



The round T socket clutch bar, Fig. 13, is the swivel-point of anchorage for the T end of the jack-screw, and consists of a round, bifurcated head connected to a threaded bar on which is a clutch nut. This fits into the clutch tube and the bar is locked in place by tightening the nut in its socket. (See magnified cut.) The clutch bar is thus readily placed in the tube, or by sufficiently loosening the clutch nut may as easily be removed from the tube, without disturbing the clutch band fixed on the tooth.

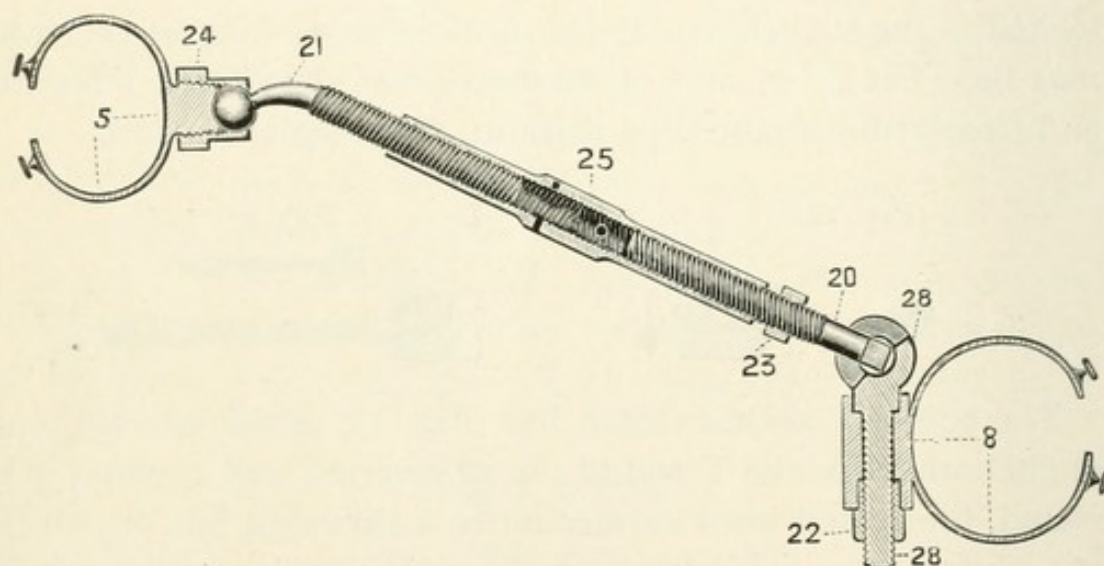
THE JACK-SCREW COMPLETE, MAGNIFIED SECTIONS.

A sectional drawing of the jack-screw organization is shown in Fig. 14. It consists of an elongated nut No. 25, right-hand threaded in one portion and left-hand threaded in the other. The letter L stamped on the long nut No. 25 (and No. 26)

indicates the left-hand threaded portion, which fits the left-hand threaded ball bar No. 21 (or No. 33 or 40). Carefully note the "L" in organizing a jack-screw. The short T bar No. 20 is screwed into the right-hand portion, and the ball bar No. 21 into the left-hand portion. The ball cap No. 24 incloses the ball of ball bar No. 21 or 33, and when this cap is screwed onto the stud of the studded band No. 5, this end of the jack-screw is clamped firmly to the band.

The T head of the T bar No. 20 is placed in the socket of the T socket clutch bar No. 28 and with it forms a swivel-joint.

FIG. 14.



By unscrewing the ball cap No. 24 from the stud of the band No. 5, the jack-screw may be swung backward and be disengaged from the round T socket of No. 28 and be removed from the mouth without removing the band.

At No. 23 will be seen a lock nut which, when tightened against the long nut No. 25, prevents it from revolving after once being tightened, thus preventing the loss of any movement once gained, as will occur when the common loose nuts are turned by the tongue in the acts of talking, eating, or of purpose by the patient, who cannot without a wrench disturb these nut-locked appliances.

Both the T bar and jack-screw will either push or pull without changing the nuts. The T bars are all made long enough for the longest reach, and will need to be cut shorter for nearly all cases. This is easily done by first screwing a nut above the point where the section is to be made and clipping the bar off with a wire cutter; then take a medium coarse file and file off the bulging portion caused by the wire cutter. The flat side of the file should be placed perpendicularly to the bar, and when the bulge is entirely filed off the nut may be turned off the end of the bar easily.

When the T bar of the jack-screw is to be cut, a nut No. 22 may be taken from the round T socket bar No. 28 and placed above the point of section, and the bar cut as described before; otherwise there will be difficulty in getting the thread just right so that the bar will enter the right-hand thread of the long nut No. 25.


When it becomes necessary to shorten the ball bar No. 21, it will be also necessary to shorten the left-hand end of the long nut No. 25. This may be done by screwing the ball bar into the nut No. 25 a proper distance so both points of section will be in the same plane; then with a suitable saw cut a groove entirely around the nut, letting the saw just reach through to the ball bar, cutting it somewhat; but care must be taken so as not to cut the ball bar entirely off.

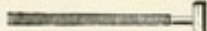
If the nut should be sawed off without first placing the bar inside far enough to reach past the point of section, it will be difficult to screw the bar in again, as the feather edge of the thread caused by the saw will fill the groove and prevent the thread of the bar from entering.

The part to be severed from the long nut should be entirely cut off first; then the ball bar should be unscrewed from the nut, carrying the severed portion with it. Next, the end of ball bar should be entirely cut off and the part of nut above point of section screwed off the end. This will clear the threads, and the ball bar will screw into the nut without difficulty. Keep carefully in mind the fact that this end of No.


25 has left-hand threads, as also have Nos. 21, 33, and 40; for the thoughtless operator will turn them to the right and have trouble by his own fault.


The parts of the jack-screw organization, Fig. 14, not hitherto separately shown, are depicted and denoted as follows, the magnified members being in brackets:

Long right and left threaded nut No. 25. 

Short T bar No. 20. 


Ball bar No. 21. 

Ball cap No. 24. 

Studded band No. 5. 

Round T socket clutch bar with clutch nut No. 28.



Lock nut No. 23. 

Double socket clutch band No. 8,



or single socket clutch band No. 12.



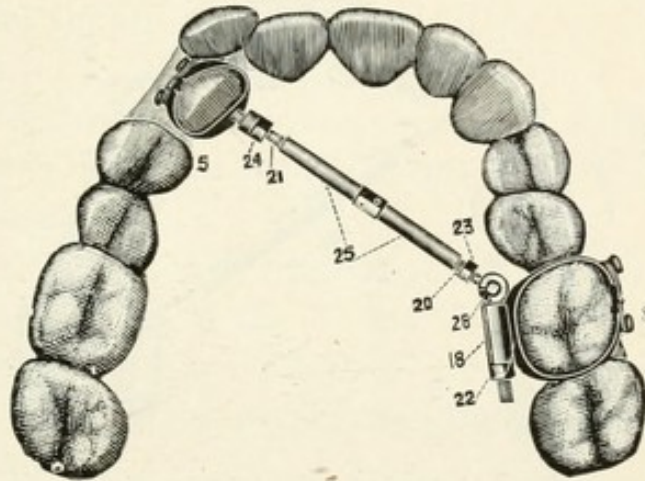
The practical application of the jack-screw, in its most simple form, is shown in Fig. 15, 8 being a clutch band cemented to the upper left first molar, with the clutch tube on the inside of the arch. In this is placed the round T socket clutch bar 28. This bar is held in the tube by the nut 22, and may be removed at any time by simply loosening the clutch nut and passing the bar out through the slot, the band remaining on the tooth.

No. 5 is a studded band cemented to the cuspid, to the stud of which band is attached the ball cap 24. When this cap is screwed tightly against the ball, of ball bar 21, the rotation of the tooth to which band 5 is cemented is prevented. If the ball cap 24 is screwed on the stud loosely the tooth will be free to rotate if the pressure is in the proper direction to

cause rotation. In this manner teeth that need to be both placed in the line of the arch, and rotated, may be so placed and rotated with this one appliance, by cementing the band to the tooth so the stud of the band will be at one side of the median line of the tooth, and then screwing the ball cap loosely on the stud.

If the rotation should be accomplished before the tooth is in position, the tightening of the ball cap against the ball will stop the rotation, and there will be no cause for readjusting the band.

FIG. 15.



As the union of the T head of the short T bar 20 and the round socket head of T socket clutch bar 28 forms a swivel joint, the ball cap may be attached to the stud of a band on any tooth, from the right second molar to the left cuspid in the case illustrated.

If the ball cap is to be attached to a band on the left central, lateral, or cuspid, the clutch band 8 should be cemented to the left second molar instead of the first molar as shown in the cut, or a short right and left threaded nut No. 26 used in place of the long nut 25 shown in the cut.

The jack-screw may be removed by unscrewing the ball cap 24 from stud of band 5 and swinging it backward until it is about opposite the right second molar. In this position

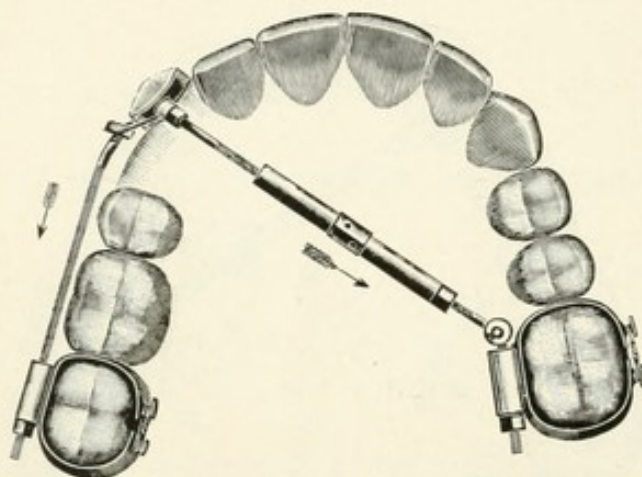
it may be lifted vertically out of the socket 28 and removed from the mouth.

Fig. 16 represents the upper teeth of a boy fourteen years old, with the appliances in position for placing the right cuspid in the arch.

The upper right temporary second molar had been extracted at an early age, to relieve toothache, and the first permanent molar came in too far forward.

When the case came to me the right first bicuspid had been extracted, the person extracting it telling the parents that the

FIG. 16.



(Nos. 8, 19, 22, 5, 30, 24, 21, 25, 23, 20, 28, 8.)

cuspid would regulate itself, but as it had been in its present position for about two years the parents came to me to see what could be done.

It would have been much better to have extracted the second bicuspid instead of the first, as there was too much room for the cuspid, and space between the bicuspid and molar would have been better than between the cuspid and bicuspid.

It was necessary to draw the cuspid backward and inward. This was done in one operation by using both a T bar and jack-screw, as shown in the cut.

A clutch band (No. 8) was cemented to the left first molar with the clutch tube on the inside of the arch, and another to the right second molar, with the clutch tube on the outside of

the arch. A studded band (No. 4) was cemented to the cuspid with the stud on the inside of the arch. The patient was dismissed until the following day to give the cement under the bands a good chance to harden, when a T socket clutch bar (No. 28) was placed in the clutch tube of the band on the left side, and a jack-screw attached from it to the stud on the cuspid band.

A T bar (No. 19) was placed in the clutch tube of the band on the right side, and a piece of band wire (No. 30) tied to the T head and passed around the tooth. The wire was placed above the stud and above one button, and below the other to prevent it from slipping up or down on the tooth. Traction was applied as indicated by the arrows.

It will be seen by referring to the cut that the tooth will move diagonally backward when both the T bar and jack-screw are tightened.

And as the tooth moved backward much more easily than inward, the tightening of the T bar was stopped as soon as the cuspid had moved far enough to pass the lateral, and the tightening of the jack-screw continued until the tooth was in the line of the arch.

As soon as the cuspid was in position, the T bar, jack-screw, and clutch bands were taken off and a retaining clamp (No. 37) and nut (No. 38) attached to the stud of the cuspid band, the ends of the clamp resting on the inner surfaces of the lateral and bicuspid, which held the cuspid firmly in position.

Fig. 17 shows an enlarged sectional drawing of the T bar 19 in combination with the clutch band, square T socket, and studded band to which the square T socket is attached.

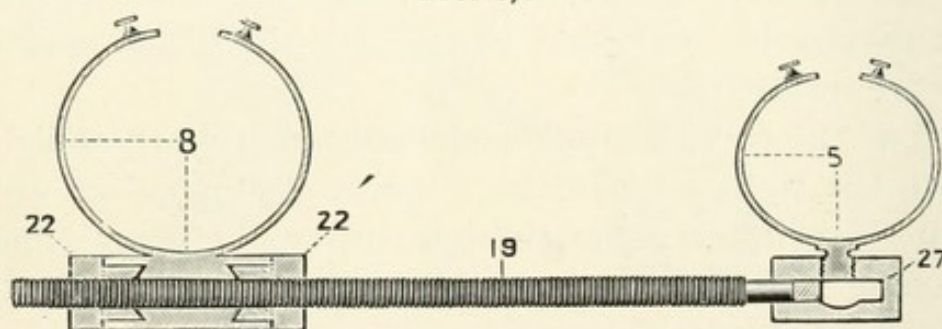
No. 8 is the clutch band which is cemented to the molar or anchor tooth to which, at the opposite side from the opening, is attached the clutch tube. This tube (see also Fig. 6) is permanently attached to the band, and it will be seen that as the band is rigidly cemented to the tooth, the tube is firmly held at right angles to the long axis of the tooth, thus pre-

venting the tooth from tipping when the T bar is passed into the tube and pressure applied. In other words, the apex of the root will move as fast as the crown of the tooth, which is an important feature, as it will be found that the anchor teeth move very little when this style of band is used.

No. 5 is the studded band, and is cemented to the tooth to be moved. No. 27 is the square T socket (see Fig. 12), which is preferably to be screwed on to the threaded stud of the band 5 prior to cementing the fitted band.

No. 19 is the T bar, the square T head of which fits accurately the square T socket 27 and prevents the socket 27 from rotating or changing position with relation to the T bar 19.

FIG. 17.



when pressure is applied. And as the socket 27 is screwed on the stud of band 5 the tooth to which the band 5 is cemented cannot rotate with relation to the T bar 19, but can tip forward or backward whether the bar is pushing or pulling. In Fig. 17 the T bar is shown in the position it would occupy in the square T socket 27, when the teeth are being drawn toward each other. But if the teeth were being pushed apart the T head of the T bar would move to the other side of the square T socket 27, where it would firmly seat itself and prevent the tooth from rotating during movement.

Nos. 22-22' are clutch nuts which move the T bar forward or backward through the clutch tube according to the direction the nuts are worked. If nut 22' is loosened and nut 22 tightened, the bands 8 and 5 will be drawn together; and if nut 22

is loosened and nut 22' tightened, the bands 5 and 8 will be forced apart. During either of which operations the tooth to which band 8 is cemented will be held at right angles to the T bar and the tooth to which the band 5 is cemented will be free to tip either forward or backward, but not to rotate.

It will be seen by referring to Fig. 6 that the T bar is free to pass in or out of the clutch tube through the slot D, but that when the clutch nuts 22 and 22' (Fig. 17) are in the sockets C-C (Fig. 6) the T bar 19 is prevented from passing through the slot D (Fig. 6). It will also be seen that the ends of the nuts 22 and 22' (Fig. 17) are concaved to fit convexed seats in the clutch tube, so that when pressure is applied the seats receive all the pressure and the square heads of the nuts do not press against the ends of clutch tube. These are important features, and add greatly to the strength and wearing qualities of the appliance.

When both nuts are tightened against the clutch tube the T bar is locked and may be left on any length of time without fear of the nuts loosening, to cause the loss of movement once gained.

An enlargement will be seen at the center of square T socket 27, directly opposite the stud of band 5, the stud end being flush with, or slightly below the socket surface. This is to allow the T bar to be moved to a position at right angles to the position it occupies in the cut, when both nuts 22 and 22' have been loosened until they are out of the socket in the clutch tube and the T head of T bar has been moved so as to be directly opposite the stud of the band 5. When in this position the T bar may be lifted out of socket 27 and taken out of the mouth; or be replaced in the socket without removing either the band 5 or 8, or the socket 27.

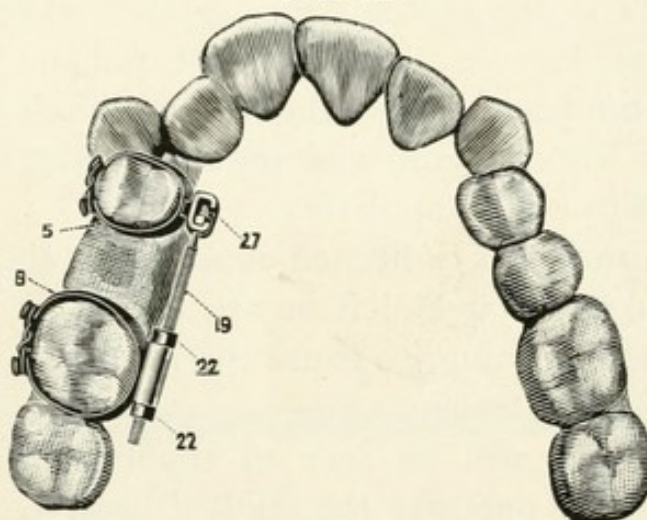
A practical application of the parts shown in Fig. 17 is illustrated in Fig. 18.

The upper right first molar is used as anchorage, and the first bicuspid is to be drawn backward into the former position of the second bicuspid which had been extracted.

Clutch band 8 is fitted to the upper right first molar, the ends of the band are tied together with band wire No. 30 and the band cemented to the tooth with the clutch tube on the inside of the arch.

Studded band 5 is wired and cemented to the first bicuspid with the stud on the inside of the arch also. As soon as the cement has hardened, square T socket 27 is screwed to the stud of band 5 and a T bar cut to the proper length, which is to leave enough extra length of bar to allow the clutch nut 22 to be turned entirely out of the end of the clutch tube without

FIG. 18.



going off the end of the bar. The head of the bar is then slipped into socket 27: the bar being held at right angles to the position it occupies in Fig. 18, which will allow the constricted portion at head of bar to pass through the entrance to the slot in 27. The bar is then given a quarter revolution backward, when it will enter the clutch tube of the band 8. The nuts are then ready to be turned into the sockets at either end of the clutch tube, and the appliance will be in order for operation.

THE BITE BANDS.

When a tooth is inlocked it is generally advisable to open the bite while the tooth is being carried over the locking teeth.

This may be easily accomplished by the use of the band illustrated in Fig. 19. These bands are wider than those used in regulating the teeth, and have four buttons, two of which are attached to one end, and the other two at some distance from the other end of the band. This allows the extra length of band to pass inside and close the otherwise open space where the ends of the band are wired together with band wire No. 30, making a tight collar around the tooth. The buttons are attached nearer to one edge of the band than the other, and as this edge is to go near the gum the upper part may be trimmed off with shears if the band is too wide and holds the teeth too far apart.

These bands are generally placed on the lower bicuspid, a band on each side of the mouth. In the case of children, when

FIG. 19.



the bicuspid are not entirely erupted, or for other causes, they may be placed on the molars. It is generally best to put them on the first bicuspid, one on each side of the mouth, if practicable.

To place these bands on the teeth: tie an end of band wire No. 30 to the button nearest the end and edge of the band; next curl the band, with the long end inside, until it is a little too small for the tooth and press it over the tooth to make a tight fit. If the extra lap of band should be too long, and pass between the teeth, causing two thicknesses of band between the teeth on one side, and the teeth should be tight together, cut the end of the lap off enough to just miss going between the teeth.

The buttons at the bottom of the band, near the gum, should be drawn a little nearer together than the upper ones.

This will make a close fit around the neck of the tooth, and form a larger grinding surface at the top of the band.

When the band is in position both sets of buttons should be wired, the lower set first, and a napkin or cotton roll placed around the tooth, and the crown of the tooth and the inside of the band thoroughly dried with alcohol. Cement and amalgam should then be mixed (the cement rather thin), the band filled two-thirds full of cement and the amalgam immediately placed on it, and firm pressure brought to bear on the top of all. This will force the cement all around the crown of the

FIG. 20.

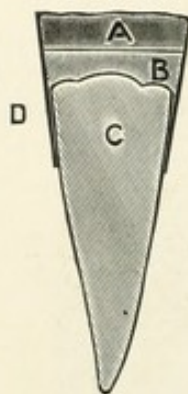
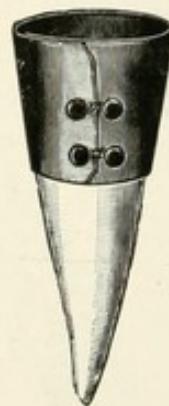


FIG. 21.



tooth and out at the lower edge of the band. This makes a very solid temporary crown, proof against decay, and may be left on any length of time with no fear of injury to the tooth, which cannot well be done with a soldered band, as it is difficult to make a proper fit at the neck of the tooth, and if left on any length of time, is liable to cause decay. The amalgam should be so trimmed that the teeth will strike evenly on each side. See sectional view Fig. 20, in which A represents the amalgam, B cement, C tooth, and D the band. Fig. 19 shows the band curled ready to be placed over the tooth. Fig. 21 shows the band wired in position on the tooth.

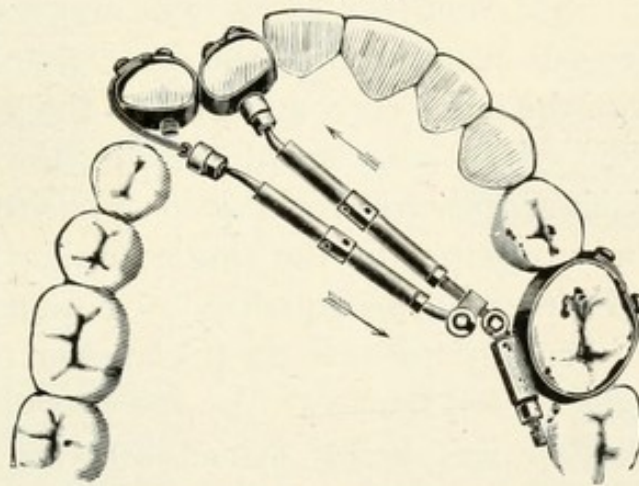
To remove the bands: Unwind the wire, strip off the band, and remove the amalgam and cement with a scaler.

The bands should be immediately sterilized in boiling water, brushed with a soft brush wheel, and put away for future use.

CASE SHOWING THE USE OF THE SINGLE AUXILIARY
T SOCKET No. 31 AND THE PERFORATED STUD
No. 36.

Fig. 22 represents a case in which the cuspid and lateral of the upper right side were thrown out of the line of arch by the anterior root of the first temporary molar, which remained in the gum until the permanent teeth were all fully erupted. The root was just anterior to the first bicuspid, occupying some of the space of the cuspid. This caused the cuspid to

FIG. 22.



(Nos. 9, 28, 20, 31, 23, 25, 21, 24, 4, —5, 24, 30, 36, 21, 25, 23, 20.)

be pushed out of line and partially rotated, and the pressure of this tooth against the lateral forced it inside the line of the arch.

After the root was extracted, enough space remained between the cuspid and bicuspid to accommodate the cuspid and lateral when placed in position.

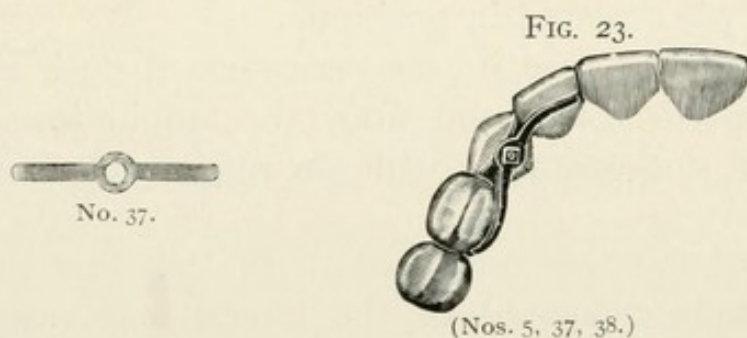
In treating this case it was necessary to push the lateral outward and to rotate and draw the cuspid inward. This was done in one operation with the appliances shown in the cut.

A clutch band was cemented to the left first molar, and studded bands cemented to the lateral and cuspid. Two jack-screws were used, and to the T bar of the jack-screw attached to the lateral, a single auxiliary T socket No. 31

was attached to form a base of anchorage for the second jack-screw, which was attached to the cuspid. As the cuspid was to be both drawn in and rotated, it was much quicker to do both operations at once, and instead of attaching the ball cap directly to the stud of the band on the cuspid, a perforated stud No. 36 was screwed into the ball cap and a piece of band wire No. 30 doubled and passed through the hole in the stud. The wire was carried two-thirds around the tooth and attached to the anterior button of the band. It will be readily seen that when the long nut of the jack-screw attached to the cuspid is turned to the right this jack-screw will contract, drawing the cuspid inward and rotating it at the same time. By turning the long nut of the jack-screw attached to the lateral to the left this jack-screw will be lengthened, pushing the lateral outward. As the jack-screws are working in opposite directions, and are held firmly together by the single auxiliary T socket, the push and pull forces will be equalized or compensated, and no strain will be brought to bear on the anchor tooth. The cuspid was actually forced backward by the pressure from the lateral as the lateral was being forced outward, while the rotating force applied to the cuspid also retrograded it, the point of contact between the cuspid and lateral acting as the fulcrum.

RETAINING DEVICE FOR FIG. 22.

When the teeth had gained their proper positions the jack-screws and bands were all taken off, excepting the band on the



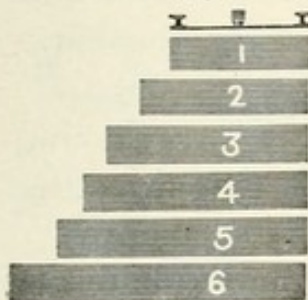
cuspid that was used to hold the retaining device as illustrated in Fig. 23. A retaining clamp No. 37 was bent to overlap the

inner surfaces of the first bicuspid and lateral and was held on the stud of the cuspid band by the retaining nut No. 38.

INSTRUCTIONS FOR ORDERING THE DIFFERENT SIZES OF BANDS.

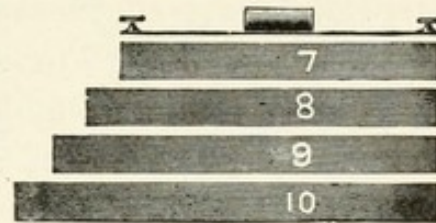
In Figs. 24, 25, 26, and 27 will be seen plane projections of each of the bands used with these regulating devices, the cuts showing the exact lengths of the several numbered bands.

FIG. 24.



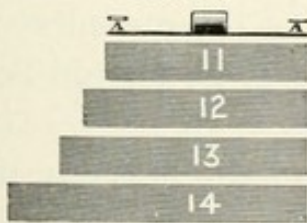
Studded Bands.

FIG. 25.



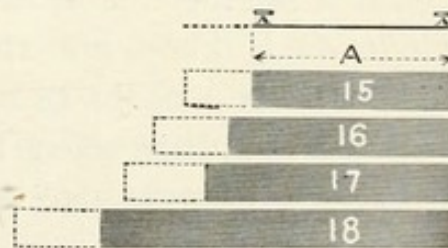
Double Socket Clutch Bands.

FIG. 26.



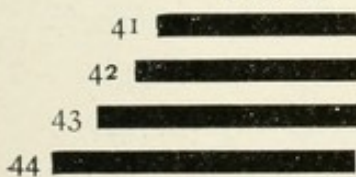
Single Socket Clutch Bands.

FIG. 27.



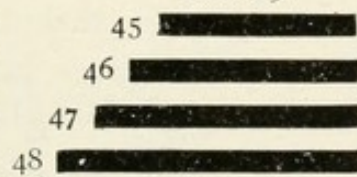
Bite Bands.

FIG. 28.



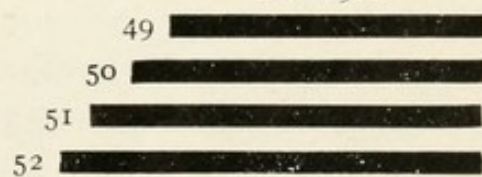
Screw Bands, Studded.

FIG. 29.



Screw Bands, Single Socket Clutch.

FIG. 29A.



Screw Bands, Double Socket Clutch.

Fig. 24 shows the six lengths of studded bands, Fig. 25 the four lengths of double socket clutch bands, Fig. 26 the four lengths of single socket clutch bands, and Fig. 27 the four lengths of bite bands.

When ordering these bands to fit any special tooth: With a piece of waxed floss silk; or, if the interdental spaces allow, binding wire, take a measure of the tooth to be banded and

compare the length of the measure so taken with the lengths of bands in the cuts, and in ordering simply give the *number of the band* that the measure agrees with.

If studded bands are wanted, compare the length of the measure with the lengths of bands shown in Fig. 24 only. If clutch bands are required, compare with lengths in Fig. 25 only, and so on with each class.

In Fig. 27, showing bite bands, the dark portions of the drawings represent the circumferences of the teeth the bands are designed to fit, the dotted portions showing the extra extensions required to make the laps.

At A, Fig. 27, will be seen the proper method of selecting the number of a bite band to order, the line at A representing the measure, or distance, around the tooth to be banded.

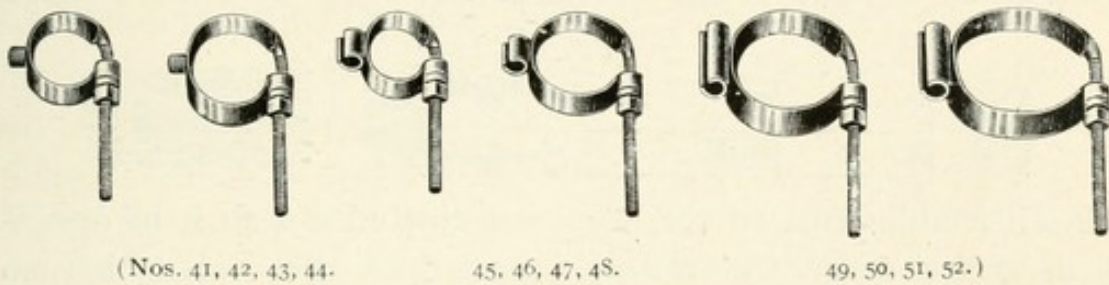
If the measure of the circumference of a tooth is between two numbers, as it generally is, always select the lesser number,—*e.g.*, if a studded band is wanted and a measure of the tooth it is to fit is taken, and the length of the measure when compared with the lengths of bands in Fig. 24 should be between Nos. 4 and 5, then select No. 4.

Always select the next size shorter than the measure taken from the tooth to be banded.

Fig. 28 shows four lengths of screw bands, studded, each of which is capable of adjustment to fit several sizes of teeth, and the same is true of the screw bands having the single socket clutch, Fig. 29, as well as the screw bands having the double socket clutch with lengths indicated under Fig. 29A. All the screw band measures denote the smallest sizes of the bands for the respective teeth to be fitted, but No. 41, for instance, will also fit a tooth having nearly the circumference of the No. 42 measure. So also of No. 43; which may be expanded to almost the length of 44; No. 44 to near 45, No. 45 to just short of 46 measure, and so through the series.

THE SCREW BANDS.

These supplemental bands have some advantages in their adjustability to teeth of various sizes; in being detachably nut-locked; in their fixedness upon the teeth; and in their co-operation with the several other members of this system. Wherever the different button bands are shown and described, the related screw bands may likewise be employed. For example, in the illustration and description of the jack-screw



complete, Fig. 15, the screw band No. 43 may be substituted for the button band No. 5, and the screw band No. 50 take the place of the button band No. 8 as also in Fig. 17, at the option of the operator. An example of the combination of the two classes of bands is shown in Fig. 30, where a button band No. 12 is seen fixed on a cuspid, and a screw band No. 51 is shown cemented onto a molar.

FIG. 30.

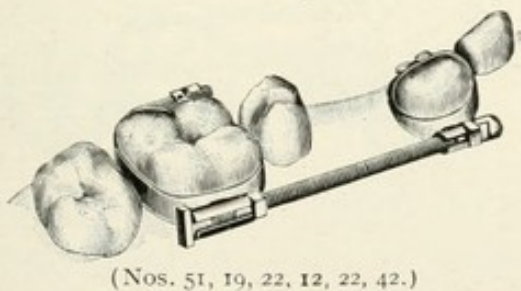
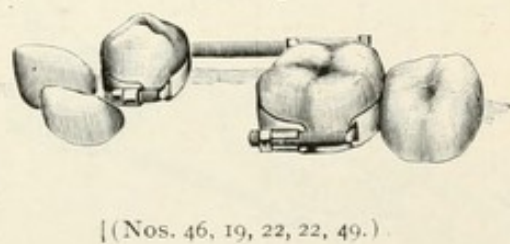


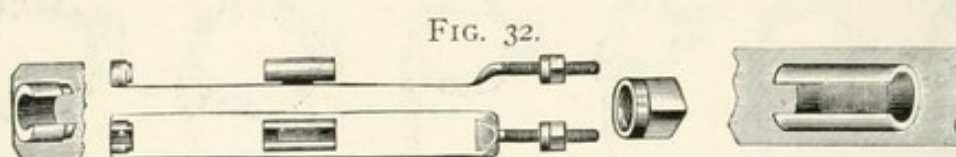
FIG. 31.



A like organization is illustrated by Fig. 31, wherein is seen screw band No. 49 fixed on a molar and screw band No. 46 cemented on a bicuspid. In the new series of twelve bands, the screws have the diameters and threads of Nos. 22, 23, 25 right, 26 right, 31, 32, 33, and 34; with all of which parts useful combinations can be made.

In placing the screw bands, their application is facilitated by the freedom with which they may be straightened, as shown by Fig. 32, in aid of the process of passing them between the teeth.

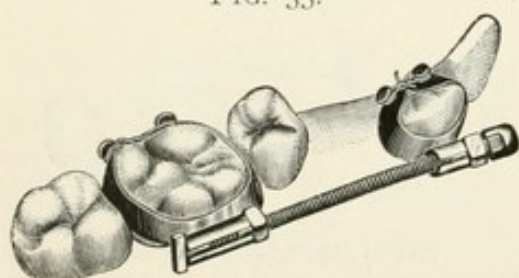
This illustration makes clear the constructive details of the screw bands. The double socket clutch forms, Nos. 49 to 52, are here shown, and the magnified socket clutch on the right is described with reference to letter indices in Fig. 6; but this magnified exhibit of the recess-collared nut and the flanged



clutch enables one to see how that slotted clutch is in operation inclosed by the recessed collar of the nut which so strengthens the flanged and slotted clutch. Thus the ends of the screw band may be detached or attached by simply passing the screw out from or into the slot of the clutch when the nut has been suitably turned. All the screw bands have this novel and useful organization.

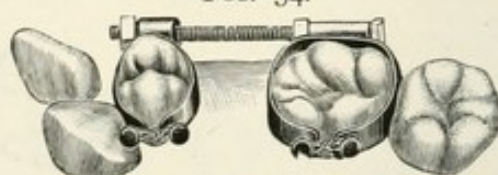
The illustrations Figs. 33 and 34 show button band applications and organizations like the screw band illustrations

FIG. 33.



(Nos. 8, 19, 22, 12, 22, 34.)

FIG. 34.



(Nos. 13, 19, 22, 22, 8.)

Figs. 30 and 31, and altogether exemplify the uses of the socket clutch bands, in connection with a T bar, for drawing a cuspid or bicuspid backward. In these instances the moving nut is located on the anterior end of the bar for convenience of access in some cases where the patient is to use the wrench, although the patient may also operate the nuts when situated behind the clutches, as in other illustrations.

In a case of the kind here represented, a clutch band, as No. 8 or No. 50, is cemented to the molar or anchor tooth, taking care when cementing to place a T bar in the clutch tube to insure proper bar alignment with the clutch tube on the tooth to be moved.

In applying the single socket clutch band to the tooth to be moved, it is important to observe that the recess or socket faces anteriorly to receive the rounded portion of the clutch nut No. 22, as may be seen by a close examination of the banded cuspid in Fig. 30 or Fig. 33. Two clutch nuts are to be screwed onto a T bar as at A, Fig. 11; the rounded portions of the nuts tending toward the T. The T bar is then cut to the proper length and passed into the slots of the clutches, the T end back of and resting against the end of the clutch tube on the band of the molar, as shown in the several illustrations. Thoughtfully turn the nuts onto the bar before cutting it; then by backing off one nut, it can be replaced, or a ball cap No. 24 be screwed on, as shown. When the clutch nut No. 22, near the T end, is screwed tight against the anterior end of the clutch tube the bar will be locked in movement in any direction. Turning the anterior nut will seat it in the single socket of the clutch tube of the cuspid or bicuspid, which by the further tightening of the nut will be pulled toward the anchor tooth, and neither of the teeth will be tipped to any considerable degree in the moving process.

Fig. 35 shows the position of the upper teeth in the mouth of a girl twelve years old. The left central was somewhat rotated and overlapped the right central, and the left lateral was inlocked; the lower teeth striking between it and the central and cuspid when the jaws were closed.

The cuspid was in proper line, but too far forward. The mesial surface of the right central was nearly on the median line, and as the left first bicuspid was very badly decayed the course indicated was to extract the bicuspid and draw the cuspid back far enough to permit the placing of the central and lateral in their proper positions.

The first bicuspid was extracted and the regulation effected by three operations, the first of which is shown in Fig. 36.

The upper left first molar was collared with a clutch band, the clutch being on the outside of the arch, and a studded band was cemented to the cuspid with the stud on the outside of the arch also. A square T socket No. 27 was screwed on the stud of the cuspid band and a T bar No. 19 was cut to the proper

FIG. 35.

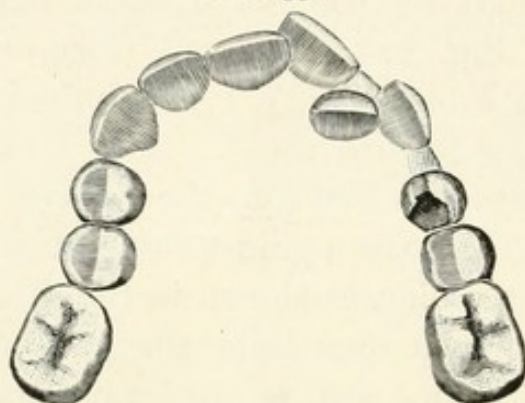
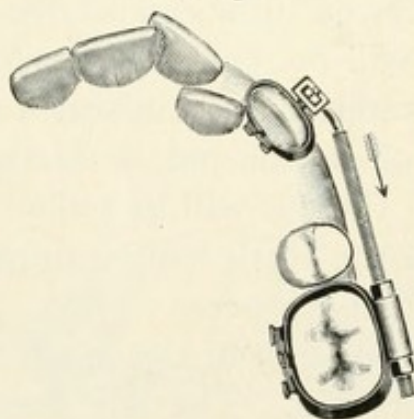


FIG. 36.



(Nos. 5, 27, 19, 22, 22, 8.)

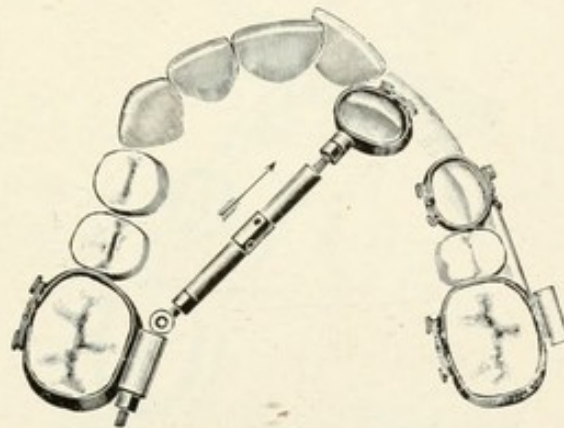
length, and the T end of the T bar was bent so that when the T was in the square T socket, the threaded portion of the bar would be in the proper direction to enter the clutch tube. This was easily done by holding the T in a pair of smooth flat-nose pliers and the threaded portion in the fingers, and bending the T neck a little at a time and trying it in the T socket every time. The proper angle of the T portion may be found

in a few minutes, as the screw portion can be easily slipped in and out of the slot in the clutch tube.

After the cuspid had been drawn back so as to nearly touch the second bicuspid, the T bar and socket were taken off. A piece of band wire No. 30 was wound around the stud of the band on the cuspid tooth and tied to the clutch tube of the clutch band on the molar, to hold the cuspid in position while the other teeth were being moved. (Seen in Fig. 37.)

The second part of the operation appears in Fig. 37. A clutch band was cemented to the upper right first molar and a studded band fixed on the lateral. Bite bands No. 15 were

FIG. 37.



(Nos. 8, 28, 20, 23, 25, 21, 24, 3,—5, 30, 8.)

attached to the lower right first bicuspid and the lower left second bicuspid (see description of bite bands), and the patient was dismissed until the following day to give the cement and amalgam a good chance to harden. A jack-screw (Nos. 21, 24, 25, 28, 20, 22, 23) was then attached, in the usual manner, from the molar to the lateral and pressure applied.

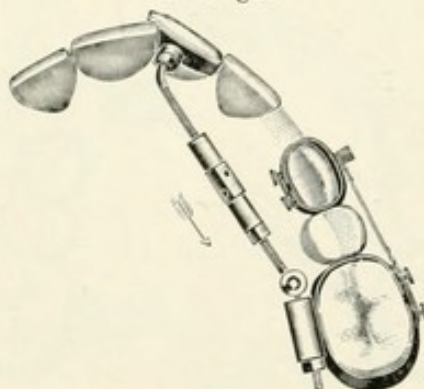
Note the location of the stud just off the center of the lateral (magnified cut to evidence the fact), so that by not quite tightening the ball cap the push pressure will partially rotate, while moving outward the lateral.

After the lateral had moved far enough to be outside the lower teeth, the bite bands were taken off, and three days afterward the jack-screw was also taken off. No retaining appli-

ance was required for this tooth, as the articulation with the lower teeth prevented it from moving inward. As there was no further use for the bands on the lateral and right molar, these were also removed.

The third part of the operation is illustrated in Fig. 38. A studded band was cemented to the left central. The clutch band on the upper left molar taken off, turned over and fixed so that the clutch tube would be on the inside of the arch. The jack-screw having a short right and left threaded nut No. 26 put in place of the long one No. 25, was then attached to the clutch tube of the left molar band and the ball cap attached to the stud on the band on the central. The ball cap should

FIG. 38.



(Nos. 4, 24, 21, 26, 23, 20, 28, 8, 30, 5.)

not be screwed tight against the ball, as this would prevent the tooth from rotating, but should be left loose enough to give the ball free movement. It will be seen that the central and lateral were both being drawn back toward the cuspid.

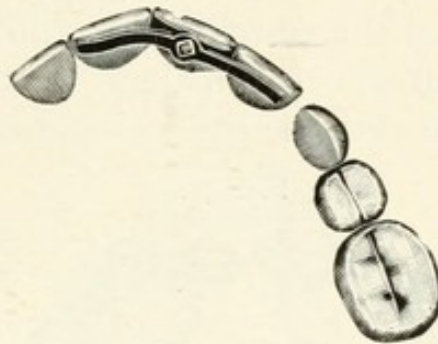
As soon as the left central was drawn back so far as not to overlap the right central, it began to rotate; and the traction was continued until the central had rotated enough to be in line with the other teeth, when the regulation was completed.

The bands were then taken off all the teeth except the left central (see Fig. 39), and a retaining clamp No. 37 with nut No. 38 was attached to the stud, leaving the ends of the retaining clamp resting on the right central and left lateral, thus preventing the left central from rotating and the lateral from

moving inward. The cuspid was expected to naturally move forward and fill the little remaining space, which it did.

The case was left for six months with the retaining clamp in position, as shown in Fig. 39.

FIG. 39.



(Nos. 5, 37, 38.)

A common occurrence attending the eruption of the permanent teeth is illustrated in Fig. 40. The roots of the upper deciduous incisors were not properly absorbed, causing the permanent teeth to erupt inside the arch.

FIG. 40.

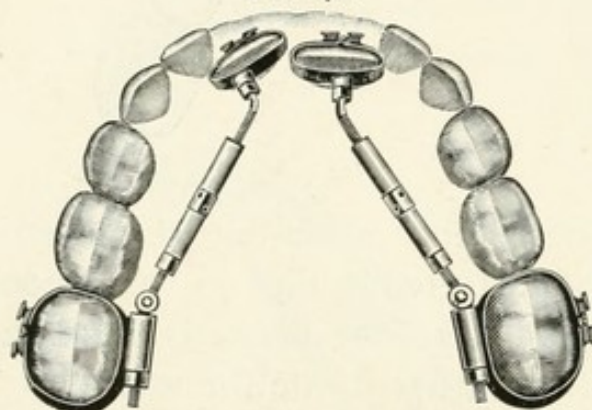


When the case presented itself the temporary teeth had been extracted, leaving the two upper central incisors firmly inlocked, and it was certain that the teeth must be forced outside the lower arch by the use of appliances, as the case had been neglected too long for self regulation.

It was impossible for the boy to draw the lower jaw back so that the lower centrals would touch the cutting edges of the inlocked upper centrals, and the wedging together of the teeth had started the lower teeth outward. As the time that

could be spent in correcting the irregularity was extremely limited, and the parents were very anxious to have the case attended to at once, studded bands were immediately cemented to each of the inlocked centrals, and clutch bands to the first permanent molars with the clutch tubes on the inside of the arch. The next morning a T socket clutch bar No. 28 was placed in each of the clutch tubes, and jack-screws (Nos. 20, 23, 25, 21, 24) attached from them to each of the studs of the bands on the inlocked centrals, as shown in Fig. 41.

FIG. 41.



(Nos. 8, 28, 20, 23, 25, 21, 24 4,—5, 24, 21, 25, 23, 20, 28, 8.)

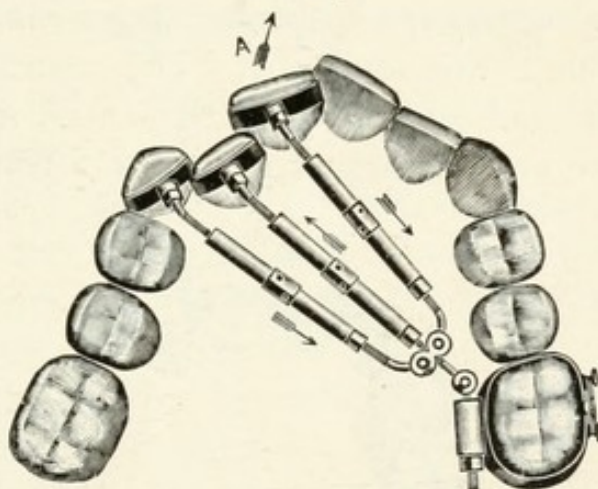
Observe in this case, also, the advantages of thoughtfully locating the studs so that by regulating the looseness or tightness of the ball caps, and the use of curved neck ball bar 21, or straight neck ball bar 33, either complex or direct movements may be effected by jack-screw action.

The long nuts of the jack-screws were tightened each morning and evening, until a snug pressure was felt by the patient, and at the end of five days from the time the bands were cemented on the teeth, they were both in their proper positions. The appliances and bands were then removed, and the two studded bands cemented on the centrals again with the studs to which was to be attached the retaining appliance Nos. 39, 38, on the outside of the arch.

In the case illustrated in Fig. 42 all of the six upper anterior teeth were out of their proper positions. The incisors and laterals were too far inward, the lower teeth striking on the

tips of the upper central incisors. Both cuspids were a little outside the proper line of the arch. It was necessary to push the centrals and laterals forward and outward and draw the cuspids inward. This case could be regulated, with the devices on hand, in two or three ways, but it was deemed advisable to move each side separately. The three teeth on the right side were moved first.

FIG. 42.



(Nos. 8, 28, 20, 32, 23, 25, 21, 24, 3,—5, 24, 21, 25, 23, 20,—5, 24, 21, 25, 23, 20.)

A clutch band was cemented to the upper left first molar, and studded bands to the right central, lateral, and cuspid. A T socket clutch bar No. 28 was placed in the clutch tube of the molar band to which were attached the three jack-screws as shown in the cut, a double auxiliary T socket No. 32 (see magnified cut in brackets) being first placed on the T bar of the central jack-screw. The T ends of the T bars of the two

No. 32.

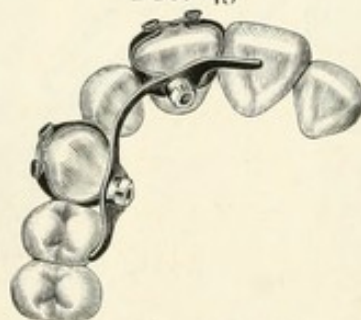


outer jack-screws were slightly bent, as shown in the cut, so as to leave a little space between them to allow the nuts to be easily turned. The jack-screw which was to be attached to the lateral was placed in position first, the one belonging to the central next, and the one reaching to the cuspid last.

Pressure was applied to the cuspid and lateral in the direc-

tions indicated by the arrows. The jack-screw attached to the central was first turned so as to push the tooth outward, and the wedging of the lateral moved the central in the direction indicated by the arrow at A. After the central had moved far enough outward, the tightening of this jack-screw was stopped and the action of the jack-screws attached to the lateral and cuspid continued, which reversed the action of the one attached to the central that served to hold the tooth from moving farther outward, its action being as indicated by the arrow at the side of the long nut. The central continued to move forward as indicated by the arrow at A until the lateral and cuspid were in their proper positions. When these three

FIG. 43.



(Nos. 5, 5, 39, 38, 38.)

teeth had gained their proper places, the jack-screws, molar band, and band on the lateral were removed, and a piece of retaining band No. 39 was bent to conform to the inner surfaces of the teeth, and holes punched in it for the studs on the central and cuspid to pass through. The retainer was then placed in position and held by two retaining nuts, No. 38, as shown in Fig. 43.

Bands were then cemented to the three upper left anterior teeth, and the clutch band to the right molar, and the jack-screws attached as before described and shown in Fig. 42.

When these teeth were also in position, the jack-screws and bands to which they were attached were removed, excepting the studded band on the cuspid. This was left on for the attachment of the retaining band, No. 39.

The band that had been placed in position to retain the three

teeth of the right side was taken off, and a new band fitted that would be long enough to reach from the first bicuspid of one side around the inside of the six anterior teeth to the first bicuspid of the other side.

The retaining band was first bent to nearly conform to the shape of the arch. It was then cut narrower with a pair of plate nippers, as shown in Fig. 44, spaces the full width of

FIG. 44.



the band being left at the points of contact of the two cuspids and the right central.

After being cut to nearly the proper shape, the band was bent to accurately conform to the teeth and holes punched to receive the three studs of the bands left on the teeth. The retainer was then filed smooth and placed in position, and three retaining nuts No. 38 screwed on the studs of the three bands as shown in Fig. 45, which retainer held the teeth firmly in position. This was left in place a little over six months.

FIG. 45.

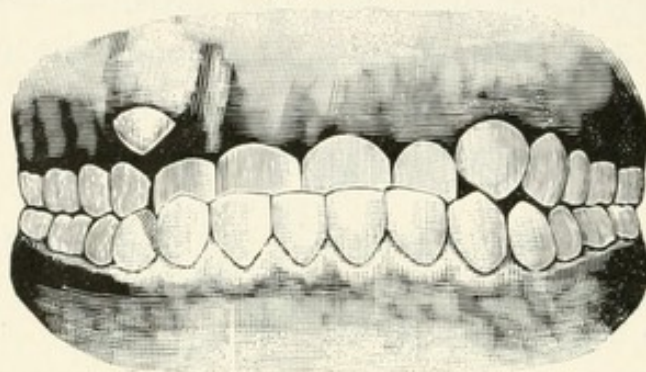


(Nos. 5, 5, 5, 39, 38, 38, 38.)

A case such as is commonly met with, although generally not irregular in such a marked degree, is illustrated in Fig. 46. In this case the right lateral was in such close relation to the first bicuspid that it was difficult to get a thread between them, and all the superior anterior teeth were inside the lower teeth, giving the upper lip a sunken, and the lower lip a very prominent appearance. The center of the face, lips, and lower teeth was about in the center of the upper left central, thus giving

the mouth a one-sided appearance when the lips were opened. When the case presented itself the tip of the upper right cuspid was just appearing through the gum at some distance above the other teeth. It was necessary to move the five

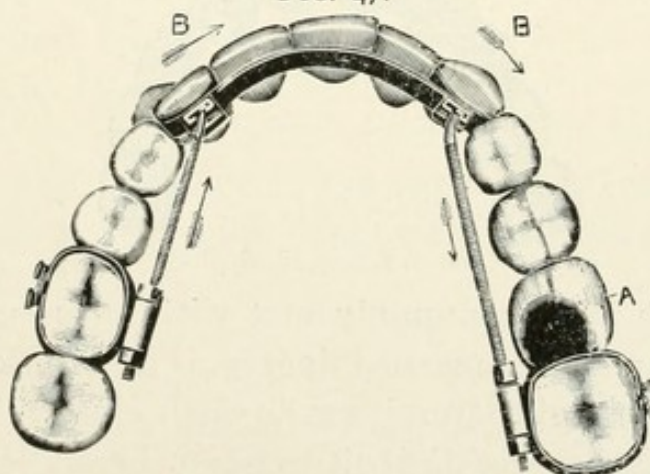
FIG. 46.



anterior teeth outward out of inlock and also to force them all to the left far enough to admit of the right cuspid being placed in the arch.

The upper left first molar (A) was very badly decayed, and was the only carious tooth in the mouth. That was extracted, and an apparatus put on for moving the teeth as shown in Fig. 47.

FIG. 47.



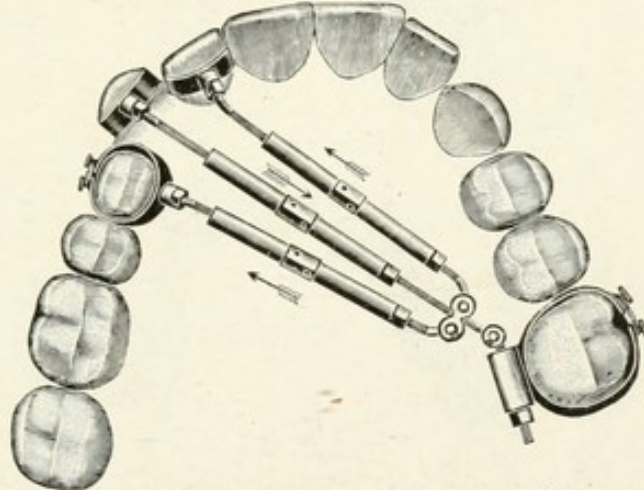
(Nos. 8, 3, 5, 8, 39, 27, 27, 19, 22, 22, 19, 22, 22.)

Clutch bands were cemented to the right first molar and the left second molar, and studded bands to the right lateral and the left cuspid. A piece of retaining band No. 39 was bent

to conform to the inner surfaces of the anterior teeth, and holes punched for the studs of the bands on the lateral and the cuspid to pass through. The retaining band being thus extended from the lateral to the cuspid, prevented the front teeth from becoming twisted or rotated and overlapping each other when pressure was applied as indicated by the arrows to force them outward and sidewise to the left through the alveolar process.

Square T sockets No. 27 were screwed on each of the studs, and a T bar (the square corners of the T heads being first filed off so that they could rotate in the square T sockets) placed from each of the square T sockets to the clutch

FIG. 48.



(Nos. 8, 28, 20, 32, 23, 25, 21, 24, 5,—3, 24, 21, 25, 23, 20,—6, 24, 21, 25, 23, 20.)

bands, pressure being applied to effect movement as indicated by the arrows. Bite bands were placed on each of the lower first bicuspid teeth, and as soon as the upper teeth had moved forward sufficiently to strike squarely on the lower incisor teeth, these bite bands were taken off.

Both T bars were regularly tightened a little at a time (the T bar on the right side being turned more each time than the one on the left) for about three months, when the teeth had gained the position shown in Fig. 48. The five anterior teeth were then striking outside the lower teeth, the interdental space between the central incisors being on the median line and the left second bicuspid touching the second molar.

A retaining appliance was then put on as shown in Fig. 49. This was left in position six months to allow the teeth to become fixed in their new positions, and also to allow the cuspid time to become fully erupted, after which the triple jack-screw appliance (the same one used in Fig. 42) was put on and the cuspid drawn into place as shown in Fig. 48.

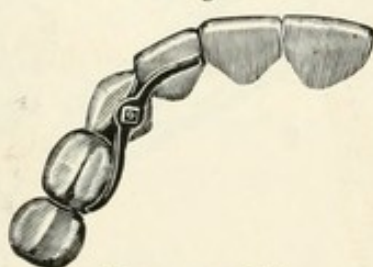
The jack-screws and bands were then all taken off excepting the bands on the cuspid and first bicuspid, to which was attached the retaining appliance in the manner shown in Fig. 50.

FIG. 49.



(Nos. 6, 3, 39, 38, 38.)

FIG. 50.



(Nos. 5, 37, 38.)

SADDLE-SHAPED ARCHES.

Of all the cases of irregularities of the teeth that present themselves for treatment, probably none exhibit such a marked similarity as those with constricted or saddle-shaped arches.

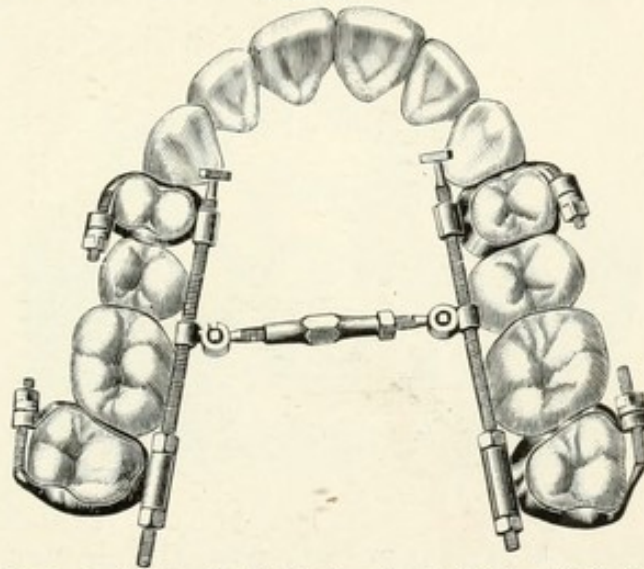
Fig. 51 shows a typical case, and the devices there illustrated will quickly and effectually accomplish the desired end with almost no alteration from the combination of parts shown in the illustration, which shows a completed case.

In these cases clutch bands are fixed onto the molar teeth, one on each side, and single socket clutch bands to the first bicuspid of each side. Single auxiliary T sockets No. 31 are placed in the center of each of two T bars, and the T bars

organized as follows to be placed in position one on each side of the arch as shown in the cut.

A short T bar No. 20, on which has been placed a lock nut No. 23, is cut to the proper length and screwed into the right-hand end of a short right and left threaded nut No. 26. Into the other end is screwed a left-hand threaded T bar No. 40. The T ends are then placed one in each of the single auxiliary T sockets, and this organization will then admit of the two T bars being adjustably placed in the clutch tubes as seen in Fig. 51.

FIG. 51.



(Nos. 20, 23, 26, 40,—19, 31, 22, 22,—19, 31, 22, 22,—46, 46, 50, 50.)

It will be seen that the pressure may be applied at any point on the T bars forward, backward, or diagonally in the mouth. And the points of force (the positions the T sockets occupy on the T bars) may be changed without removing any part of the appliance, by simply loosening the clutch nuts and revolving the T bars with a pair of small pliers applied to the T heads. This will cause the T socket to travel along the T bar, and it may be placed at any point in this manner, and when the clutch nuts are again tightened on the clutch tube, the T bar is prevented from revolving, and the T sockets are prevented from moving.

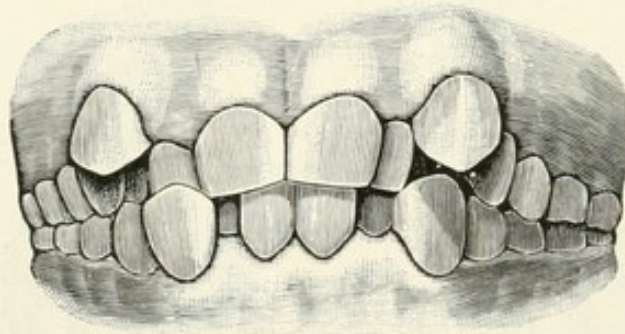
As this device is very powerful, care should be taken not to

tighten the right and left threaded nut too much at a time, or the superior maxillary bones may be separated. If this should happen, it is easily detected, as a wider space than usual will appear between the central incisor teeth, when of course the tightening should be discontinued for a few days.

To retain the teeth in these cases it is best to vulcanize a thin rubber plate to cover as little of the roof of the mouth as possible and still be large enough to rest against all the teeth that have been moved.

In the case illustrated by Fig. 52, the upper cuspids were both outside the arch, and the centrals and laterals formed one-half of a circle the diameter of which was less than an

FIG. 52.



inch. Each lateral striking between the lower cuspids and the laterals caused the lower laterals to be quite a distance inside the lower line of the arch.

The eight incisor teeth of both jaws were not prominent enough to give the proper expression to the lips, and it was necessary to force these eight teeth outward and draw the superior cuspids into the arch to give the lips their proper expression.

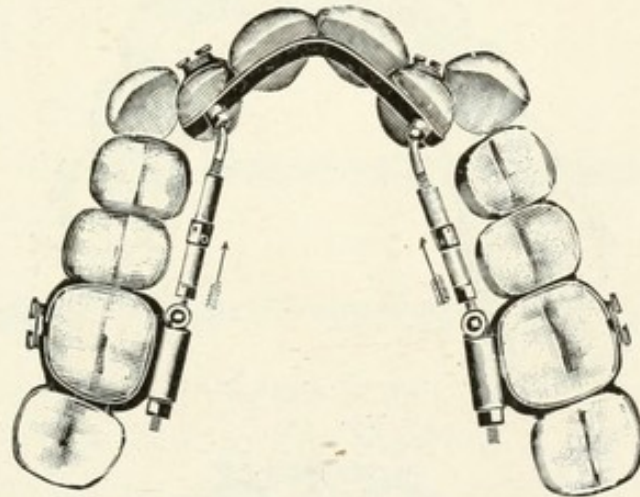
An appliance was first placed on the upper teeth to force the four anterior teeth outward, as shown in Fig. 53.

Clutch bands No. 8 were cemented to each of the upper first molars, and studded bands No. 3 likewise fixed upon the laterals.

A piece of retaining band No. 39 was bent to fit the inner

surfaces of the four anterior teeth, and holes punched to receive the studs of the bands on the laterals. T socket clutch bars No. 28 were then placed in each of the clutch tubes of the molar bands, to which were attached the jack-screws (Nos. 20, 23, 26, 21, and 24). The ball caps No. 24 when screwed on to the studs of the bands on the laterals held the retaining band in position. The arrows indicate the direction of the applied pressure which moved the four front teeth outward, the retaining band preventing them from crowding together and becoming uneven during this operation.

FIG. 53.



(Nos. 3, 3, 39.—8, 28, 20, 23, 26, 21, 24.—24, 21, 26, 23, 20, 28, 8.)

When these teeth had been moved far enough outward, the cuspids were one after the other drawn into the arch with the combination shown in Fig. 48.

The lower laterals were forced outward and the arch expanded to receive them by the use of the threaded arch bar No. 35, as shown in Fig. 54. (See Fig. 58.)

Clutch bands No. 8 were cemented to each of the lower first molars, and single socket clutch bands No. 11 likewise fixed upon the laterals. Four clutch nuts No. 22 were placed with their rounded portions toward each other (as in Fig. 58) on the arch bar No. 35, and the bar bent and cut to the proper length.

Bar end caps No. 34 were then screwed on the ends to pre-

vent irritation of the tongue. The center portion of the bar that would come inside the six anterior teeth was bent to the proper shape that the teeth should be in when the case should be completed and the bar placed in position. Pressure was applied as indicated by the arrows.

The laterals were first forced forward, and pushed the centrals ahead of them. The cuspids were also forced apart, giving room for the laterals in the arch.

When the laterals and centrals had been forced outward far

FIG. 54.

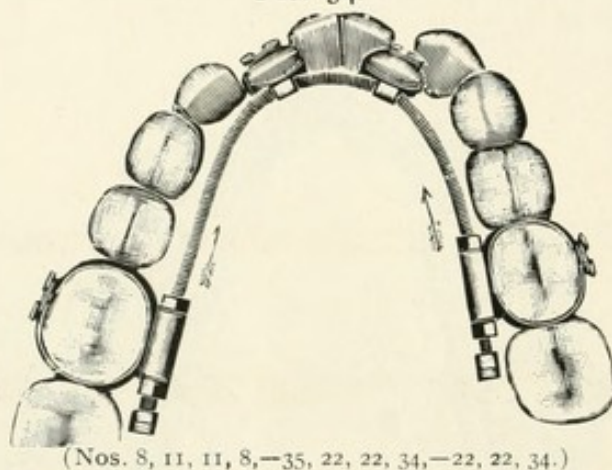
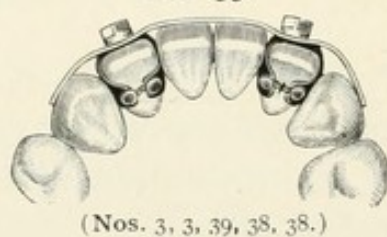


FIG. 55.



enough, the arch bar and bands were removed, and studded bands No. 3 placed on the laterals, with the studs outside the arch, to which studs was attached the retaining band No. 39 (see description of Fig. 44). The band was held in position by two retaining clamp nuts No. 38, as shown in Fig. 55.

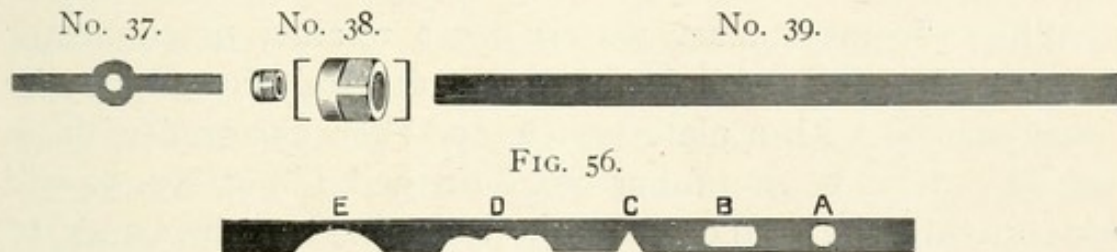
It is noteworthy that by suitably bending one of these retaining bands to bear properly on the surface of a tooth situated between the studs, or beyond a stud, regulating pressure may be applied by turning the nut No. 38, or the series of nuts, as the case may be, whether the band be located labially as seen in Fig. 55, or lingually as shown in Fig. 45.

RETAINING DEVICES.

The parts numbered 37, 38, and 39 are used for holding the teeth in line after they have been moved to their proper positions.

The retaining clamp No. 37 is attached to the bands by passing the stud of the band through the hole in the broadened center of the clamp, the ends of the clamp being first suitably bent to rest upon the adjoining teeth. A retaining nut No. 38 (magnified cut in brackets) is then screwed on the stud of the band which holds the clamp in position.

Part No. 39 is a blank band which is to be prepared to connect a number of teeth when they are all to be moved in one



direction, and also is to be made as a retainer when a number of teeth are to be held in line, making it necessary to place bands on two or more teeth.

To attach a retaining or a connecting band No. 39 to the teeth:

First make a pattern of sheet tin, or lead, punching holes in the pattern for the studs of the bands to pass through. This will mark the proper distances apart that the holes should be punched in the retaining band. After bending the band to the proper curve the holes should be punched, the band placed in position, and a retaining nut No. 38 screwed on each of the studs which pass through the band to hold it in position.

Fig. 56 represents at A a hole punched to receive the stud of the band on the tooth. B indicates a slot formed by punching a succession of holes. This may be necessary in some cases, especially when the holes have not been properly punched at first.

When it becomes necessary to bend the band in the plane of its width, cut a V-shaped notch two-thirds the width of the band as shown at C, Fig. 56. This will allow the band to be bent in a lateral direction.

If it should be advisable to have the band as narrow as possible it may be so made as shown at D, Fig. 56, by cutting away two-thirds of the width of the band with plate nippers and filing off the points smooth with a half-round file as shown at E. Carefully leave enough metal to surround the stud at the parts of the band where the holes are punched to receive the studs.

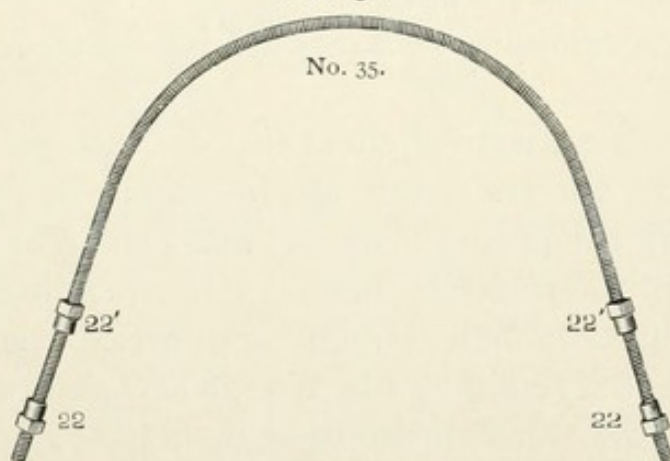
FIG. 57.



When the preliminary pattern for a retainer or connector has been formed, the holes in the blank band No. 38 may be first punched with a plate punch, and then enlarged with an engine bur. The round bur No. 6 or the bud bur No. 52 will cut suitably sized holes to allow the studs on the bands to pass through the retainer to receive the No. 38 retaining nuts.

An example of a retaining band is seen in Fig. 57.

FIG. 58.



THE THREADED ARCH BAR.

The several styles of studded and clutch bands readily lend themselves to the well-known uses of the threaded arch bar No. 35, which, when provided with the clutch nuts No. 22 dis-

posed as shown in Fig. 58, may be quickly placed in or taken from the clutch tubes of the bands, when these are fixed on the molars or bicuspidis of both sides. Observe in Fig. 58 the relations of the clutch nuts Nos. 22, 22 to 22', 22', as that disposal of them, with the rounded portions toward each other, adapts them to the locking sockets of the clutch tubes, as previously explained.

When the threaded arch bar, or T bar, is to be bent, slip sections of a small rubber tube over the plier jaws to prevent injury to the screw threads. Better still, take a piece of hard wood or bone of about two inches long, half an inch wide, and a quarter of an inch thick; put a fissure bur No. 70 in the engine hand-piece, hold it at a right angle to the wood edge, and cut a slot about an eighth of an inch deep. While the bur is at the bottom of the slot, swing the hand-piece slightly back and forth lengthwise of the wood to round the inner corners of the slot. The bar may then be slid into the slot and be bent, or straightened, without injury to the threads over which the nuts are to pass. By thinning one edge of the wood, a slot in it can be adapted to the bending of short curves, when these are requisite in conforming the bar to the case in hand.

Indeed, it seems advisable to here renewedly emphasize the fact that these appliances are in character like instruments of precision, and are designed for thoughtful and skillful professional uses in the correction of dental deformities and irregularities. Therefore the several members are finely finished and delicate in dimensions, yet are sufficiently strong for proper employment in moving living organs set in yielding tissues; the pressure should always be simply sufficient, without being excessive.

The several parts are formed with exactness, and are accurately gauged by the inspector to be as sure as is practicable that every part will fit its related part. For instance, the T end of the T bars, Nos. 19, 20, and 40, will easily enter the slot of the square T socket No. 27 at a right angle to the socket or

mortise; and the bar is then to be swung to the right or left, while the T end is pushed against the *socket wall opposite the slot* until the bar is swung *in line with the squared socket*, which the square T will then enter by push, or pull, and closely fit and be squarely secured for its carefully designed uses. (See Fig. 17.) A like process is to be pursued when placing a T bar in the round T sockets of Nos. 28, 31, and 32; but in these the T is secured so soon as the bar is swung to the right or left of the slot; yet the pull or push action may be employed at any radius from the socket within the swinging range of the bar. But, as in the previous instance, the insertion of the T is to be carefully, yet easily, effected without undue force, because if it does not readily enter through the slot and get seated in the socket, a thoughtful readjustment of the socket or other parts is necessary. Then, too, in turning the ball cap of the ball bar upon the stud of the band in the jack-screw organization, as shown in Fig. 14, careful delicacy of manipulation with judgment is requisite in starting the threads of the cap right over the threads of the stud, to avoid wrenching them ruinously, and needlessly, since the ball and socket joint provides for the proper engagement of the stud with the screw cap.

Recurring to Fig. 58, it is to be furthermore said that the arch bar is threaded along its entire length, and thus provides for the familiar ligature process of regulation, as the screw threads permit the non-slipping fastening of the ligatures to the bar at any angle of draft on the teeth to be drawn directly or obliquely outward.

In cases requiring inward movement of the oral teeth, single socket clutch bands may be fixed showing the clutch tubes on the labial aspects of the teeth. The arch bar, as shown in Fig. 58, may then be seated in clutch tubes fixed on the second molars, and the suitably bent bow of the bar be made to rest in the clutch tubes of the bands on the anterior teeth. A tractive stress may then be initiated by loosening nuts 22', 22' and tightening nuts 22, 22, Fig. 58. Two bar-end caps No. 34 screwed on the ends of the bar will protect the cheek and

tongue from irritation. The organization thus applied will prove effective and satisfactory. Other similar combinations may be readily arranged and applied to meet presenting cases.

The nuts on all the bars work easily, so that before and after using the wrench they may usually be turned on the bars into or out of position by sweeping over them with the ball of the finger.

With reference to the screw band it is to be said that care should be taken not to tighten the nut too tight, as more bands are broken from this cause than from actual use. After the band has been placed on the tooth in the required position, the nut should be turned moderately tight and the band burnished to conform to the irregularities of the tooth's surface. The nut can then be turned somewhat tighter to take up the slack caused by burnishing.

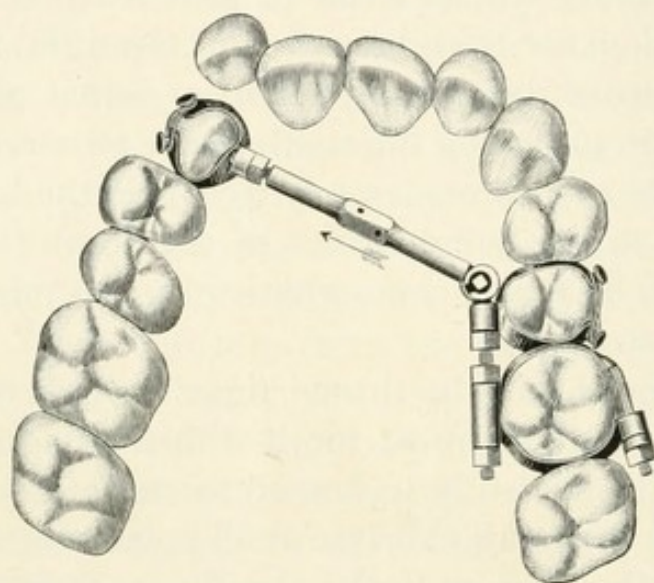
The nut need only be turned tight enough to prevent the band being pulled from the tooth with the fingers. After the nut has been sufficiently tightened to cause the band to be in contact with the tooth's surface at all points, further tightening only injures the band, as the band will not stretch and the tooth cannot be compressed. Do not kink the band or attempt to drive it into position by the use of a mallet, plugger or other steel instrument. Always work the band onto the tooth with the fingers, as the nut can be quickly and easily slipped off the slotted collar and the band straightened out when necessary. The working of the bands between the teeth and getting the tubes or studs in their proper positions is thus greatly facilitated.

In the case illustrated in Fig. 59 the superior right cuspid was to be pushed into line from the anchorage of the superior left second bicuspid, which was somewhat inside the line. A studded band No. 5 was cemented on the cuspid, a single socket band No. 13 was fixed on the bicuspid, the socket opening anteriorly, while a screw band No. 49 was placed on the first molar. A clutch bar No. 28 had a lock-nut No. 23 and

two clutch nuts No. 22 put on it, and was then set and screw-locked in the two socket clutches of the bicuspid and molar as shown in the figure.

A No. 24, 21, 25, 20 jack-screw (see Fig. 15) was duly connected with the stud of the cuspid band, as also with the round T-socket of the No. 28 bar, and pushing pressure was then

FIG. 59.



(Nos. 5, 13, 49, 28, 23, 22, 22, 20, 25, 21, 24.)

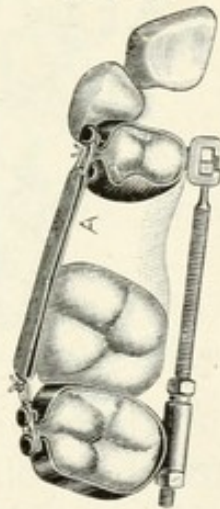
effected in the direction of the arrow. Obviously, the bicuspid would get the direct anchorage-thrust of the jack-screw, and, while receiving some support from the coupled molar, would somewhat yield under the stress requisite to move the stubborn cuspid into position; the bicuspid also getting into line.

When this had been accomplished the jack-screw was removed, the bar No. 28 detached from the bicuspid band socket, and replaced in the molar band socket. A studded band No. 3 was fixed on the lateral, and a single auxiliary socket No. 31 was screwed on the bar No. 20 between its T and the end of No. 25. To that No. 31, another jack-screw, was coupled, and the T of the first jack-screw placed in the No. 28 of the molar band. The respective ball caps of the two jack-screws could then be coupled to the studs on the cuspid and lateral in a

manner similar to the organization shown in Fig. 22. Then, while the cuspid was held in place by the jack-screw with which it was first pushed into position, the lateral could with the other jack-screw be pulled into line.

It will sometimes occur that the malposed cuspid or bicuspid of a full-grown patient is unusually resistant to tractive action, and in such a case reinforcing aid may be expedient.

FIG. 60.



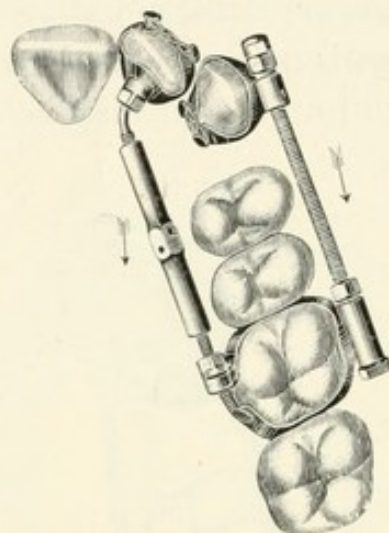
(Nos. 8, 5, 19, 22, 22, 27.)

In Fig. 60 is seen an example similar to that of Fig. 18. In this instance a section of a rubber tube, A, is by means of ligatures stretched between the band buttons of the molar and bicuspid. The operative traction of the bar No. 19 will be aided by the pull of A, the constant drag of which will be checked or limited by the intermittent action of the bar controlled by the nuts 22, 22; thus avoiding the common danger of over-pull by the gum elastic if the patient should delay recourse to the dentist, a not infrequent event.

In this case the cuspid, Fig. 61, is being retracted by a T-bar organization like that of Fig. 30, while the lateral is subject to the dragging and rotative action of a jack-screw, the right-hand threaded end of which directly engages the screw of a No. 49 band. This very effective combination led to the later adoption of the T-bar size and thread for all the screw bands,

thus providing for other like organizations. In the present case it may be seen, that if 24 is not turned tight on the ball of 21, the traction will rotate as well as retract the lateral.

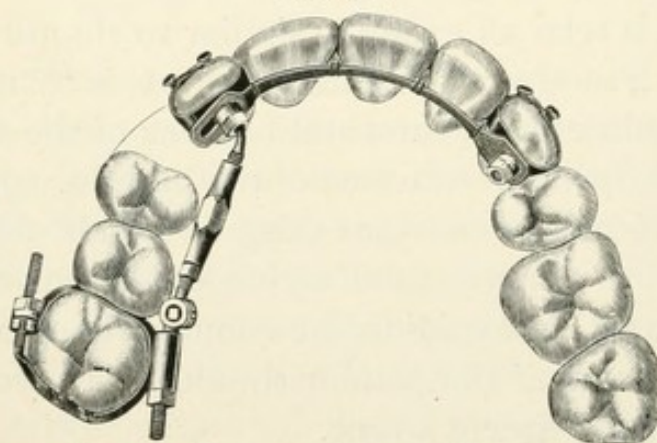
FIG. 61.



(Nos. 49, 12, 3, 19, 2, 22, 22, 34, 25, 24, 21.)

Fig. 62 shows a case in which the upper incisor teeth occluded directly on or a little back of the cutting-edges of the lower incisor teeth.

FIG. 62.



(Nos. 50, 28, 20, 23, 26, 21, 24, 38, 39, 3, 4.)

There was not enough room for the upper right cuspid in the arch, and the upper incisors all stood a little apart from each other (not shown in the cut).

The left cuspid and right lateral were banded with studded bands, and the right first molar with a double-socket screw

band. A piece of retaining and connecting band, No. 39, was punched to go over the studs of the bands on the cuspid and lateral, and was trimmed to a narrower width where it passed over the lingual surfaces of the centrals and left lateral, as shown in the cut. Then a round T-socket clutch bar No. 28 was placed in the clutch tube of the band on the molar, and a jack-screw (composed of Nos. 20, 23, 26, 21, and 24) attached from it to the stud of the band on the lateral. It will be also noticed, in referring to the cut, that this band is held to the stud of the band on the cuspid by a retaining nut, No. 38, and to the stud of the band on the lateral by the ball cap (No. 24) of the jack-screw.

The hole for the stud of the band on the lateral was elongated with a fissure bur (see cut) so as to allow the teeth to crowd together until the spaces between them had been closed. As soon as the teeth were in contact the ball cap was screwed tightly against the band, which prevented any more crowding and held the teeth in line while they were being forced forward to their proper positions.

The wire ligatures seen in the illustration were not employed in the present case, but they are shown as applicable in some similar cases to secure the bar in contact with the lingual surfaces of the teeth. The author, however, prefers the employment of bands wherever applicable.

FIG. 63.

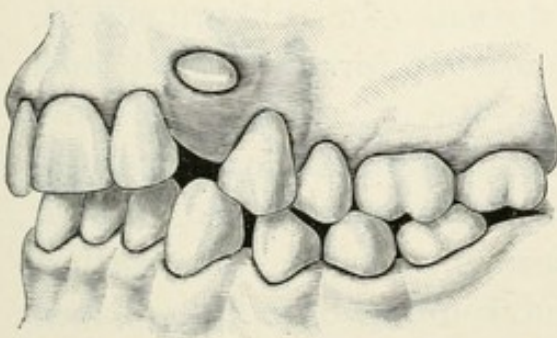
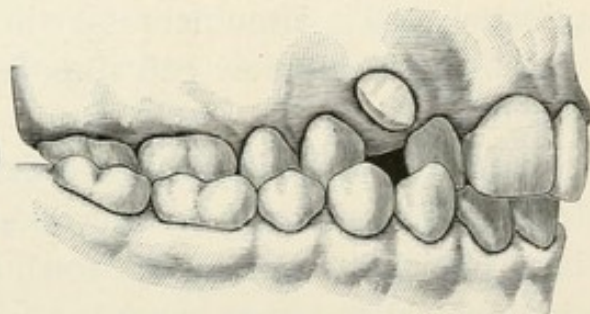


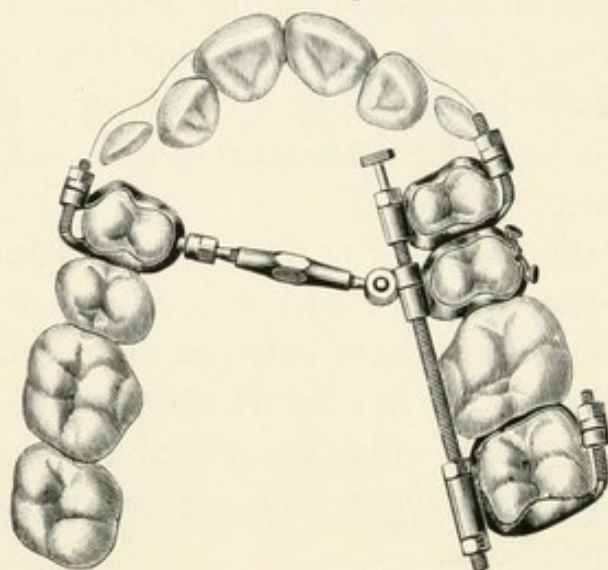
FIG. 64.



In Figs. 63 and 64 are seen the lateral aspects of a peculiar form of saddle-shaped arch. Fig. 63 shows on the left side the

occlusion of the teeth to be almost normal. Fig. 64 shows the teeth of the right side, which, beginning with the lateral, are all inside the arch. In this case a modified form of the appliance shown in Fig. 51 is used, the bicuspid and molars of the left side being used as anchor teeth, and only one tooth of the right side forced out at a time, as shown at Fig. 65. It will

FIG. 65.



(Nos. 42, 24, 33, 26, 20, 19, 22, 31, 22, 22, 49, 13, 46.)

be readily seen that by using four teeth as anchorage to move one, all of the inlocked teeth may be successively moved into position, one at a time, without moving the anchor teeth which are already in their proper positions. This form of compound anchorage may be used in any case where jack-screws are applicable, and is often necessary in the case of a stubborn cuspid, when one jack-screw can thus be used to force the tooth into position.

In the case illustrated, the first and second bicuspid teeth, to use for anchorage, were banded with single-socket clutch bands (either screw or button), and the second molar with a double-socket screw band. A clutch nut, No. 22, was placed on a T bar 19, followed by a single auxiliary T socket 31, and two clutch nuts, 22. A jack-screw, composed of parts numbered 20, 26, 33, and 24, was attached from the single auxiliary

T socket to the stud of the band on the tooth to be moved, as shown in the cut. The position of the single auxiliary T socket on the T bar can be readily changed by loosening the clutch nuts and revolving the bar. The socket will travel forward or backward on the bar as the bar is revolved to the right or left.

SIMPLE ROTATION.

FIG. 66.

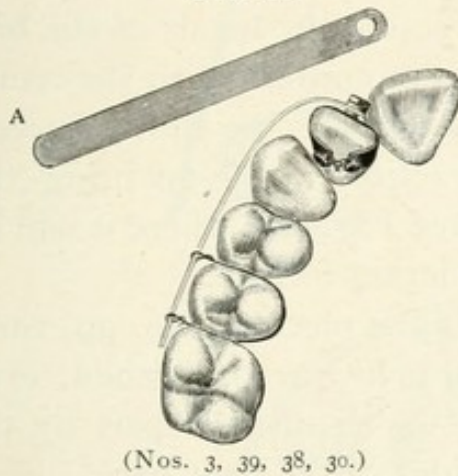


FIG. 67.

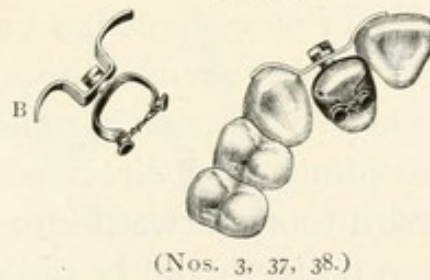
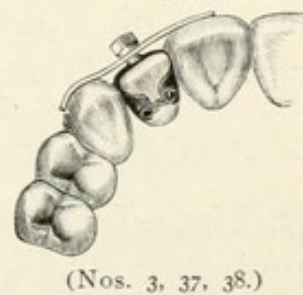


FIG. 68.



Spring lever rotation of a single tooth is illustrated in Fig. 66. In this typical case a studded band No. 3 was cemented on the upper right lateral. With the retaining band punch a hole was punched in one end of a piece of the retaining and connecting band No. 39, as shown at A. This was suitably curved, and with No. 38 fixed on the stud of the band of the lateral incisor. This bent spring lever was then secured to the second bicuspid by a ligature of band wire No. 30. Obviously, successive slight bendings of the lever from day to day will exert a rotative action upon the tooth until the desired relations shall have been attained. Then the retaining clamp No. 37 may replace the lever to maintain the proper position of the tooth.

The regulative function of the retaining clamp No. 37 is exemplified in Fig. 67, where it is shown in action on an inward lateral incisor. This had fitted and cemented upon it a studded band No. 3, and a No. 37 was bent as shown at B, and a retaining nut No. 38 screwed onto the stud. It will be seen that the bow of the clamp does not quite touch the band, and consequently, when the wings rest on the cuspid and central, a turn of the nut will pull the banded lateral outward. When a degree of movement has been effected, the bends of the bar, as at B, are lessened to those shown in contact with the teeth, and renewed traction produced by turning the nut. Successive bendings and direct screw traction will soon bring the backward tooth forward into line (see Fig. 68), where it will be retained perfectly by the same regulating fixture.

By suitably punching and banding a piece of No. 39, similar simple rectifications may be quickly accomplished, even when the teeth on either side are to be pushed apart by the wedging pressure of the inclined sides of the bent bar.

ARCH-BAR EXEMPLIFICATIONS.

No. 35, Fig. 69, is the threaded arch bar on which are six clutch nuts, No. 22. The No. 8 is a molar double-socket clutch band; the Nos. 13 are single-socket clutch bands, while No. 49 is a double-socket screw clutch band.

In Fig. 70 is shown No. 8 fitted, wired, and cemented upon an upper right first molar. No. 13 is likewise fixed upon the upper right cuspid, and there is also secured on the upper left lateral another button band, No. 13. Upon the upper left first molar a screw clutch band, No. 49, is screw clamped.

Upon the arch bar No. 35 six Nos. 22 have first been screwed into the positions shown in Fig. 69, and two bar end caps, No. 34, fixed on the ends of the bar.

This is then ready to be bent, placed, and adjusted in the position shown in Fig. 70. The open sockets of the bands are specially designed to make easy the passing of the bar

through the slots into the sockets, wherein it is then secured by means of the peculiar-shaped nuts No. 22.

FIG. 69.

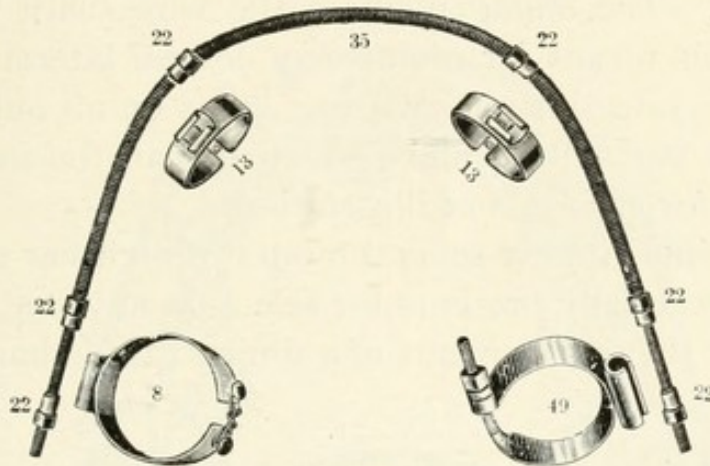
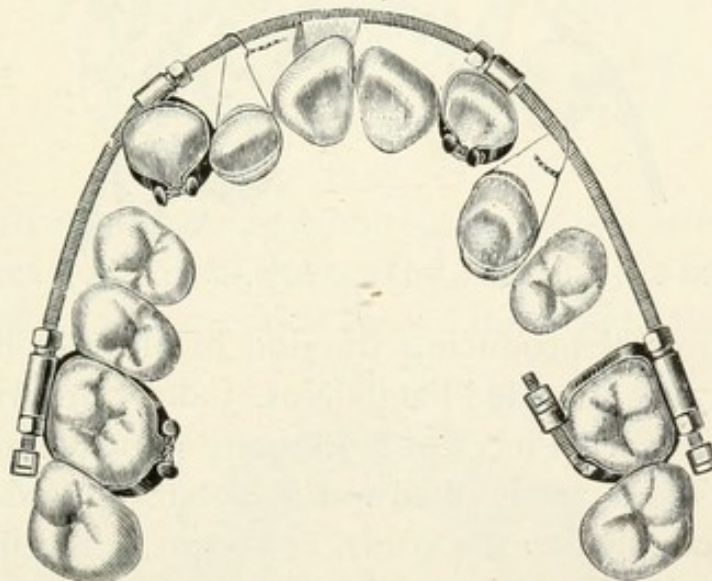


FIG. 70.

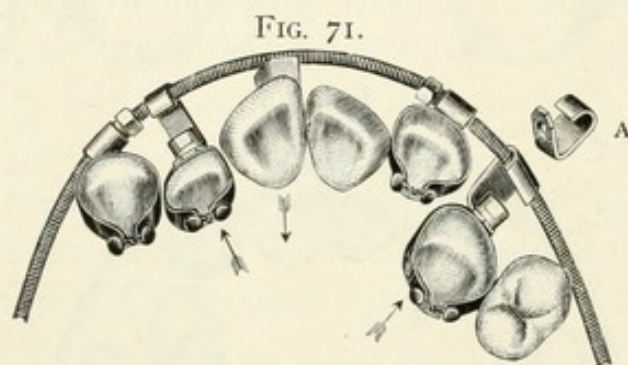


(Nos. 8, 49, 13, 13, 35, 22, 22, 22, 22, 22, 22, 34, 34.)

In the present instance, illustrated in Fig. 70, the arch bar is shown to have been readily placed in the socketed clutches of the molar and cuspid bands, and operatively secured therein by turning the nuts with the wrench No. 29. Manifestly the turning of the distal nuts of the anchor teeth bands will drag the cuspids both inward and rearward, and the turning of the mesial nuts will also force the cuspids backward. Simultaneous pressure on the rubber or wood block will press the right central inward with a rotative action.

Independent traction of the right lateral and left first bicuspid may be effected by means of the wire ligatures, the twisted ends of which may with pliers be given operatively torsional strain. The engagement of the wires with the screw threads affords means for giving any desired lateral direction to the drag. Locating the twisting stress on an outside contact with the bar will be more effective than the inside positions chosen for clearness of illustration.

The grouping of these several modes of arch bar regulation in this Fig. 70 briefly presents for selection any one, or all, of them to meet the requirements of a similar case in hand.



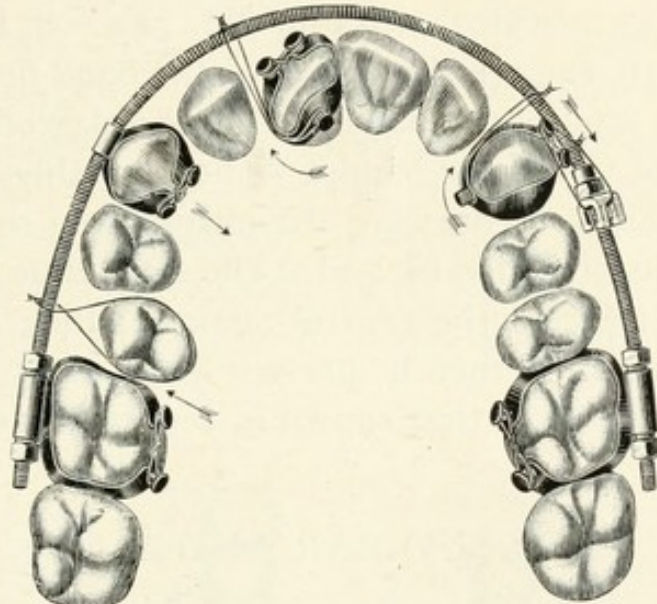
(Nos. 8, 49, 22, 22, 22, 22, 13, 3, 12, 5, 35, 39, 39, 38, 38.)

Another way of producing traction in place of ligatures is seen in Fig. 71. Studded bands Nos. 3 and 5 are fixed on the lateral and cuspid. Pieces of No. 39 are punched and bent as seen at A. These are hooked onto the bar 35, and by retaining nuts 38 coupled to the studs, as shown in the illustration. When the limit of tractive action by the turning of the nuts has been reached, the hooks are removed, bent somewhat shorter, and replaced. Repetitions of this process will bring the teeth into line ready for retainers.

The arch bar, 35, may be employed in rotative action, as exemplified in Fig. 72. Fix double-socket bands on the molars, a single-socket band on the right cuspid, and studded bands on the right central and left cuspid. Turn a clutch nut 22 round end ahead well onto the arch bar, following with a No. 27, and two 22's on that side, as also two on the other side. Place the

bar in the several socket clutches, and with loops of wire around the studs twist the wire ends tight on the bar and on No. 27. A careful consideration of the illustration will make

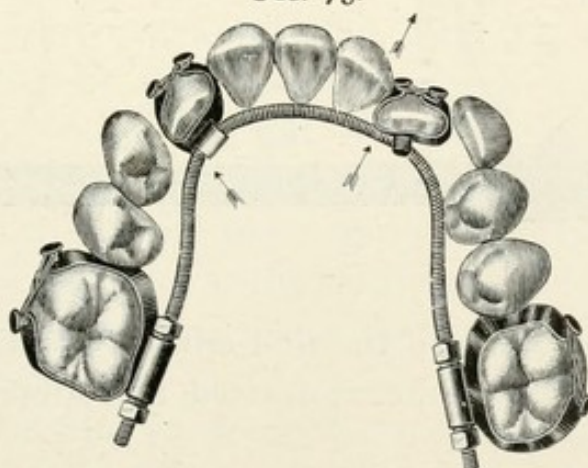
FIG. 72.



(Nos. 8, 12, 5, 4, 35, 22, 27, 8, 22, 22, 22, 22.)

it evident that the proper turning of the nuts on the right molar band socket will rotate the central and aid the corresponding rotative action on the cuspid caused by turning the nuts on the

FIG. 73.



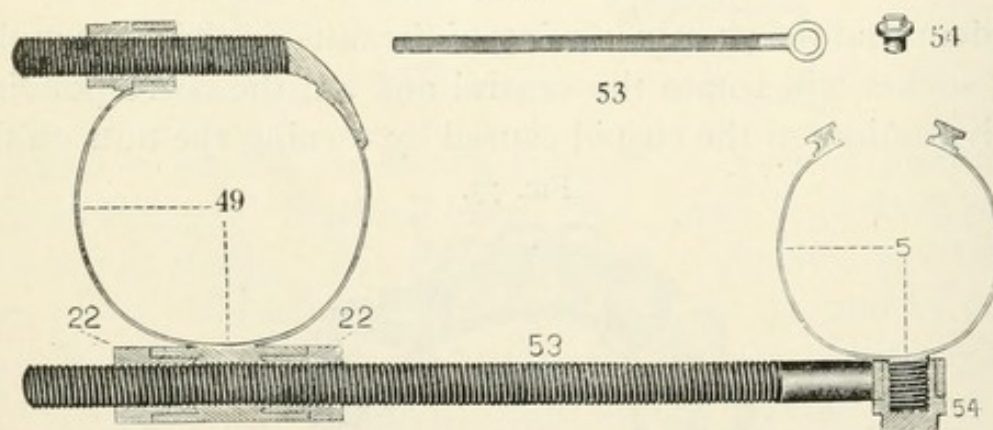
(Nos. 8, 12, 3, 8, 35, 22, 22, 22, 22.)

socket of the left molar band. At the same time a twisting traction of the wire ligature on the right second bicuspid will press inward the right cuspid.

Fig. 73 exemplifies the operation of an arch bar No. 35 when applied to some forms of irregular inferior teeth. In the present case, after Nos. 8, 12, 3, and 8 (Nos. 50, 50 might replace the Nos. 8) had been fixed on the respective teeth, an arch bar No. 35 provided with four No. 22's (see Fig. 58) was bent to properly engage the socket of the band on the cuspid, and under the stud of the band on the lateral, while resting in the clutches of the molar bands. Then suitably turning the clutch nuts will force outward the cuspid, and so act on the lateral as to push it outward, and at the same time partially rotate it, together with the central against which it impinges. The left cuspid could then be pressed into line by an arch bar combination similar to that shown in Fig. 70 in action on the right cuspid.

THE STUD BAR AND NUT.

FIG. 74.



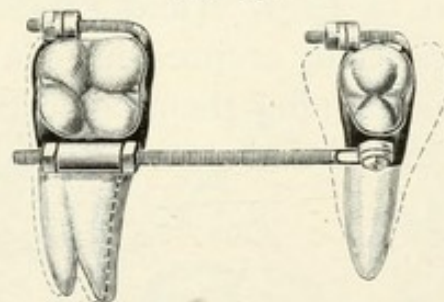
Since the publication of the first edition of this work, there have been some improvements devised, and some changes suggested by experience.

The organization shown magnified in cross-section by Fig. 17 and in position by Fig. 18, while operative in many instances, has been occasionally inadequate in some obstinate cases whereon strong pressure would effect some degree of un-

desirable rotation in addition to the back or forth tipping movement of the irregular tooth.

A careful consideration of the illustrative Figs. 74 and 75 will make evident the fact that in the new stud bar No. 53 and stud bar nut No. 54 we now have means for effecting a tipping movement without rotation in any actual instance. In Fig. 74 the magnified members exhibit the operative functions of the new appliances Nos. 53 and 54, which couple the stud of No. 5 to the clutch of No. 49 in such a way as to permit optional pull or push action on the tooth to be moved, without any rotative stress, while surely effecting the desired tipping movement of the tooth crown in a progressive and retentive manner.

FIG. 75.



(Nos. 43, 49, 53, 54, 22, 22.)

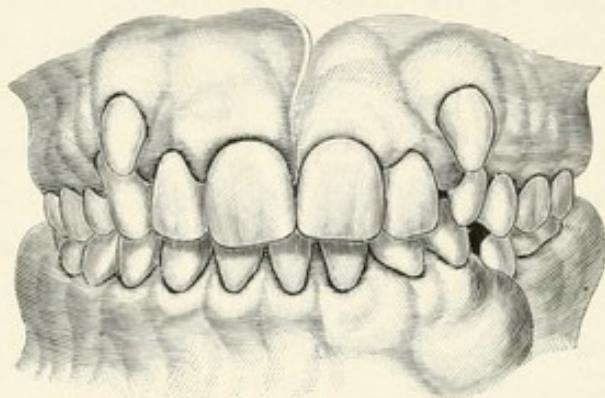
In an illustrative example like Fig. 74, a studded band No. 5 was fitted on the bicuspid and a No. 49 on the molar. The stud bar No. 53 and nut No. 54 were adjusted on the stud of No. 5, the bicuspid was dried and kept dry, while with a little cement around its inner surface the band was pressed tight upon the bicuspid, at the same time the bar rested in the clutch of the molar band, ready for operative action after the setting of the cement.

Pursuing the same course with a studded screw-band instead of No. 5, the cement may be omitted, and an immediate application of the stud bar effected, as shown in Fig. 75.

By turning 54 tight on 53, and suitably turning the 22's the tooth may be tipped forward or backward (see dotted lines

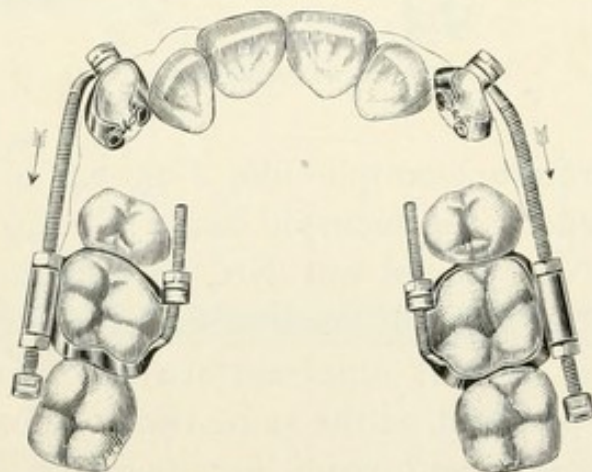
Fig. 75) without any rotative movement whatsoever. The device is both simple and strong; affording another example of the adaptable usefulness of the studded bands.

FIG. 76.



In the case shown by Figs. 76 and 77 (the cut, Fig. 76, erroneously shows the partially erupted cuspids behind the laterals, instead of above and lapping them, as in the model), the first bicuspids were extracted and studded bands Nos. 3 cemented

FIG. 77.



(Nos. 3, 50, 53, 54, 22, 22, 34,—3, 51, 53, 54, 22, 22, 34.)

on the cuspids. Screw-bands Nos. 50 and 51 were fixed on the molars, and stud bars No. 53, with stud bar nuts No. 54, were applied as shown in Fig. 77.

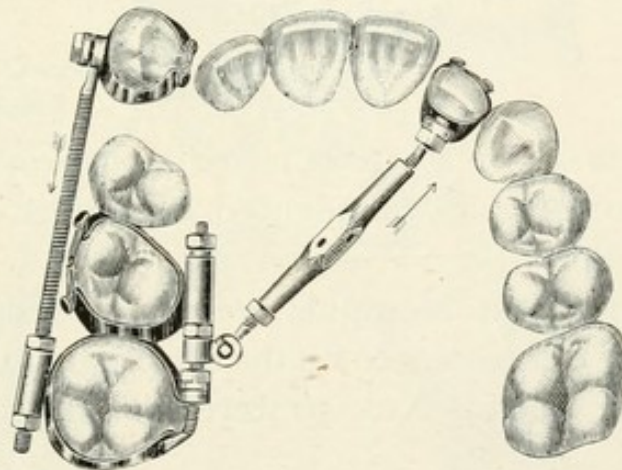
By suitably turning the nuts, Nos. 22, and from time to time bending the slightly flattened stud bars, to exert inward

spring action on the retrograding cuspids, they were simultaneously moved backward and inward into line; the long screws of the screw-bands being bent into contact with the second bicuspid to prevent rotative stress on the molars due to the spring action of the stud bars.

REINFORCED ANCHORAGE.

In this instance the upper right outward cuspid and the left inward lateral were to be moved into line. The lateral had a No. 3 band, the cuspid a No. 5 band, and the right first molar a No. 8 band, wired and cemented as seen in Fig. 78. On a No.

FIG. 78.

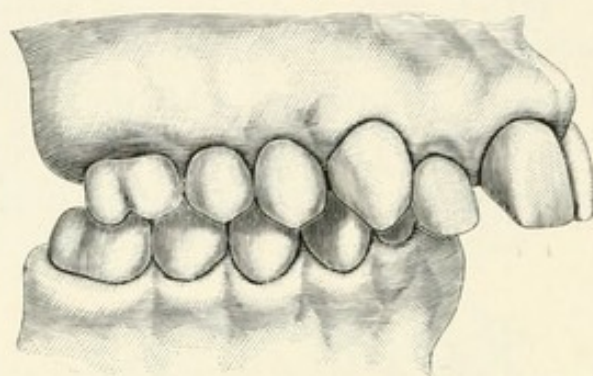


(Nos. 3, 5, 8, 50, 31, 23, 22, 20, 23, 25, 21, 24, 53, 54, 22, 22.)

50 band were first screwed Nos. 31, 23, and 22, and the band fixed on the right second molar as shown. A jack-screw was then attached to 31 and 3, and pressure from the reinforced anchorage exerted against the lateral in the direction of the arrow. A like pushing or pulling action on a left central, cuspid, bicuspid, or molar could be based on this firm duplex anchorage. This is also serviceable in the case of the cuspid, on the band stud 5 of which a stud bar No. 53 is fixed by the stud bar nut No. 54, the other end of the bar entering the clutch of No. 50. By turning the nuts 22, 22 on the bar, tractive action on the cuspid may be employed, and by from time to time removing and slightly bending the bar its resilience

or spring will press the cuspid inward so that its movement into line may be completed by this stud bar action alone. It is noteworthy that the two molars coupled by means of the long screw of 50 resist firmly the torsional stress of the spring finger action of the bent stud bar.

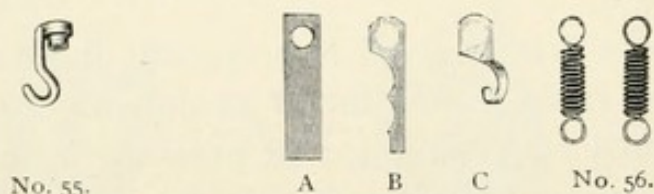
FIG. 79.



In Fig. 79 is shown a case of remarkable protrusion wherein the lower central incisors indented the gums on a line from cuspid to cuspid.

The superior first bicuspid were removed, and studded bands Nos. 4 were cemented on the central incisors as shown in Fig. 81. Screw bands Nos. 50 were then fixed upon the first

FIG. 80.

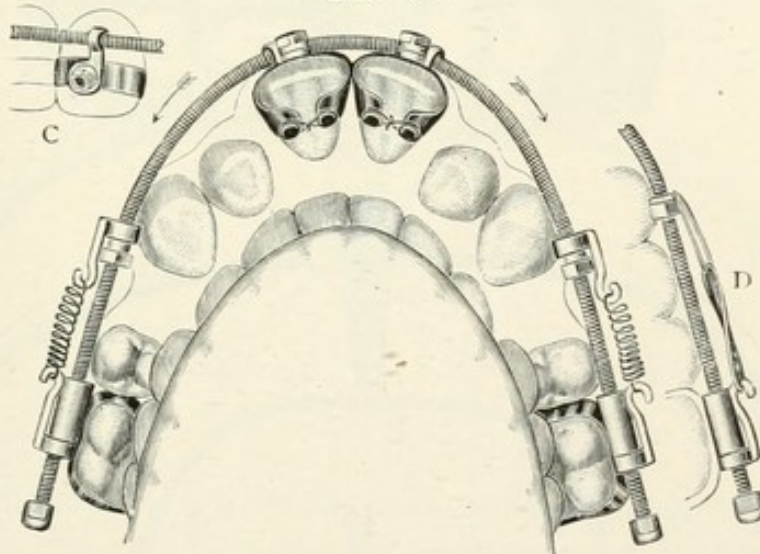


molars. Two bar hooks Nos. 55, see Fig. 80, are (one on each side) to be slid head first upon an arch bar, No. 35, and followed by lock nuts Nos. 23 to retain the hooks in the positions as shown by Fig. 81. Two more bar hooks are then slid, hooks first, on the bar and kept from sliding off by bar-end caps Nos. 34. Two short pieces of No. 39 are to be punched as seen at A, Fig. 80, cut with plate nippers as seen at B, and shaped into limit hook form like C. The prepared arch bar

may then be placed in position, and the hooks coupled by springs, Nos. 56, shown separately in Fig. 80. Two limit hooks (C) are then fixed upon the band studs of the centrals by retaining nuts Nos. 38 as shown by Fig. 81 in the labial aspect of C, that indicates clearly the limiting function of the hook C, Fig. 80.

The illustrations and descriptions should make apparent the fact that by repeatedly screwing the nuts 23 away from the spiral springs, this tension will draw the oral teeth backward into position. Rubber rings may likewise then be used as shown at D, Fig. 81, but the springs are preferable from every point of view.

FIG. 81.



(Nos. 4, 4, 50, 50, 35, 55, 55, 23, 23, 55, 55, 34, 34, 56, 56.)

The bar can be taken from the mouth and replaced in a minute by first detaching the springs, sliding the rear hooks out of the clutches and loosening the retaining nuts; then reversing these steps will suffice to readily replace the bar for action.

Of course the positive screw traction can be produced by substituting for the springs and their hooks the bar and nuts shown in Fig. 70, but the variable, yet controllably constant resilient action of this Fig. 81 organization has proven useful in regulative movements of like magnitude.

MAJOR PROTRUSION.

In cases of major protrusion when the oral teeth, sometimes even including the bicuspids, are to be retracted simultaneously, or partially so, merely dental anchorage is insufficient and a resort to the occipital base becomes necessary. A case in point is shown by Fig. 82. The early loss of the

FIG. 82.

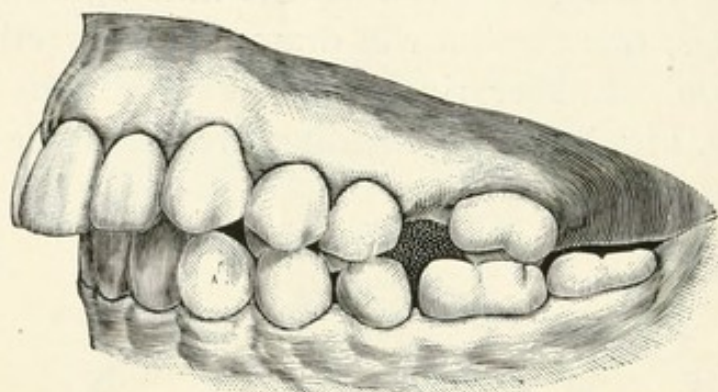
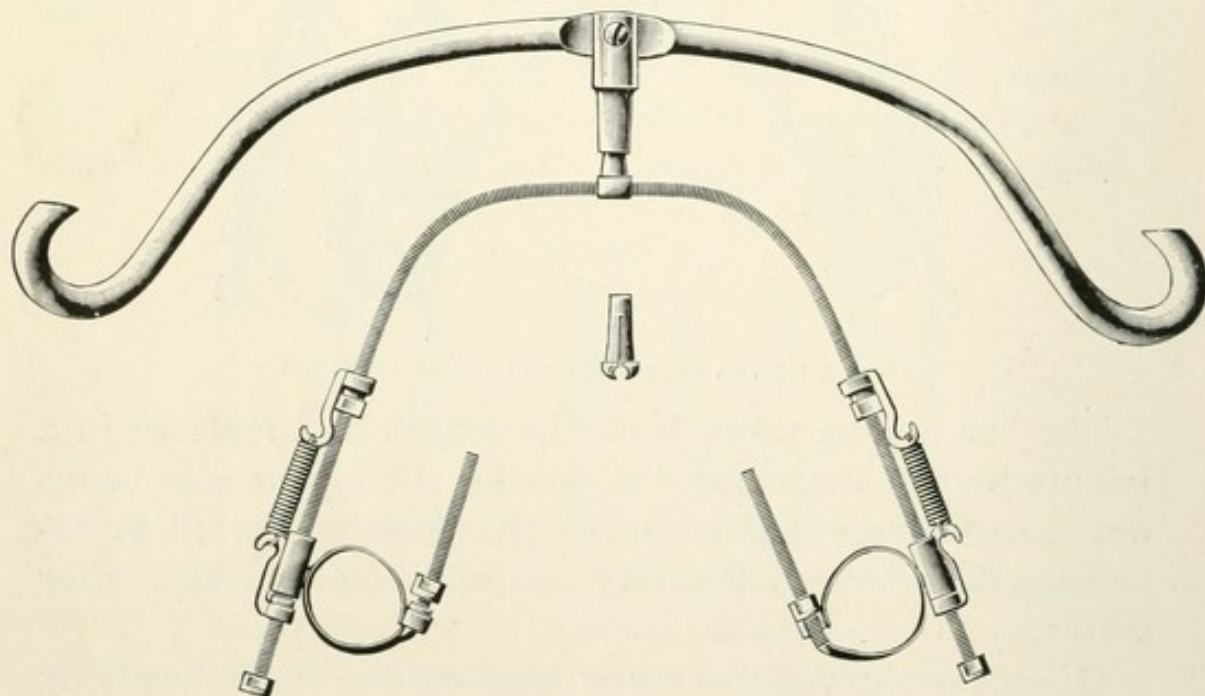


FIG. 83.

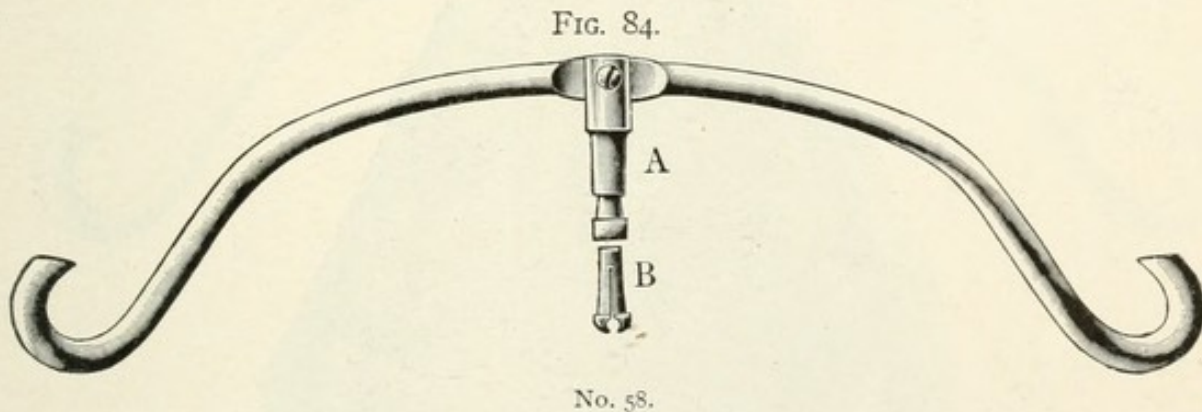


(Nos. 58, 35, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, 56.)

upper first molars and the obviously very considerable protrusion of the six anterior teeth, make this an illustrative instance of the applicability of the protrusion bow organization shown in Fig. 83.

PROTRUSION BOW.

The protrusion bow No. 58, shown separately in Fig. 84, has a pivoted central standard A, in the socket of which the split chuck B is conically seated. This chuck is transversely bored and threaded to receive the arch bar No. 35. In operation the arch bar is to be secured upon the teeth in a manner similar to that shown by Fig. 81. The chuck B is then sprung onto No. 35, and the standard A telescoped upon the chuck, which by cone action is made to grip the arch bar at any anterior location; usually a central position as seen in Fig. 83. Any suitable head gear or cap (that supplied by Dr. E. H. Angle is an excellent one) may be connected by elastic bands,



or straps and buckles, with the bow ends to produce retractive pressure on the arch bar; either supplemental to the No. 56 action, or independently of the springs.

The protrusion bow rocks on its pivot to prevent shocks when the bow ends are pressed upon by the pillow or otherwise, and also provides for unswerving pressure on the standard, which would act latero-obliquely if it rocked, instead of being rigidly gripped to the bar by the threaded chuck B, Fig. 84.

The split-chuck grips the bar firmly under retractive pressure, which when relaxed somewhat, does not detach the bow, but permits adjustive rotation and fixation of the chuck on the bar to direct the retractive force upward to counteract the

usual extension of the centrals and laterals simultaneously with the protrusive correction. It also provides for downward pressure to increase the extension, if the teeth are to be lengthened while being pressed backward,—a combined movement provided for and sometimes required.

To remove the bow, or change its relations, it is only necessary to detach the bow ends from the head cap and slip the standard from the chuck. This too is readily sprung off the bar by a slight lateral movement.

FIG. 85.

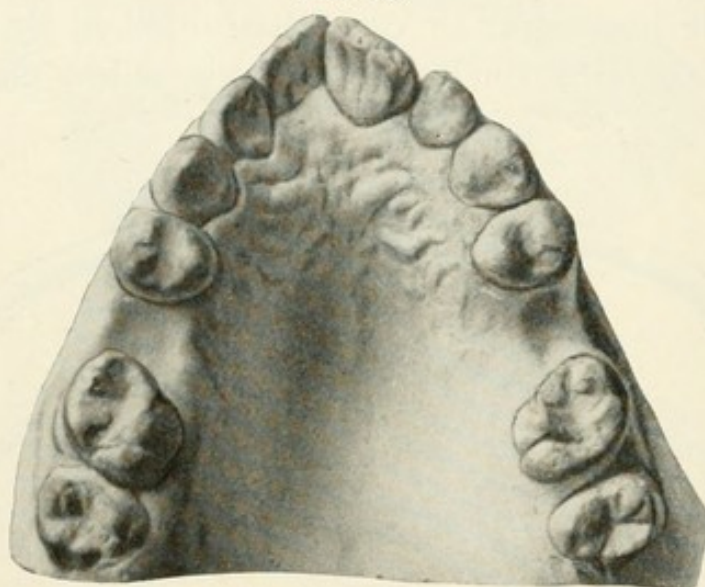
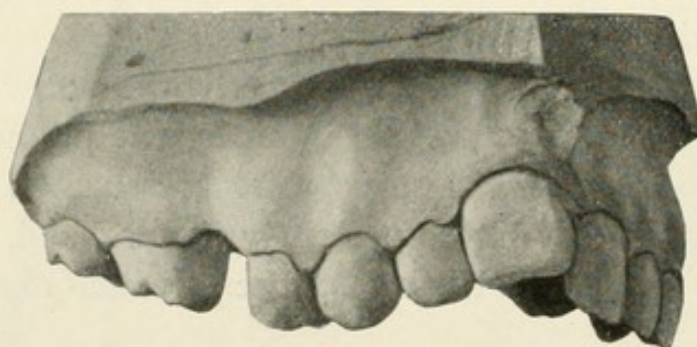


FIG. 86.

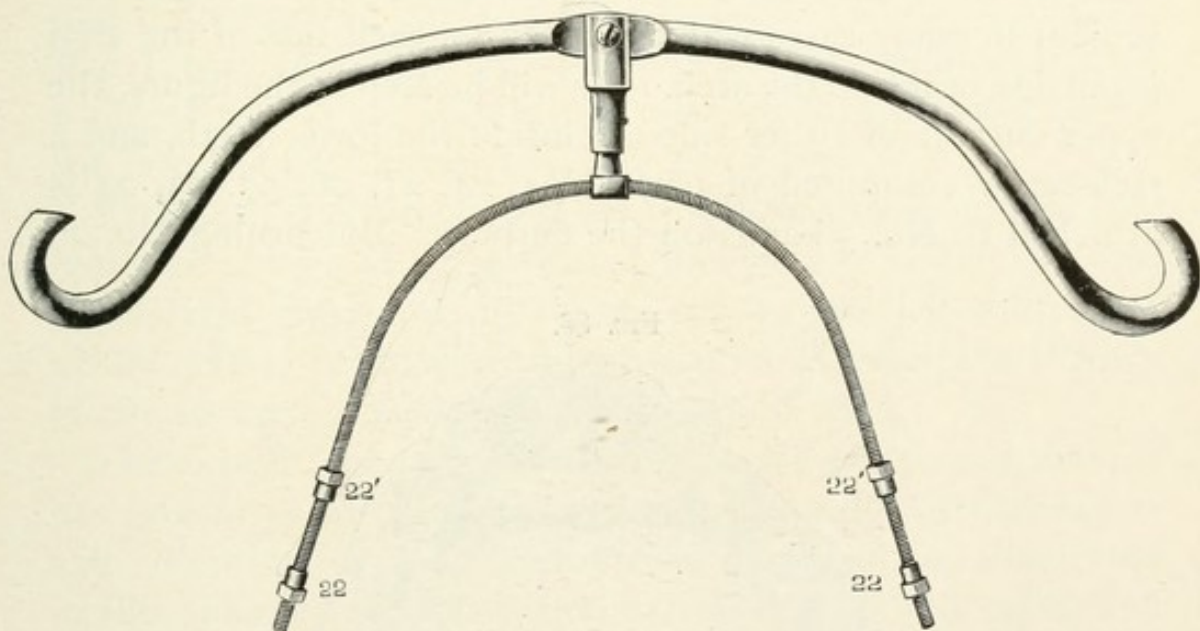


An instance of this sort of complex major protrusion is shown by Figs. 85 and 86. In this case the procedure would be as follows:

Fit and cement tight on the right central a No. 4 band, placing the stud labio-mesially, and near the gum margin.

Fix two No. 50 bands on the first molars. Place a No. 35 with four 22's on it (see Fig. 58) so that the bar will rest on the right central above the stud. Press the bar into the clutch sockets of the 50's, turning in the 22's to produce traction on the right central. Then spring the split chuck B of No. 58 onto the 35 mesially, near the stud of No. 4, slide B into its socket in the standard A of the protrusion bow No. 58, and attach to the bow hooks the elastic bands of a head-cap; that of Dr. E. H. Angle shown on page 71, Fig. 85, of the Angle System, is an excellent head gear.

FIG. 87.



(Nos. 58, 35, 22.)

By inclining somewhat backward the standard A of No. 58 and suitably adjusting the retractive force so that the lower elastic band shall draw from the lowest location on the occipital base, an eruptive action, additional to the retractive exertion, may ensue, and the central be drawn down as well as back. A yet lower line of retractive draft may be obtained by leading strong elastic bands from the protrusion bow hooks to the buttons on the chin retractor illustrated in Fig. 92 on page 76 of Dr. E. H. Angle's book descriptive of the Angle System.

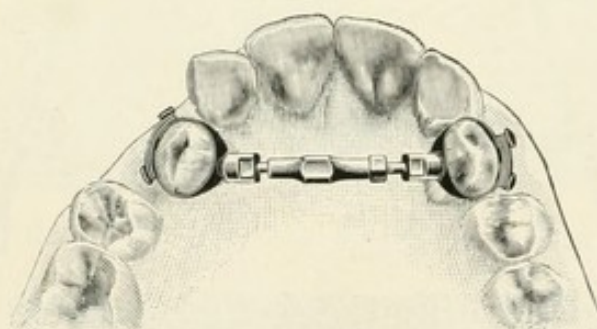
As a result of the judicious placing, adjusting, and operation of these appliances, the superior oral teeth including the bicuspids of this patient may be symmetrically retracted, and retained in their proper positions.

The protrusion bow and arch bar organization shown in Fig. 87 will serve in combination with suitable bands for cases of minor protrusion; but not seldom the supplemental hooks 55 and springs 56 of the Fig. 83 assemblage will be found necessary, as in the case of Fig. 82.

DUPLEX BALL-BAR JACK-SCREW.

The form of jack-screw shown in Fig. 88 will be found convenient in many cases where a tooth on each side of the arch is outside or inside the arch. As will be seen in the figure, the upper cuspids of either side are inside the lower teeth, and a jack-screw composed of parts Nos. 24, 21, 26, 57, 23, 24 is attached to No. 5 bands on the cuspids. By turning No. 26

FIG. 88.



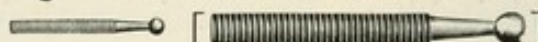
(Nos. 5, 24, 21, 26, 23, 57, 24, 5.)

FIG. 89.



(Nos. 5, 24, 21, 23, 25, 57, 24, 4.)

FIG. 90.

Right-hand Threaded Ball-Bar No. 57.

No. 57.

in the proper direction, the jack-screw will expand, and both the cuspids be forced outward into their proper positions. This same jack-screw organization will also draw into position teeth that are outside the line of the arch, and will apply to all

teeth anterior to the first molars (upper and lower). If the reach is long, No. 25, see Fig. 89, may be used in place of No. 26. This form of jack-screw differs from those previously shown in that the right-hand threaded ball-bar No. 57, see Fig. 90, replaces the short T bar No. 20; thus allowing both ends of the appliance to be attached to studded bands.

It should be carefully noticed that in the illustrations of the several separate ball and T bars, their relations to the right- and left-hand threaded nuts 25 and 26 are shown by the positional tendencies of the screw ends. For example, in Fig. 90 the screw-end of No. 57 is shown in the proper position to be screwed into the right-threaded end of 25, Fig. 89. The T bars 19 and 20 are also shown in like right positions, while 21 and 33 are seen in positions for being turned to the left into the left-threaded ends of 25 or 26.

Attention is directed to these indications to insure the correct assemblage of these related members in order to avoid inadvertent entries of right-hand screws into left-hand nuts, or the reverse procedure, which would also wreck the threads of the accurately made and adapted appliances.

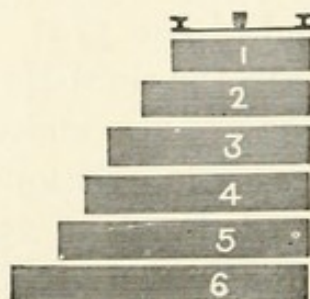
The expeditious and extensive adoption of these appliances has greatly encouraged the author to expect a further favorable reception for some later devices described and illustrated in this enlarged second edition, which is gratefully submitted for the consideration of the profession that is ever ready to appreciate any real advancement in the means and methods for facilitating the almost always perplexing problems of teeth regulation.

LIST OF NUMBERED APPLIANCES, MEASUREMENTS, AND PRICES.

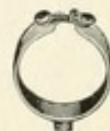
Patented January 18, 1898, January 24, 1898, September 12, 1899.

The cuts show nearly exact sizes, except those inclosed in brackets, which are magnified to show details of the small parts.

Studded Bands, Nos. 1 to 6,
inclusive,

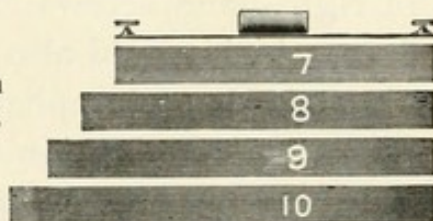


Measures.

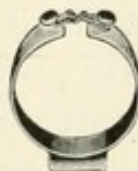


Price, Each.
50 cents.

Double Socket Clutch
Bands, Nos. 7 to 10,
inclusive,



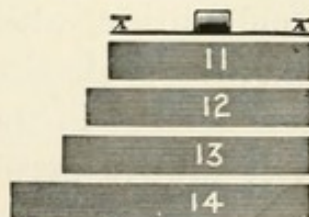
Measures.



75 cents.



Single Socket Clutch Bands,
Nos. 11 to 14, inclusive,

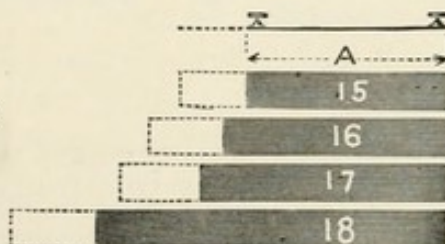


Measures.



60 cents.

Bite Bands, Nos. 15 to
18, inclusive,

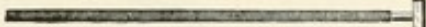


Measures.



50 cents.

The S. S. White Dental Mfg. Co., Sole Agent.

Long T Bar, No. 19,  50 cents.


Short T Bar, No. 20,  45 cents.


Ball Bar, No. 21,  50 cents.



Clutch Nut, No. 22,   25 cents.

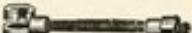
Lock Nut, No. 23,   20 cents.

Ball Cap, No. 24,   75 cents.


Long Right and Left Threaded Nut, No. 25,  75 cents.

Short Right and Left Threaded Nut, No. 26,  60 cents.



Square T Socket, No. 27,   75 cents.

Round T Socket
Clutch Bar with
Clutch Nut, No. 28,   \$1.00.



Wrench, No. 29,  15 cents.

Band Wire, No. 30,  25 cents.

Single Auxiliary T Socket, No. 31,   75 cents.

Double Auxiliary T Socket, No. 32,   \$1.00.

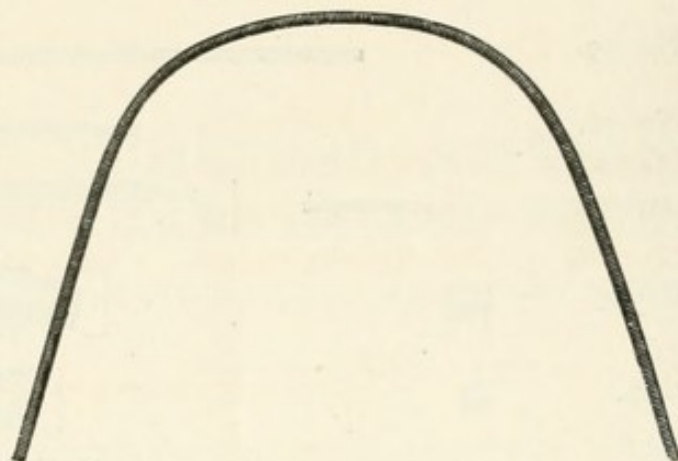
Straight Neck Ball Bar, No. 33,   50 cents.

Bar-End Cap, No. 34,   25 cents.

The S. S. White Dental Mfg. Co., Sole Agent.

Arch Bar,
Threaded,
No. 35,

\$1.00.



Perforated Stud, No. 36,



25 cents.

Retaining Clamp, No. 37,



50 cents.

Retaining Clamp Nut, No. 38,



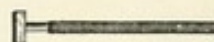
25 cents.

Retaining and
Connecting Band,
No. 39,



25 cents.

Left-hand Threaded T Bar, No. 40,



50 cents.

Screw Band, Studded, No. 41,



\$1.00.

" " " " 42,

Old Nos.



1.00.

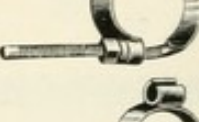
" " " " 43,

42



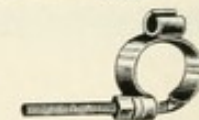
1.00.

" " " " 44,



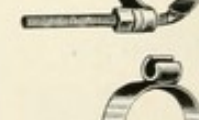
1.00.

" " Single Socket Clutch, No. 45, 43



1.00.

" " " " " 46,



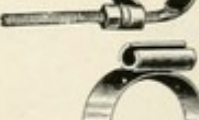
1.00.

" " " " " 47, 44



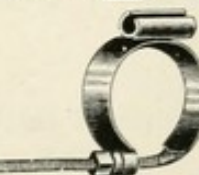
1.00.

" " " " " 48,



1.00.

" " Double " " " 49, 45



1.00.

" " " " " 50,



1.00.

" " " " " 51, 46



1.00.

" " " " " 52,



1.00.

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50 cents.

Stud Bar Nut, No. 54,



No. 54,



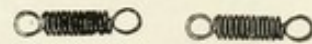
75 cents.

Bar Hook, No. 55,



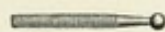
25 cents.

Spring, No. 56, per pair,



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Right-hand Threaded Ball-Bar No. 57.

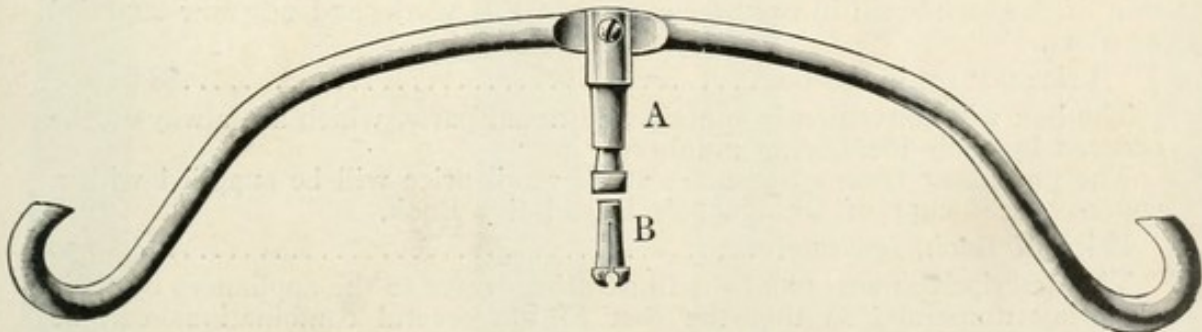


No. 57.



Price.....\$0.50

Protrusion Bow No. 58.



Price\$2.50

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A selected set in a box (see illustration) will suffice for use in many cases. It includes Nos. 3, 4, 5, 8, 20, 21, 23, 24, 25, 29, 30, 53, 54, and three No. 22.

This set contains the Stud Bar No. 53 and Stud Bar Nut No. 54, which are recent improvements for use instead of the No. 19 and No. 27 combination of the set shown in the first edition of this work, and not now supplied as a set.

Price per set in the box.....\$8.00

The box will conveniently contain additional parts, which are always to be ordered by their identifying numbers.

The purchaser from us of a set at its retail price will be supplied with a paper-covered copy of Dr. Knapp's Descriptive Book.

Price of Book, separately.....\$0.50

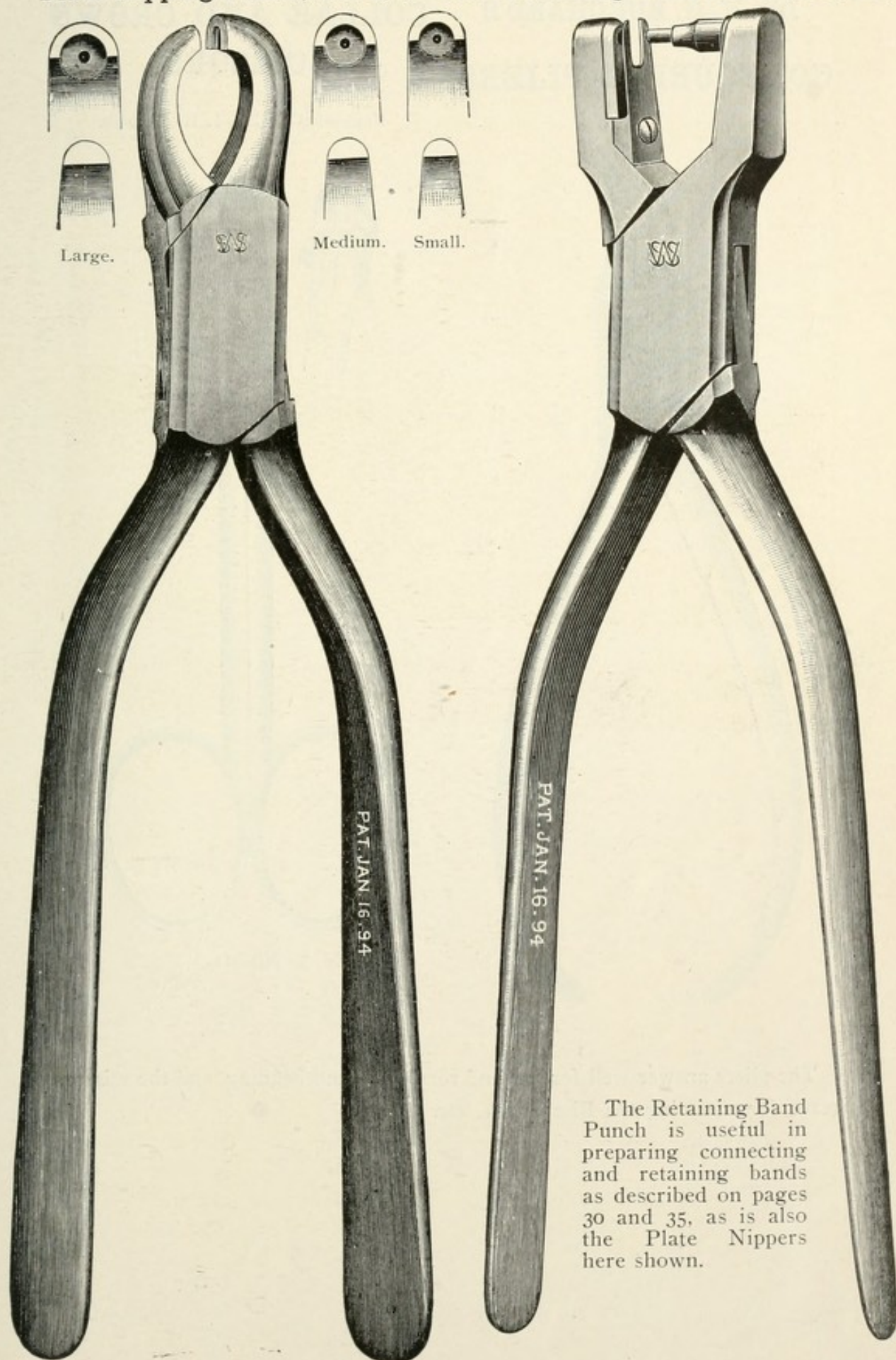
The descriptive matter and the illustrations refer to the appliances by their denoting numerals, so that the cost of the several combinations can be readily ascertained.

The devices are finely made of high grade German silver, accurately interchangeable, and electro-gilt.

Manufactured under the author's supervision.

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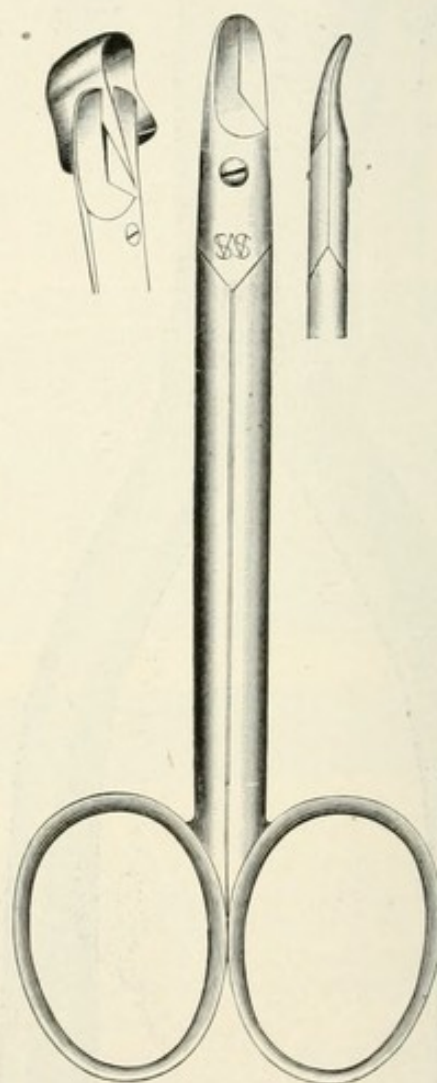
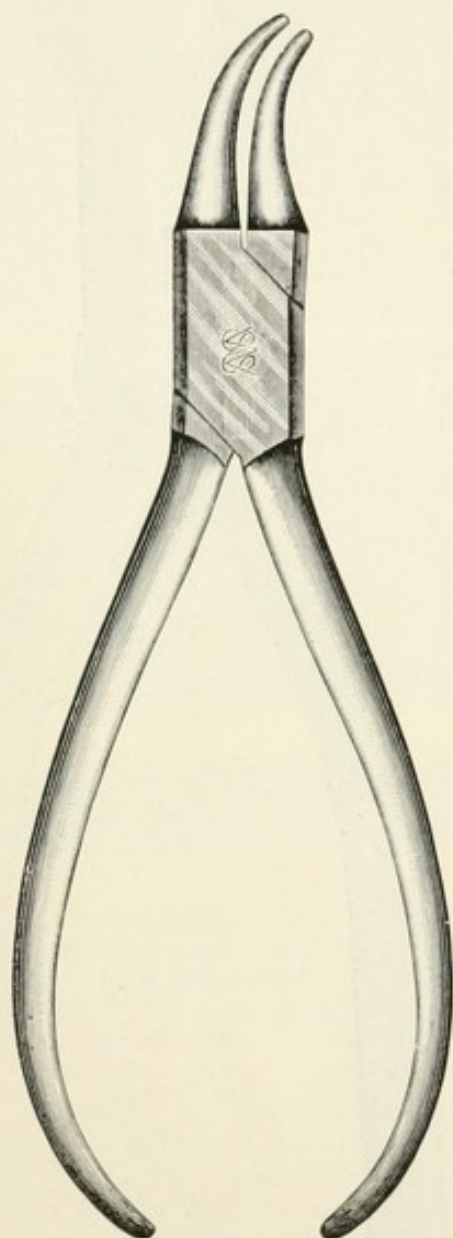
Plate-Nipping Punch, No. 3, Small. Retaining Band Punch, No. 12.



The Retaining Band Punch is useful in preparing connecting and retaining bands as described on pages 30 and 35, as is also the Plate Nippers here shown.

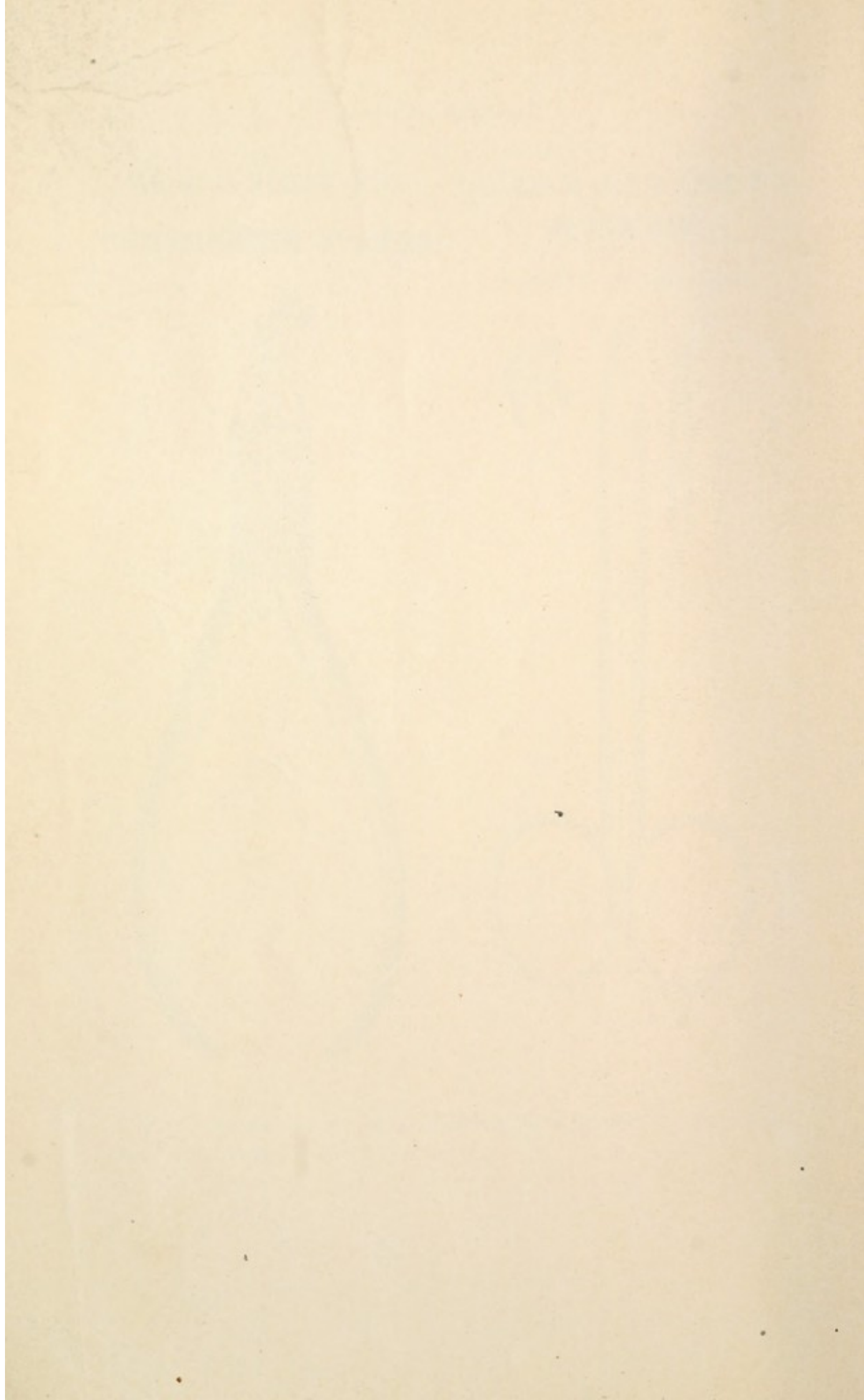
DR. H. H. BURCHARD'S COLLAR AND CROWN
CONTOURING PLIERS. SCISSORS.

Suggested by DR. J. H. BEEBEE.



No. 11.

The pliers answer well for bar and retaining band bending, and the scissors serve for trimming the Bite Bands, etc.





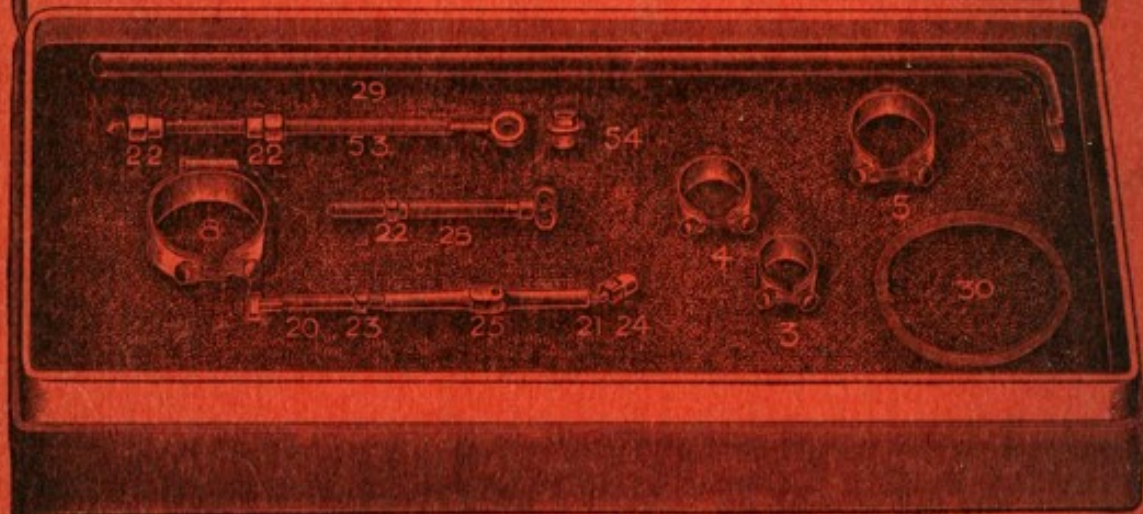
PAT. JAN. 18th 1898.

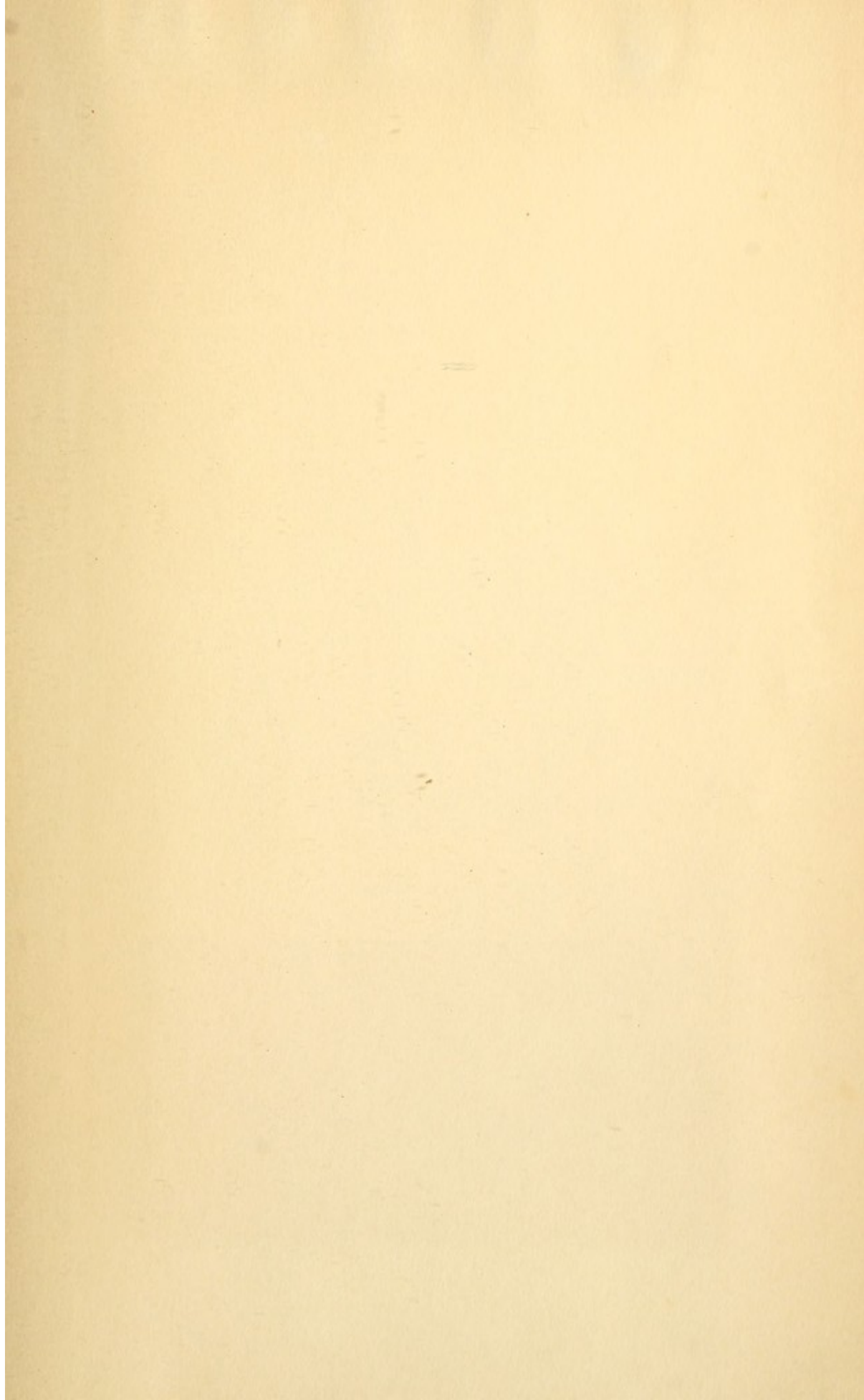
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