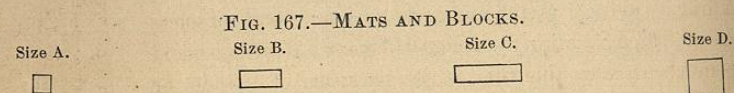


CHAPTER XXIV.

OPERATIVE DENTISTRY.

FILLING TEETH.

Filling Teeth with Gold—Non-Cohesive.—Referring to individual cavities, which shall serve as studies to direct the ingenious hand, attention is first given to such simple forms as are represented by round holes,—cavities



alluded to as being common to the crowns and sides of the molar teeth and to the posterior faces of the incisors. To fill cavities of this class, the cylinder naturally suggests itself. Selecting one of a size that will reach the bottom and extend beyond the margin, it is, after being placed, to be laterally expanded by a wedge-plugger carried through its centre, or otherwise is condensed in mass

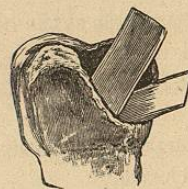
FIG. 168.



Cylinders and mats in the act of being introduced into a crown cavity.

against the wall of the cavity. The space thus secured is to be filled by a second cylinder of convenient size, the wedging to be repeated, and the introduction of cylinder after cylinder to follow, until no more can be introduced. (See Fig. 168.)

FIG. 169.



Mats in place.

FIG. 170.



The principle of wedging.

Mats are found, in the beginning of an operation, to conveniently replace the cylinder where crown cavities are large and of more or less irregular form; as in Fig. 169. These are used precisely as the latter, being carried into position by means of the foil-carrier, and condensed carefully and accurately against the immediately neighboring wall. Other mats, following the first, are to be arranged around the cavity, thus making as it were a gold tube into which cylinder after cylinder, as before directed, is wedged, or, one plate may be condensed against its fellow until in this way the cavity is full. Wedging throws apart laterally, thus insuring marginal solidity to a plug; it is the master principle of making perfect operations. Soft gold is commonly used. The idea of wedging is fully illustrated in wood-splitting, Fig. 170.

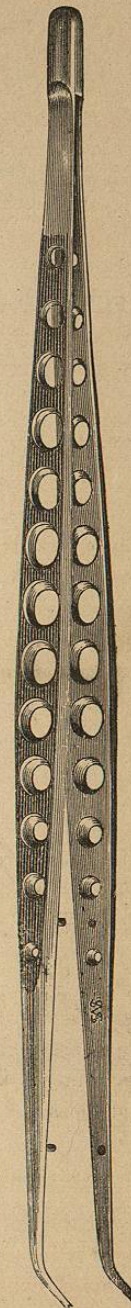
Filling a cavity with the ribbon is now an almost obsolete practice, although highly extolled by many; it is associated with much more trouble than is the use either of cylinder or mat. To manipulate gold so prepared, the operator, after carrying the initial extremity to the bottom of a cavity and fixing it by any convenient means,—generally by holding it with an instrument held in the left hand, or confiding the task to an assistant,—folds upon this first, layer after layer, making the bend at such distance above the orifice of the cavity as considers the condensation to which, later, the metal is to be subjected, and which, if properly done, is to afford a solid surface that shall not be sunk below the margin when the necessary filling and polishing shall have been completed.

Twists, or ropes, are used precisely as the ribbon, fold after fold being bent and carried into a cavity until no more will be received. It is more common to confine the use of the rope to small cavities, such as are found on the approximal faces of anterior teeth, although operators are met with who employ gold in this form exclusively.

A modification on the use of ribbon and rope, as just described, consists in wedging the centre during the progress of the filling. The operator first gets his cavity loosely filled; then, leaving the rope as related with the last fold, he wedges the gold against the parietes. The secondary cavity thus made is then filled by turning the rope into it precisely as in the first instance, the lateral pressure securing solidity.

Another study, which will serve as the demonstration of a second class of fillings made of non-cohesive gold, relates to cavities in anterior teeth, approximal faces. As the filling

FIG. 171.

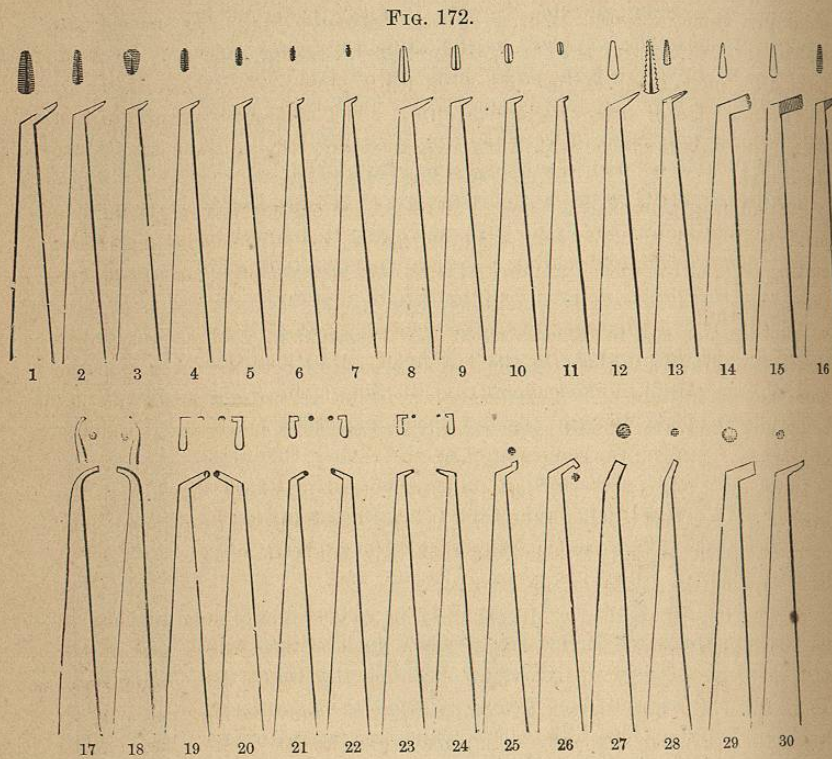


Foil-Carrier

BIBLIOTHECA

of all such cavities is on a common principle, we will take the superior incisor, Fig. 134, right side, as seen prepared.

To fill this tooth,—being made ready as understood,—the operator takes a leaf of gold, preparing with it, besides a rope, a number of mats. The mats he arranges upon his tray or table, having various sizes in such convenient rotation that, without search, he is able to pick up each as required. The rope is to be cut into small pieces. The material thus made ready, the next requirements are the necessary instruments. Fig. 172 exhibits a set of plug-



gers, designed by Dr. W. G. Redman. Possessing these instruments, an operator will find himself able to readily introduce and pack cylinders, mats, and ropes in the various cavities to which they are found adapted. These cuts represent thirty of the most approved points. They can be procured with handles to suit. A half-inch ivory or ebony handle is recommended. Nos. 1 to 7 (serrated-foot instruments) are lateral condensers for all cavities. Nos. 8 to 11 (smooth-foot instruments) are used in the same cavities and in the same manner, but not until the cavities are nearly full. Nos. 12 to 24 are all approximal condensers. No. 25 is for anterior approximal cavities, molars, and bicuspid. No. 26 is for posterior approximal cavities, molars, and

bicuspid. Nos. 27 and 28 are for crown cavities, upper molars, and bicuspid. Nos. 29 and 30 are for crown cavities, lower molars, and bicuspid.

To fill the tooth selected, the operator takes up with his foil-carrier a mat of gold of a size suited to an easy introduction into the cavity. This mat it is designed to place firmly against the neck-surface. To so direct and place it, any of the instruments, Nos. 7, 11, 27, or 28, may be employed. The first piece in position, a second is to follow, being introduced in like manner and consolidated against the first. Sometimes, particularly where the labial wall of a cavity is delicate, it is best to lay the second mat against such wall, obtaining thus increased security against fracture. Mat after mat is now added until the cavity is full; or, if preferred, the cut rope may be used, piece after piece being carried and wedged into place.

Another plan of using mats in cavities of this character consists in first lining the circumference with them and afterward wedging the cut rope into the centre.

Still another plan that is found at times convenient consists in placing one mat against the neck-wall, and a second in that portion of the cavity nearest the cutting edge of the tooth, wedging next the cut rope, or other mats, between these.

Another plan still is found in using a twist or rope of gold, as directed in the case of crown cavities, turning into the cavity layer after layer, until no more can be introduced. This formerly was the almost universal practice, being now, however, almost as universally replaced by cohesive foil, a manner of working gold shortly to be described.

In operating on a cavity of such position as has just been considered, the head of the patient is to be thrown back, the mouth looking upward. The operator stands at the right side of the chair, while the fingers of the left hand support the tooth and adjacent parts.

Passing to still another study, we consider anterior approximal surfaces of the bicuspidati and molars. Referring to the diagram, Fig. 134, it is seen that such cavities, when properly exposed, are converted into a very simple form. To fill them it is only necessary to employ the mechanical means given. Commonly the operator commences with a mat which he fixes against the cervical wall, laying one after another of these over this first one, until the cavity is full. Where the cylinder is employed, the manner of introduction and consolidation is precisely the same. In large cavities of this position it is found an excellent plan first to bound the cervical and lateral walls with mats, and afterwards wedge cylinders or mats within this golden cavity.

Posterior approximal faces are commonly much more difficult to fill than anterior. Such difficulty, however, is found markedly influenced by the preparation of the cavity and the state of the boundaries of the mouth to be operated in. A deep narrow arch with the oral orifice small and tense, and strong buccal muscular tissue, and with the patient unable or unwilling to assist by keeping the mouth open, will worry the most skilful and experienced.

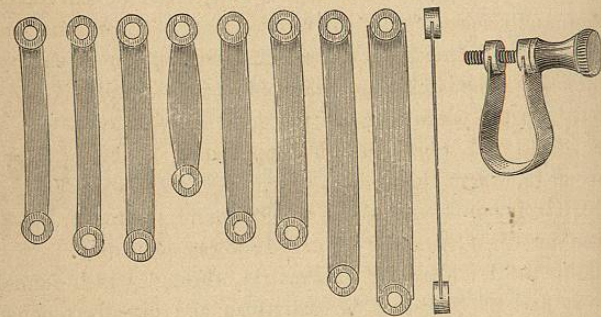
On the contrary, in the wide mouth of free and lax orifice, little more trouble is experienced than in the case of anterior faces. Such cavities are filled with the non-cohesive gold precisely as are the anterior.

The use of matrices in the construction of a temporary wall for the conversion of approximal cavities into simple holes has long been a favorite means employed by many persons. A very easy and always convenient way of making a matrix, and one which the author has employed in hundreds of cases with satisfactory success, consists in breaking off a section of an ordinary separating file having a free or uncut surface, and slipping it between the two teeth, wedging it in place. This, as must be seen, is not by any means a complete wall, but it will be found to answer an excellent end, needing, indeed, to be seconded only by a reasonably skilful touch to fulfil sufficiently the indications. Such a matrix is most conveniently used if the temper be first removed.

Another mode of making a matrix applicable to an approximal inclined plane consists in taking a delicate strip of silver, and after cutting and filing so that it shall half cover the cavity, being bulged, however, just over it, wedging it by means of splints of boxwood into place; this manipulation forms, as is seen, a limited last wall, but such wall is quite sufficient to answer the ends.

A matrix known as the "Loop" is a late device and one of much promise;

FIG. 173.—LOOP MATRICES.



a set of these consists of eight thin flexible steel bars and a milled thumb-screw. The bars have heads on each end, with eyes, in one of which a thread is cut to fit the thumb-screw. To use them, select the proper size for the case in hand, pass the head with the smooth hole over the thumb-screw, bend the screwed head around and screw to place on the tooth.

A character of matrix invented by Louis Jack, D.D.S., has attained deserved popularity; reference to Figs. 174 and 175 will afford idea of its construction. When cavities are of such extent as to very much complicate the process of introducing and fixing gold, these matrices, from what might be termed their permanent and full character, will be found not only to spare

the operator much fatigue, but to assist materially in giving form and solidity to a plug.

Fig. 174 shows that surface of a matrix which is placed next the cavity; it will be observed to correspond with the part to be restored. This face is file-cut or coarsely draw-filed. Fig. 175 shows reverse face, which is in most cases plane and smooth, excepting at the section *c*, which is file-cut. It is

FIG. 174.



FIG. 175.



FIG. 176.



often, according to the experience of the inventor, desirable to have this side in two surfaces; one, section *a*, parallel with the plane parts of the face, and from this point inclining to a thin edge. A very desirable form is to have section *c* bent backward to follow the incline of the proximate tooth beneath the gum; *b d*, show square cuts made to accord with the plier-ends shown in Fig. 176.

To apply a matrix, it is necessary first to secure space either through pressure, or preferably by means of file or disk. As well is it necessary to the performance of a preservative operation that before wedging a matrix in position the edges of a cavity, as well as the cavity itself, be so prepared that no obstruction exist to an easy reaching of every part.

Employing the Jack matrix, selection is to be made of one corresponding in curve, size, and thickness with the requirements of a particular case under treatment. For small cavities it is recommended by the inventor that the drying be first done, the napkins or dam applied, and a hard rope of bibulous paper pressed against the gum, followed by the matrix. Fig. 177 represents the appearance of the parts at this stage, except the wedges, which are not shown. When the cavity is now examined, it will be found to present an open mouth, formed by its curved lower edge of enamel and by the boundary of the matrix, through which funnel-shaped opening every part of the space is easily seen and directly touched. The case is now ready for the reception of gold.

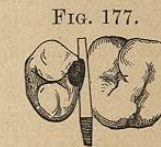


FIG. 177.

Fig. 178 represents a transverse section of two cases at a point immediately above the grinding surface, which exhibits the outline of the form of the cavity and finished surface of the gold.

Referring again to the diagram, Fig. 134, attention is directed to the filling of the very irregular crown cavities represented, two of which are shown running, upon the first molar, into the lateral walls. In filling such cavities, the operation is to be accomplished without much difficulty by introducing first into either extremity (which has been prepared as described) cylinders or mats of gold, and, after securing the fixedness of these,



FIG. 178.

packing subsequent mats or twist-pellets one after the other, until the line of association is full. It is, however, in instances of this kind that the use of the cohesive gold is felt to be almost a necessity. Working gold so prepared and understood, one would scarcely be likely to depend on the mode just described. (See *Cohesive Gold*.)

A last study that seems necessary to be made in connection with the exclusive use of the non-cohesive gold is to be directed to the cavity seen in the crown face of the wisdom-tooth, Fig. 134, right side. This cavity has a complex relation, only, however, from the fact that it is seen to be half covered by an operculum of gum-tissue. In filling such a cavity (or, indeed, rather would it pertain to the preparation of the cavity), it is found necessary to uncover the parts; to accomplish this, a tuft of cotton or sponge is to be thrust between the tooth and operculum, which tuft, in the process of swelling, will sometimes remedy the trouble by pushing the gum beyond the posterior wall of the tooth, around which it may have gathered. If the operator be not successful in this performance he is to cut the part away, using scissors or a bistoury.

Cohesive Gold.—Two leaves or portions of that preparation of gold known as cohesive, when pressed together with a moderate degree of force, will cohere so strictly as not to permit of subsequent separation.

To fill a tooth with cohesive foil, absolute dryness is essential to even a comparative success. To make ready such gold for use, if not bought sufficiently prepared, it is desirable that the operator first wash his fingers with alcohol: this cleans and dries them thoroughly. The foil is now to be cut according to the number used, being folded loosely into twists or cut into strips. Confining one's self to what is known as No. 5,—that is, a leaf of this number of grains in weight,—the manner of procedure is first to fold the full leaf ribbon-fashion, making the folds very loose, and about an inch in breadth; afterward lightly twist it upon itself. In making the twist, it would seem that nothing is more necessary than that the bright crisp and polish of the foil be not broken, while to avoid so breaking it requires only the exercise of a very little care. The twists are to be cut into pellets.

Heavier foils—those ranging from 20 to 120—are commonly used cut into little oblong squares, a delicate strip being first taken from a leaf and this strip subdivided into pieces of a size suited to the cavity to be filled. These heavy numbers are, however, confined mostly to use on the surface of a filling the bulk of which has been made by the lighter foils, or otherwise are employed for filling the root-canals,—which see.

Cohesive gold exposed to the atmosphere or to association with phosphorus or sulphuretted-hydrogen gas, loses always more or less of its quality. To restore lost cohesiveness, it is the practice to anneal the leaf, doing this either by laying it upon a heated plate or by passing it through the flame of a spirit-lamp. The amount of heat to which foil is to be subjected is found to vary considerably. A satisfactory test of cohesiveness is found in touch;

a plan is to pass the twist through the flame, and then touch to it a finger: if it stick, it is to be considered sufficiently annealed; if it do not stick, greater heat is required. A practice with many is to heat every twist to a cherry red at the moment of introducing it into the cavity; and while such a rule may be found generally applicable, many lots of foil are met with which the treatment assuredly ruins. A rule to be observed in every case is not to burn the gold and not to heat it to an extent which destroys its softness. A foil that is not made cohesive by a heat which varies from that which shall simply dry it to that which exhibits the cherry red can never be made so by any such means; it is faulty.

It is not, however, to be understood that cohesive foil always requires annealing at the hands of the operator. Many makes are so perfect in this respect, as received from the makers, that it is only necessary to keep the books in a strictly dry place, and inclosed, when not being used, in the envelopes which accompany them.

Placing foil in the rays of the sun transmitted through glass, as an ordinary window, is a reasonably satisfactory way of annealing. In cool weather concentrated sunshine answers every purpose where the gold is good.

Instruments with which cohesive gold is worked differ from those employed with the soft foil in being serrated. In the production of such tools the most accomplished skill has exerted itself, both in the way of devising forms and in securing temper. Instruments when too deeply serrated cut the gold; when too smooth they fail to assist the natural cohesiveness by addition of the quality of interdigitation. Attention, however, is to be directed to the fact that there are operators of repute who deny the necessity for serrations, and even, indeed, the desirability of using instruments so prepared, believing that cohesive gold is to be worked with better results by smooth-faced pluggers. At the other extreme, needle-points are used.

To afford the student every advantage which is to be gained without actual manipulative trial, cuts are inserted representing the instruments of serrated character most in esteem by the experienced dentists of the country. It is to be found, perhaps, that in the use of these, as with the use of the various kinds of gold, familiarity constitutes the best recommendation.

Fig. 179 exhibits perfectly the features of a set of pluggers, comprising fifty-nine instruments, designed by William H. Atkinson, M.D., of New York City, and known by his name. Although intended to be used with the mallet,—a process yet to be described,—these instruments are found adapted to hand-pressure. Lately, however, as has been reported to the writer, this set, long among the most celebrated, has been renounced by the designer, in a preference for smooth-faced pluggers. Much reputation attaches to them with the best practitioners; a too great depth in the serrations is an objection that has been urged. A set of these instruments, consisting of twenty-four pieces, selected from the full complement, is found to answer the purposes of most operators.